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## Invitation to review for Case Studies in Construction Materials

1 message

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Sat, Nov 4, 2023 at 12:43 PM

Reply-To: support@elsevier.com

To: Omar Qarani Aziz &lt;omerqarani@gmail.com&gt;

Manuscript Number: CSCM-D-23-02509

Analyzing the shear strength of RC beams while retrofitted by cement based FRP composites using ANN  
R. Byron Pipes; Tyler Tallman; Eduardo Barocio

Dear Professor Aziz,

I would like to invite you to review the above referenced manuscript submitted by Dr Eduardo Barocio, as I believe it falls within your expertise and interest. The abstract for this manuscript is included below.

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Kind regards,

Kevin A. Paine  
Executive Guest Editor  
Case Studies in Construction Materials

Abstract:

Fiber-reinforced polymers (FRP) have attracted a lot of attention as a promising solution for the preservation of existing reinforced concrete (RC) buildings. Structures could be maintained by reinforcing, repairing, or retrofitting to address seismic inadequacies. For reinforced concrete beams, shear failure is identified as the most catastrophic failure mode due to lack of failure warning. However, there is not enough information on the shear behavior of these retrofitted beams, especially in terms of the ideal design and placement of the FRP composites. This study aims to

examine the shear strength of RC beams retrofitted with FRP composites and identifies the most efficient design and deployment procedures for these composites. Artificial Neural Network (ANN) algorithm is used to enhance the precision and efficiency of forecasting the shear strength, increase the solidity and durability of reinforced concrete structures, and reduce the need for expensive repairs or replacements. Three RC beams were examined experimentally under combined torsion and shear. ANN values of RMSE = 0.466, R2 = 0.856, and r = 0.945 indicate a satisfactory correlation between experimental and numerical values, as well as the AI model's reliability. The results of each training set are near 1 when considering the R2 values, regardless of torsion or shear exposes the retrofitted T-beams. The test set R2 values of A1, A2, and AB under torsion and shear also demonstrate correct ANN performance. Fiber reinforced and the volumetric ratio of the FRP materials used, determine the final structural strength of RC beams enhanced with FRP. Higher torsional reinforced beams have a larger torsional capacity, final angle of twist, and enhanced post-cracking rigidity for a given angle of twist.

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