Analytical Model to Predict the Shear Capacity of Reinforced Concrete Beams Externally Strengthened with CFRP Composites Conditions

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Abstract : This paper presents a proposed analytical model for predicting the shear strength of reinforced concrete beams strengthened with CFRP composites as external reinforcement. The proposed analytical model can predict the shear contribution of CFRP composites of RC beams with an acceptable coefficient of correlation with the tested results. Based on the comparison of the proposed model with the published well-known models (ACI model, Triantafillou model, and Colotti model), the ACI model had a wider range of 0.16 to 10.08 for the ratio between tested and predicted ultimate shears at failure. Also, an acceptable range of 0.27 to 2.78 for the ratio between tested and predicted ultimate shears by the Triantafillou model. Finally, the best prediction (the ratio between the tested and predicted ones) of the ultimate shear capacity is observed by using Colotti model with a range of 0.20 to 1.78. Thus, the contribution of the CFRP composites as external reinforcement can be predicted with high accuracy by using the proposed analytical model.