



Modeling of Failure Mode of Shear Strengthened RC Beams with FRP Sheets Based on FE Simulation.

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Abstract:

In this paper a 3D finite element (FE) analysis was carried out to study the effects of new variables on predicting the failure mode in shear strengthened reinforced concrete (RC) beams with FRP sheets. Thirty eight specimens were analyzed by considering the effect of beam width, concrete strength, effective height of FRP sheet, FRP thickness, elastic modulus of the FRP sheet and strengthening configuration (U-jacketing, and side bonding). Experimental data of 142 beams collected from previous articles were analyzed to verify the accuracy of the proposed model. The results indicate that the suggested model can calculate the failure mode in shear strengthened with an error less than 4.27 % for debonding failure and error- free for tensile rupture, for beams having side bonding and U-jacketing. Moreover, the proposed model showed higher accuracy in predicting the failure mode in shear strengthened of RC beams with FRP sheets as compared to the existing models.

Keywords:

Numerical analysis; Reinforced concrete; Shear failure; FRP sheet; Beam.

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