

External Strengthening of RC Continuous Beams Using FRP Plates: Finite Element Model

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Abstract : Fiber reinforced polymer (FRP) installation is a very effective way to repair and strengthen structures that have become structurally weak over their life span. This technique attracted the concerning of researchers during the last two decades. This paper presents a simple uniaxial nonlinear finite element model (UNFEM) able to accurately estimate the load-carrying capacity, different failure modes and the interfacial stresses of reinforced concrete (RC) continuous beams flexurally strengthened with externally bonded FRP plates on the upper and lower fibers. Results of the proposed finite element (FE) model are verified by comparing them with experimental measurements available in the literature. The agreement between numerical and experimental results is very good. Considering fracture energy of adhesive is necessary to get a realistic load carrying capacity of continuous RC beams strengthened with FRP. This simple UNFEM is able to help design engineers to model their strengthened structures and solve their problems.

Keywords : continuous beams, debonding, finite element, fibre reinforced polymer

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