عنوان مقاله:

Strength Capacity Cracks Propagations Deflection and Tensile Enhancement of Reinforced Concrete Beams Warped by Glass Fiber Reinforced Polymer Strips

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خلاصه مقاله:

Different approaches were adapted to strength the structural elements to increase the load capacity and reduce the deformation such as deflection. The easiest and light external strengthening of reinforced concrete members are Fiber Reinforced Polymer (FRP) family such as Armed, Carbon, Glass and Basalt, respectively. This paper presents the theoretical approach to check out the experimental tests of reinforced concrete beams strengthened by glass fiber reinforced polymer (GFRP) using finite elements method by ANSYS software in which all models are simulate the tested beams. All models have the same geometry and mechanical properties but differ in GFRP layers and width. The main objectives of present work are evaluating the strength capacity, cracks propagations, deflection and tensile enhancement of reinforced concrete beams warped by GFRP strips subject to four points static load. Analysisof results indicate that the presences of GFRP sheets enhance the capacity and ductility of reinforced concrete beams in additional to delay the post crack concrete. The delay in the formation of first crack, increase in the number of cracks and ultimate loads of the models compared with the control model. There are improvements in flexural strength based on the modulus of rupture. Also, the cracks propogation become less in case of presence of GFRP and there is improvements in tensile resistance due to flexural. Analysis results inicated that the presence of GFRP at the bottom face of reinforced concrete beam in case of two layers gave increase in ultimate load ۱۰۴.۳% as compared with the control model. The reduction of the deflection for same models is ۱۰.۸۴%. Factor of the modulus of rupture range between (۰.۷۶-۱.۳۶) that is more than with ACI code suggested as ۰.۶. All model results were close to the experimental tests.

کلمات کلیدی:

Propagations Composite, Action Tensile Strength, Glass fiber reinforced polymer, Strength Capacity, Ansys, Finite elements

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