

عنوان مقاله:

Numerical Study on Flexural Behavior of Concrete Beams Strengthened with Fiber Reinforced Cementitious Matrix
Considering Different Concrete Compressive Strength and Steel Reinforcement Ratio

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خلاصه مقاله:

Concrete structures retrofitted with fiber reinforced cementitious matrix (FRCM) have become widespread due to their mechanical and durability performances. However, the behavior of FRCM -strengthened RC members under service loads is still a concern, and more efforts need to be done. In this study, a nonlinear three-dimensional finite element (FE) model has been developed to study the performance of reinforced concrete (RC) beams strengthened by (FRCM). The model was validated against the experimental results gathered from six beams tested under three-bending points. Consequently, the primary numerically studied parameters were longitudinal steel reinforcement ratio and concrete compressive strength. A cohesive damage parameters were investigated to represent the experimental results. Also, the theoretical flexural capacity of strengthened beams based on ACI-549 code was evaluated based on the numerical method results. As a conclusion, the numerical results are in a very good agreement with the experimental ones regarding yielding load, ultimate load, and failure mode. In addition, the developed models from parametric studies concluded the insignificant effect of concrete compressive strength on increasing the ultimate capacity of strengthened beam. However, the steel reinforcement ratio has a major impact on enhancing the ultimate capacity of strengthened beams.

کلمات کلیدی:

Cohesive bond models, Fiber reinforced cementitious matrix, Finite Element, Numerical Study, Reinforced concrete beams strengthening

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