

FEM Study of Different Methods of Fiber Reinforcement Polymer Strengthening of a High Strength Concrete Beam-Column Connection

Authors : Talebi Aliasghar, Ebrahimpour Komeleh Hooman, Maghsoudi Ali Akbar

Abstract : In reinforced concrete (RC) structures, beam-column connection region has a considerable effect on the behavior of structures. Using fiber reinforcement polymer (FRP) for the strengthening of connections in RC structures can be one of the solutions to retrofitting this zone which result in the enhanced behavior of structure. In this paper, these changes in behavior by using FRP for high strength concrete beam-column connection have been studied by finite element modeling. The concrete damage plasticity (CDP) model has been used to analyze the RC. The results illustrated a considerable development in load-bearing capacity but also a noticeable reduction in ductility. The study also assesses these qualities for several modes of strengthening and suggests the most effective mode of strengthening. Using FRP in flexural zone and FRP with 45-degree oriented fibers in shear zone of joint showed the most significant change in behavior.

Keywords : HSC, beam-column connection, Fiber Reinforcement Polymer, FRP, Finite Element Modeling, FEM

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