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STRENGTHENING OF BEAM-COLUMN JOINT USING FIBER REINFORCED POLYMER COMPOSITES BASED ON DEEP NEURAL NETWORK WITH OPTIMIZATION

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▼ Abstract

In the field of concrete construction all over the world, the behaviour of reinforced concrete resisting frame structures at the time of earthquakes because of its poor performance of beam-column joints. In order to improve the performance of beam-column joints, fiber is added to the concrete material. In the proposed study, two fibers are considered i.e. Basalt Fiber Reinforced Polymer (BFRP) and hybrid (Basalt and Glass) Fiber Reinforced Polymer (HFRP) to strengthen the beam-column joint by wrapping technique. In this modeling, the input parameters are taken as load, area, density, elongation break, tensile strength, and Young modulus. To enhance the performance of FRP-strengthened beam-column joint, simulation modeling is proposed i.e. Deep Neural Network (DNN). Also, to attain the optimized DNN structure, the Firefly Algorithm (FA) is represented. The performances of the two beam-column joints are analyzed and compared with existing algorithms in terms of deflection, ductility and stiffness. The results demonstrate that the HFRP specimen achieves better performance compared to the BFRP specimen.

▼ Keywords

BFRP; DNN; and FA; beam-column joint; experimentation; hybrid; simulation modeling

▼ Cite this article

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