

## Pushover Analysis of Reinforced Concrete Beam-Column Joint Strengthening with Ultra High Performance Concrete

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**Abstract :** The purpose of this research is to study the behavior of exterior beam-column joints (BCJs) strengthened with ultra-high performance concrete (UHPC), in terms of the shear strength and maximum displacement using pushover analysis at the tip of the beam. A finite element (F.E) analysis was performed to study three main parameters - the level of the axial load in the column (N), the beam shear reinforcement ( $A_v/s$ )B, and the effect of using UHPC. The normal concrete at the studied joint region was replaced by UHPC. The model was verified by using experimental results taken from the literature. The results showed that the UHPC contributed to the transference of the plastic hinge from the joint to the beam-column interface. In addition, the strength of the UHPC-strengthened joints was enhanced dramatically from 8% to 38% for the joints subjected to 12.8MPa and zero axial loads, respectively. Moreover, the UHPC contributed in improving the maximum deflection. This improvement amounted to 1% and 176% for the joints subjected to zero and 12.8MPa axial load, respectively.

**Keywords :** ultra high performance concrete, ductility, reinforced concrete joints, finite element modeling, nonlinear behavior; pushover analysis

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