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Evaluation for Punching Shear Strength of Slab-Column Connections with Ultra High Performance Fiber-Reinforced Concrete Overlay

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Abstract : This paper presents the test results on 5 slab-column connection specimens with Ultra High Performance Fiber-Reinforced Concrete (UHPFRC) overlay including 1 control specimen to investigate retrofitting effect of UHPFRC overlay on the punching shear capacity. The test parameters were the thickness of the UHPFRC overlay and the amount of steel re-bars in it. All specimens failed in punching shear mode with abrupt failure aspect. The test results showed that by adding a thin layer of UHPFRC over the Reinforced Concrete (RC) substrates, considerable increases in global punching shear resistance up to 82% and structural rigidity were achieved. Furthermore, based on the cracking patterns the composite systems appeared to be governed by two failure modes: 1) diagonal shear failure in RC section and 2) debonding failure at the interface.

Keywords : punching shear strength, retrofit, slab-column connection, UHPFRC, UHPFRC overlay
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