

Structural Performance of Concrete Beams Reinforced with Steel Plates: Experimental Study

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Abstract : This study presents the performance of concrete beams reinforced with steel plates as a technique of reinforcement. Three reinforced concrete beams with the dimensions of 200 mm x 300 mm x 4000 mm (width x height x length, respectively) were experimentally investigated under flexural loading. The deformed steel bars were used as the main reinforcement for the first beam. A steel plate placed horizontally was used as the main reinforcement for the second beam. The bond between the steel plate and the surrounding concrete was enhanced by using steel bolts (with a diameter of 20 mm and length of 100 mm) welded to the steel plate at a regular distance of 200 mm. A pair of steel plates placed vertically was used as the main reinforcement for the third beam. The bond between the pair steel plates and the surrounding concrete was enhanced by using 4 equal steel angles (with the dimensions of 75 mm x 75 mm and the thickness of 8 mm) for each vertical steel plate. Two steel angles were welded at each end of the steel plate. The outcomes revealed that the bending stiffness of the beams reinforced with steel plates was higher than that reinforced with deformed steel bars. Also, the flexural ductile behavior of the second beam was much higher than the rest beams.

Keywords : concrete beam, deflection, ductility, plate

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