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Minimum Ratio of Flexural Reinforcement for High Strength Concrete Beams

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Abstract : Current ACI 318 Code provides two limits for minimum steel ratio for concrete beams. When concrete compressive strength be larger than 31 MPa the limit of √(fc')/4fy usually governs. In this paper shortcomings related to using this limit was fairly discussed and showed that the limit is based on 90% safety factor and was derived based on modulus of rupture equation suitable for concretes of compressive strength lower than 31 MPa. Accordingly, the limit is nor suitable and critical for concretes of higher compressive strength. An alternative equation was proposed for minimum steel ratio of rectangular beams and was found that the proposed limit is accurate for beams of wide range of concrete compressive strength. Shortcomings of the current ACI 318 Code equation and accuracy of the proposed equation were supported by test data obtained from testing six reinforced concrete beams.

Keywords : concrete beam, compressive strength, minimum steel ratio, modulus of rupture
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