

Theoretical Stress-Strain Model for Confined Concrete by Rectangular Reinforcement

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Abstract : In reinforced concrete elements, reinforcement steel bars are placed in concrete both longitudinal and lateral directions. The lateral reinforcement (called as confinement) which is used for confining circular RC elements is in a spiral shape. If the cross section of RC element is rectangular, stirrups should be rectangular too. At very high compressive stresses concrete will reach its limit strain value and therefore concrete outside the lateral reinforcement, which is not confined, will crush and start to spall. At this stage, concrete core of the RC element tries to expand laterally as a reason of high Poisson's ratio value of concrete. Such a deformation is prevented by the lateral reinforcement which applies lateral passive pressure on concrete. At very high compressive stresses, the strength of reinforced column member rises to four times σ_c . This increase in strength of member is related to the properties of rectangular stirrups. In this paper, effect of stirrup step spacing to column behavior is calculated and presented confined concrete model is proved by numerical solutions.

Keywords : confined concrete, concrete column, stress-strain, stirrup, solid, frame

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