

FAILURE MECHANISM FOR CONFINED PLAIN CONCRETE COLUMN

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ABSTRACT

In reinforced concrete structures, fiber reinforced polymer (FRP) confined concrete columns is one of the most attractive techniques used, but two problems delayed its wide spread. The first is the effect of column slenderness ratio, and column diameters and heights. The second problem is to accurately calculate the ultimate confined strength. Tested results of the eight polyvinylchloride tubes (PVC) confined concrete columns are used to study the behavior of confined columns. In addition, experimental results of eight plain concrete columns carried out for comparing between confined and unconfined column behavior. The theoretical prediction of confined compressive strength by using ultimate limit state method based on computability deformations is presented. In the paper, crack propagation and modes of failure were described. Analyses of the experimental results with the effect of column heights and diameters were discussed. The cracking behavior of confined concrete during loading is analyzed. The fracture compressive strain related to vertical stresses and corresponding axial strains, and fracture tensile strain related to horizontal acting stresses and corresponding radial strains are calculated. The experimental results showed that, the radial strains distribution may be not uniform through the hoop direction of confined columns.

KEYWORDS: Composite, Concrete, Confinement, Fracture Mechanics, Theoretical Model