

Shear Behavior of Ultra High Strength Concrete Beams

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Abstract : Ultra High Strength Concrete (UHSC) is a new advanced concrete that is being transferred from laboratory researches to practicable applications. In addition to its excellent durability properties, UHSC has high compressive and tensile strengths, and high modulus of elasticity. Despite of this low degree of hydration, ultra high strength values can be achieved by controlling the mixture proportions. In this research, an experimental program was carried out to investigate the shear behavior of ultra high strength concrete beams. A total of nine beams were tested to determine the effect of different parameters on the shear behavior of UHSC beams. The parameters include concrete strength, steel fiber volume, shear span to depth ratio, and web reinforcement ratio. The results demonstrated that nominal shear stress at cracking load and at ultimate load increased with the increase of concrete strength or the decrease in shear span-depth ratio. Using steel fibers or shear reinforcement increases the ultimate shear strength and makes the shear behavior more ductile. In this study, a simplified analytical model to calculate the shear strength of UHSC beams is introduced. Shear strength estimated according to the proposed method in this research is in good agreement with the experimental results.

Keywords : ultra high strength, shear strength, diagonal, cracking, steel fibers

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