

SHEAR STRENGTH AND BEHAVIOR OF ULTRA-HIGH PERFORMANCE FIBER REINFORCED CONCRETE (UHPC) DEEP BEAMS WITHOUT WEB REINFORCEMENT

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ABSTRACT

Ultra-high performance fiber reinforced concrete (UHPC) is a new class of concrete that has been developed in recent decades, it has enhanced properties such as; very high compressive strength, improved tensile strength. In this study, three types of concrete were used based on the compressive strength of concrete, named; Normal Strength Concrete (NSC) of ($f'_c = 42$ MPa), High Strength Concrete (HSC) of ($f'_c = 63.75$ MPa) and Ultra High Performance Concrete (UHPC) of ($f'_c = 134.5$ MPa). The experimental program included casting and testing of fifteen reinforced concrete deep beams without web reinforcement (stirrups), nine specimens of (UHPC), three specimens of (HSC) and three specimens of (NSC), in order to study the shear strength and behavior of deep beams under two point loading. Considered variables were; the compressive strength of concrete (42, 63.75 and 134.5 MPa), the shear span to depth ratio (a/d) (1, 1.5 and 2) and over all depth of the beam (h) (180, 240 and 300 mm), while the width of all beams was (120 mm). The experimental results showed that the compressive strength of concrete also the shear span to depth ratio (a/d) has a significant effect on failure load, while the increase in overall depth of the beam from (180 to 240) mm reduces the nominal shear stress significantly, but beyond which no obvious size effect can be seen.

KEYWORDS: Shear Strength, Ultra-High Performance Fiber Reinforced Concrete (UHPC), Deep Beams