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Flexural Behavior of Very High Strength Concrete Beams
Reinforced with High Strength Steel Wires

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ABSTRACT

Very-high strength concrete can be obtained by minimizing water to cement ratio in combination with the use of superplasticizer for good workability. The advantages of very-high strength concrete become remarkably significant in both precast industry and cast in-situ concrete construction. However the structural behavior would be somewhat different from ordinary reinforced concrete structures. The research study was carried out to seek for a proper concrete mix with local materials for use in very-high strength concrete beams reinforced with high strength steel wires. Five beams with 10 cm. width, 18 cm. depth and 240 cm. length, were cast and tested to failure. The span length was kept constant at 210 cm. and the variable in this study was the percentage of steel, ρ , which varied from 0.0015 to 0.0051. Loads strains, deflections and crack patterns had been observed and recorded during the test to failure.

Analyses of ultimate strength of beams predicted by Nedderman's, triangular stress distribution, equivalent rectangular stress distribution showed reasonable agreement with the test results. The load-deflection response calculated by working stress method yielded good agreement for reinforcement index ranging from 0.041 to 0.061 while the parabolic distribution with strain compatibility and effective moment of inertia

yielded good agreement in the range of reinforcement index from 0.092 to 0.121. Due to low ductility, the possible service load of test beams can be as high as 44 % of the ultimate load as the maximum mid-span deflection is controlled by $\ell/180$.



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