

## Experimental Investigation on Shear Behaviour of Fibre Reinforced Concrete Beams Using Steel Fibres

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**Abstract :** Fibre reinforced concrete (FRC) has been widely used in industrial pavements and non-structural elements such as pipes, culverts, tunnels, and precast elements. The strengthening effect of fibres in the concrete matrix is achieved primarily due to the bridging effect of fibres at the crack interfaces. The workability of the concrete was reduced on addition of high percentages of steel fibres. The optimum percentage of addition of steel fibres varies with its aspect ratio. For this study, 1% addition of steel has resulted to be the optimum percentage for both Hooked and Crimped Steel Fibres and was added to the beam specimens. The fibres restrain efficiently the cracks and take up residual stresses beyond the cracking. In this sense, diagonal cracks are effectively stitched up by fibres crossing it. The failure of beams within the shear failure range changed from shear to flexure in the presence of sufficient steel fibre quantity. The shear strength is increased with the addition of steel fibres and had exceeded the enhancement obtained with the transverse reinforcement. However, such increase is not directly in proportion with the quantity of fibres used. Considering all the clarification made in the present experimental investigation, it is concluded that 1% of crimped steel fibres with an aspect ratio of 50 is the best type of steel fibres for replacement of transverse stirrups in high strength concrete beams when compared to the steel fibres with hooked ends.

**Keywords :** fibre reinforced concrete, steel fibre, shear strength, crack pattern

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