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Experimental Evaluation of Bamboo Reinforced Concrete Beams

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Abstract

The paper presents the experimental study on flexural behaviour of concrete beams reinforced with “bamboo strips”. Total 30 beam specimens were tested under four point bending test (pure bending). Three different types of concrete beams were investigated experimentally. They were concrete beams reinforced with bamboo strips, concrete beams reinforced with conventional steel and concrete beams with no reinforcement. The flexural behaviour of these beams was studied through linear stiffness, ultimate load, energy absorption capacity, shear strength and flexural strength.

There are two types of BRC (Bamboo reinforced concrete) beams having both longitudinal as well as shear reinforcement (stirrups) in the form of bamboo strips. First is with 2.8% and second with 3.8% longitudinal bamboo reinforcement with respect to the beam cross section. Analysis and comparison of different performance parameters against RCC (steel reinforced cement concrete) as well as PCC (plain cement concrete) beams is carried out. It is observed that both types of BRC beams have shown significantly higher shear as well as flexural strength than PCC beams.

However, BRC beams with 2.8% bamboo reinforcement shown less shear and flexural capacity compared to that of RCC beams. The effect of additional 1% bamboo reinforcement on shear as well as flexural strength can be clearly observed in second type of BRC beam. Failure mode observed in both type of BRC beams were different from that of PCC and RCC beams.

Keywords: Bamboo reinforced concrete, Flexural behaviour, Reinforced concrete, Bond strength, Semi rectangular groove, Surface treatment.

HIGHLIGHTS:

- Bond strength enhancement through mechanical action in treated grooved bamboo samples.
- Application of newly developed bamboo reinforcement in RC beam specimens.
- Effect of bamboo reinforcement percentage on enhancing shear and flexural strength.

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