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TO DETERMINE THE FLEXURAL PROPERTIES OF R.C.C BEAM USING DIFFERENT COMPOSITE MATERIALS AS A REPLACEMENT OF MAIN REINFORCEMENT IN A BEAM

Shubham Gour[1], Vinay Kumar Singh Chandrakar[2], Dr. Ashish Kant Ahirwar[3]

[1]M.Tech. Scholar, School of Civil Engineering, Faculty of Engineering and Technology Madhyanchal Professional University Bhopal, M.P, India.

[2,3]Assistant Professor, School of Civil Engineering, Faculty of Engineering and Technology Madhyanchal Professional University Bhopal, M.P, India.

ABSTRACT

In this thesis Comparative Study R.C.C. Beam Durability of Bamboo-Glass Fiber Mix Reinforced Polymer Matrix Hybrid Composites System Bamboo fibers show promising results in terms of concrete strength and avoid undesirable brittle failure. However, an updated assessment is needed which collects all the relevant important information and provides an easy for the reader to judge the suitability of bamboo fibers. Therefore, in this thesis is carried out on bamboo fiber-reinforced concrete to present past and recent research that was already done by another researcher. The fresh properties, structural properties, performance in elevated temperature, durability, and morphology structure are the main parameters of this review. Results indicate that bamboo fibers decreased the concrete flow like other types of fiber such as steel fiber etc. However, an increase in strength parameters was also detected with the addition of bamboo fibers. To validate our result, we used that studied on composites produced from chopped stranded use of fibers considerably improved the flexural strength of concrete, and fiber-reinforced concrete has the potential to hold on to concrete cracks and prevent concrete beams from collapsing Reliability and durability of buildings and civil infrastructure should be high. Although extensive research has been conducted on synthetic and natural color reinforcing materials over the past few decades, natural reinforcement remains an active area of research. To determine the flexural properties of R.C.C beam using different composite materials as a replacement of main reinforcement in a beam.

Key words- Fiber reinforcement, Beam Durability, Bamboo-Glass Fiber, Mix Reinforced Polymer Matrix.

1. INTRODUCTION

The general practical monetary development, efficiency, and the prosperity of a country depend vigorously on the usefulness, unwavering quality, and sturdiness of its built offices. Be that as it may, aside the natural and operational condition, the constituent materials representing the expanding instances of basic insufficiency and practical outdated nature are recorded in the constructed environment.

Weakening in solid structures is a noteworthy test looked by the framework and scaffold ventures around the world. The decay is fundamentally because of natural impacts, which incorporates consumption of steel, progressive loss of quality with maturing, rehashed high force stacking, temperature variation, solidification of defrost cycles, contact with synthetic concoctions and saline water and introduction to ultra-violet radiations. This issue, combined with amendments in basic codes expected to represent the characteristic marvels like seismic tremors or natural weakening powers, requests improvement of fruitful basic retrofit innovations. The auxiliary retrofit issue has two alternatives, repair/retrofit or devastation/remaking. Generally, the pattern inside the US development ventures has been towards the last alternative. This arrangement has turned out to be progressively unsuitable because of changing financial and social states of mind concerning existing structures. This reality prompts the need for advancement of proper auxiliary retrofit/repair frameworks.

2. LITERATURE REVIEW

Amitha S Lal et. al. (2022) Generally fibers are used to arrest cracking and strengthening of concrete. Usually various fibers are used in the concrete mix to attain the desired strength and resistance. Recently, in response to global warming issues and sustainable society, usage of natural fibers materials has become active in the developing countries. Bamboo which is low cost, fast growing, and having broad distribution of growth, is expected to contribute significantly to earthquake- resistant construction and seismic retrofit technology in the developing countries. Concrete is strong in compression but weak in tension. Properties of concrete can be improved by using natural fibers. The extent of progress depends on the type, length and diameter of fiber. The present study investigated the toughness properties, compressive strength and tensile strength of Bamboo Fiber Reinforced Concrete (BFRC). The investigation was done using 3 aspect ratios of bamboo fiber and M20 grade of concrete. The results indicate that, Toughness increase with decrease in fiber length. The optimum fiber length and diameter were found to be 36 mm and 1.2 mm.

Moe Moe Thwea et. al. (2021) The resistance of bamboo fiber reinforced polypropylene composite (BFRP) and bamboo-glass fiber reinforced polypropylene hybrid composite (BGRP) to hydrothermal aging and their fatigue behavior under cyclic tensile load were studied. Injection molded samples were exposed in water at 25 C for up to 6 months and at 75 C for up to 3 months. Tensile strength and elastic modulus of BFRP and BGRP samples have shown moderate reduction after aging at 25C after 6 months, however, they were reduced considerably after aging at 75C for 3 months. Moisture absorption and tensile strength degradation are suppressed by using maleic anhydride polypropylene (MAPP) as a coupling agent in both types of composite systems. BFRP and BGRP samples were also loaded cyclically at maximum cyclic load of 35, 50, 65, and 80% of their ultimate tensile stress. Results suggest that BGRP has better fatigue resistance than BFRP at all load levels tested. # 2002 Published by Elsevier Science Ltd.

3. METHODOLOGY

The way toward choosing reasonable elements of cement and deciding their relative sums with the goal of delivering a solid of the required, quality, toughness, and functionality as monetarily as would be prudent, is named the solid blend plan. The proportioning of element of cement is administered by the required execution of cement in 2 states, in particular the plastic and the solidified states. On the off chance that the plastic cement isn't serviceable, it can't be appropriately set and compacted. The property of functionality, in this manner, is the fate of essential significance.

The compressive quality of solidified solid which is by and large thought to be a file of its different properties, relies on numerous variables, e.g. quality and amount of concrete, water and totals; bunching and blending; putting, compaction and curing. The cost of cement is comprised of the cost of materials, plant and work. The varieties in the cost of materials emerge from the way that the bond is a few times exorbitant than the total, accordingly the point is to deliver as lean a blend as would be prudent. From specialized perspective the rich blends may prompt high shrinkage and splitting in the auxiliary cement, and to advancement of high warmth of hydration in mass solid which may cause breaking.

4. RESULT ANALYSIS

Table.1 Failure loads for beam

Beam	First crack load, Fc (KN)	Ultimate load failure, Fu (KN)	Fc/Fu	Flexural Strength (N/mm^2)
RCC beam	19	33	0.57	12.1
R RCC Beam with Glass fiber	12	18	0.67	6.4
RCC Beam with bamboo	7	7.5	0.933	3.21
RCC Beam with Bamboo & glass fiber mix	9.8	12	.73	5.45

Table 2 Impact test values

Aggregate size (mm)	**Weight of sample before testing(kg)**	**Weight of sample after testing(kg)**	**Loss in weight (kg)**
In between 10mm to 12.mm	**3.50**	**1.23**	**2.27**

In this experiment the sample of aggregate is taken of 3.50kg after placing in impact testing mold and testing the sample weight reduces to 1.23kg and the loss of weight is taking place 2.27 kg from calculation the value of impact in percentage is 35. This is suitable.

5. CONCLUSION

The following observation we did in laboratory and prepared a comparative study, and concluded that R.C.C. beam is comparatively more stable in load resisting but in comparison we can also prefer glass fiber or Glass fiber and bamboo fiber mix one as depends on load resisting requirements.

The flexural properties of the three reinforcing materials are normally distributed and their stress ratios satisfied the minimum requirement value of 1.08. The strength of Glass fiber and bamboo represented 45% and 17% of that of steel reinforcing bars respectively. Bamboo and glass fiber can only be used for lightweight RC structures.

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