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# Review on Flexural Behaviour of RCC Slab using Epoxy Coated Bamboo as Reinforcement

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***Abstract*— Bamboo is one of the potential material as a substitute for steel reinforcement. Bamboo is very cheap, easily available, and available in ample quantity. Bamboo is cultivated in farm by farmers. Bamboo is having very good mechanical properties which attract many researchers to use it as reinforcing material in concrete. From bamboo small thin strips were prepared. These strips were tied together in two directions to form a bamboo-strip- mat. All these strips while making bamboo-strip-mat was tied together with small thin Mild Steel wire to ensure their position in mat formation. Testing is done using bamboo- strip-mat as reinforcement in cement concrete prismatic section at bottom side. Concrete slab thus produced in laboratory were tested in flexure; results obtained were presented in this project. Bamboo strips were prepared from old age bamboo.**

***Keywords* - Pin-on-Disc, Taguchi technique, Tribology, Optical Microscope.**

## I. INTRODUCTION

Concrete is a composite material consisting of fine, coarse materials that are re- tained together by a cement paste that hardens over time. Lime- based cement binders, such as lime putty, were formerly common, although they were some-times mixed with other hydraulic cements, to create Portland cement concrete, use calcium aluminate cement or Portland cement. Asphalt concrete with a bi- tumen binder, which is commonly used for road surfaces, and polymer concretes, which employ polymers as a binder, are examples of non-cementitious concretes that use alternative methods to bind aggregate together. Concrete differs from mortar. Prestressing is a technique that produces known permanent stresses in a structure or element before adding a full or live load. Tensioning the High Tensile Strands, wires, or rods, which are subsequently mechanically fastened to the Prestressed component, produces these stresses. Prestressed concrete is simply concrete in which suitable magnitude and distribution of internal stresses are supplied to counteract the stresses generated by external loads to a desired amount. Cables are made of high-tensile-strength strands that have been bunched together. These wires are typically housed within the High-Tension Cable. TENDON refers to the whole assembly that includes the Anchorage and the High-Tension Cable

## LITURATURE REVIEW

1. Archila H. F. and Kaminski S.[1] This review addresses such ‘bamboo-reinforced concrete’ and assesses its structural and environmental performance as an alternative to steel reinforced concrete. A prototype three bay portal frame, that would not be uncommon in regions of the world where bamboo-reinforced concrete may be considered, is used to illustrate bamboo reinforced concrete design and as a basis for a life cycle assessment of the same. The authors conclude that, although bamboo is a material with extraordinary mechanical properties, its use in bamboo-reinforced concrete is an ill-considered concept, having significant durability, strength and stiffness issues, and does not meet the environmentally friendly credentials often attributed to it.
2. . Saheb D.N. and Jog J.P.[2] Tensile tests and micro structural analysis were conducted to investigate the impact of different corrosive environments on the bamboo composite material’s behaviour. The results revealed that the application of epoxy coating successfully protected bamboo composite material’s integrity without substantially affecting its mechanical capacity, particularly in acidic environment. Secondly, bond strength between bamboo composite material and concrete was investigated through pull- out tests. The epoxy coating improved the bond strength, especially with addition of sand particles. The findings of this study suggest that epoxy coating can be

an effective approach to simultaneously enhance the bamboo composite material's resistance towards acid attack and improve its bond strength with concrete for concrete reinforcement application.

3. Agarwal Atul and Bharadwaj Nanda.[3]
The feasibility for usage of bamboo as reinforcement in concrete is evaluated through a series of experimental investigations in the present study. First of all, tensile test of locally procured bamboo strips are conducted for evaluation of its ultimate strength and engineering properties. Varieties of adhesives such as Tapecrete P-151, Sikadur 32 Gel, Araldite and Anti CorrRC have been used for the treatment bamboo to study their effect on bond strength at the interface of the bamboo concrete composite. From the comparative study the most suitable adhesive has been selected and used further to cast bamboo reinforced beams and columns.
4. Sakaray Harish and Reddy Ramana[4] In this paper an attempt has been made for finding bamboo as reinforcement in concrete by determining the various physical and mechanical properties of bamboo. The investigations conducted for the tested types of bamboo are evaluated using the same accept criteria as that of steel. This study investigates the Moso type bamboo tensile stress, compressive stress, Modulus of Elasticity, Water absorption capacity, Shear stress, and bonding stress.
5. Ahmad Shakeel and Raza Altamash[5] To see the effect of bamboo fibre on compressive and flexure strength, bamboo reinforced Concrete cubes have been tested. On comparing the results with plain concrete cubes, strength becomes double in 50 days testing. Further singly and doubly reinforced beam with bamboo sticks have been cast and tested in

**Remark on Literature Review**

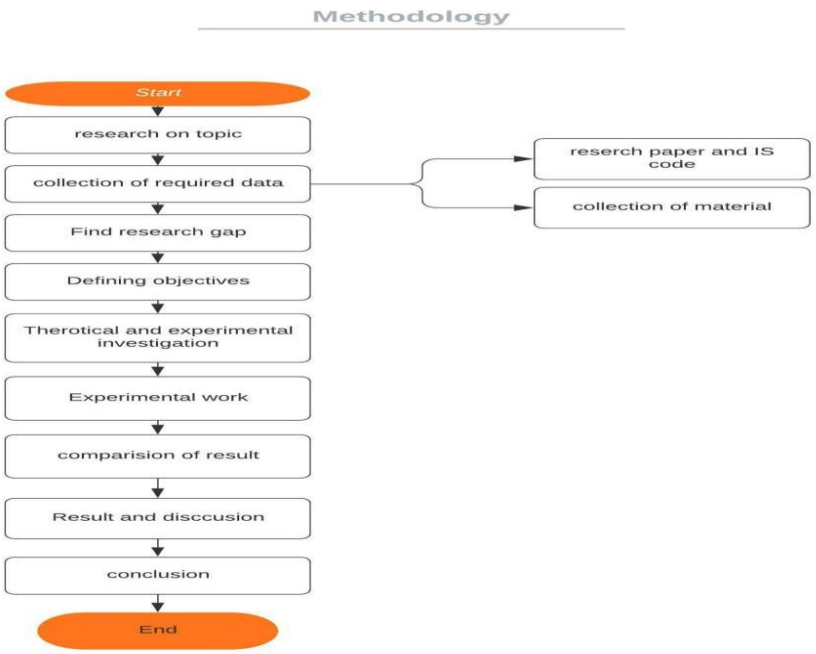
In recent years, it has been noted that researchers are primarily focused on post tensioned systems that are used in slab analysis and design. However, no substantial research has been conducted on the analysis and designof Optimization of slab by post tensioned design in slab. Post- tensioned slab thickness optimization is often done to improve mechanical behaviour, particularly bending moments, as well as to minimise strain energy of the slab, which results ina reduction in the area of the post- tensioned tendons and, as a result, a reductionin construction cost.

## II. METHODOLOGY

**Experimental Work**

The design of RCC slab and PT slab has been carried out in the proposed project work as per Indian scenario. For experimental purposes cast a prototype model which is suitable for casting, handling and testing. After the casting of all slab specimens are done and reinforced with IS 456:2000 and IS 1343:2012. All the slabs have been designed and tendons are stressed by using prestressing jack andalso testing will be done with loading frame.

Table 3.1 shows the mechanical and thermal properties of the selected materials.



## III. RESULT AND DISCUSSION

Four-point loading was applied to the slab until it failed. A digital loading frame was used to apply the load. The graphical representation of Load vs Deflection for RCC and post-tensioned slabs with optimization of slab thickness.

## IV. CONCLUSIONS

1.The deflection of pt slab is optimized up to 5% than RCC Slab
2.The moment of resistance for pt slab increased than rcc slab of thickness whereas pt slab increased

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