

## **Bamboo as a Building Material**

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**Abstract** – CO<sub>2</sub> makes up the vast majority of green house gas emission; India is the third largest in CO<sub>2</sub> emission which is causing damage to our heritage. The construction industry emits more than enough CO<sub>2</sub> to damage the atmosphere. Together it is responsible for 39% of all carbon emission in the world, to limit this problem we need to move back to the nature, a step towards eco-friendly future.

**Key Words:** Bamboo, steel, concrete

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### **I. INTRODUCTION**

Bamboo has a long and well-established tradition as a building material. Bamboo is a renewable and versatile resource. For growing nation, steel is stiff to get because of its high rate in construction industry. The growing rates of bamboo woody bushes are very fast other than any types of bush in the world. Commonly the main types of bamboo are seasoned about four to five years of time period. For rapid control of soil erosion one bamboo plants closely matted roots can bind up to six cubic meters of soil.

### **II. PROPERTIES OF BAMBOO**

Bamboo is a viable alternative for steel, concrete and masonry. It is because of its properties which are clearly mentioned below:

#### **2.1 Tensile Strength**

Bamboo is able to resist more tension than compression. The fibers of bamboo run axially are of highly elastic vascular bundle that has high tensile strength.

#### **2.2 Compressive Strength**

The compressive strength of the treated bamboo is found to be at its largest at the top section and which is slightly reduced in bottom section. The compressive strength of bamboo is roughly situated between 40 and 85N/mm<sup>2</sup>. Bamboo with low moisture content has a higher compressive strength than bamboo with high moisture content.

#### **2.3 Elastic Modulus**

The highly strong fibers in the outer part of the tube wall also work positive in connection with the elastic modulus like it does for the tension, shear and bending strength. Higher elastic modulus, higher is the quality at the bamboo. The elasticity makes it very useful building material in area with high risk of earthquake.

#### **2.4 Anisotropic Properties**

Bamboo is an anisotropic material properties in the longitudinal direction are completely different from those in transversal direction there are cellulose fibers in the longitudinal direction, which is strong and still and in the transverse direction there is lignin, which is soft and brittle.

#### **2.5 Shrinkage**

Bamboo shrinks more than wood when it loses water bamboo shrinks in a cross section of 10-16-1 and a wall thickness of 15-17-1 therefore it is necessary to false necessary measure to prevent water loss when used as a building material.

#### **2.6 Fire Resistance**

The fire resistance of bamboo is very good because of the high content of high content of silicate acid tilled up with water; it can stand a temperature of 400<sup>0</sup>C while the water cooks inside.

### **III. BAMBOO HOUSING**

As we know that Bamboo is a versatile material, it can be used for the construction of the houses whose budget is low. Today with some treatment on two bamboo it can be used for Bamboo housing, Trusses, Roofing, ceiling and also for wall construction. In many countries, low cost housing technique has been started using

bamboo, because it has reasonably good tensile strength, compressive strength, easily available or easily planted and weight to strength Ratio is high

Bamboo have used in many other purposes like decorative things, Cricket bats, etc and it's good thing is if bamboo planted then it grow immediately and used by after 5 years as Compared to RCC construction, bamboo reduces Environmental Pollution and it's hazardous effect, economically and no need extra skill labour to construct it's Tensile strength as compared to steel is less but strength to weight ratio is high. So it can reduce the cost by 60% as compared to RCC.

#### **IV. CONCLUSIONS**

1. Bamboo is easily available in nature.
2. It is economical for reinforcement use.
3. Bamboo reflects heat so the house acquires more comfortable life.
4. Cast of RCC structure is 72% more than that of bamboos structure.
5. The strength to cost ratio of bamboo is comparatively greater than that of steel.
6. Bamboo wall reduces 53% of brick wall construction cost.
7. The waste produced after dismantling the bamboo house is very less as compared to steel and RCC house.
8. A bamboo building is not only economically but also aesthetically better than bamboo house.
9. Carbon emitted per kg of steel is 1.37kg, of concrete is 0.159kg and that of timber is 0.46kg and from bamboo it ZERO, thereby we come to a conclusion that bamboo reduces carbon footprint of the structure making it more stable and durable.

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