

Use of Bamboo as Building Material

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Abstract: *The existence of wood is continuously reducing, mostly in tropical. In whole world at hot and dense divisions bamboo has a long and well-established habit for building material. So it is essential to aware about its need to whole world. Conventionally the material used in concrete is steel. Because its high cost it is essential to replace with another economic and easily available material. Bamboo is acceptable and money saving substitute of steel. In maximum divisions of world, bamboo is found durable, accepted by nature, verdant and rapid growing raw material. It is evaluated that in 14.5 million hectare region about 1400 variants grows. Bamboo is about 20 times more expansible than the steel.*

Keywords: Bamboo, concrete, reinforcement, physical properties, conclusion

1. Introduction

Nowadays, the increasing price and common reduction of reinforcement steel in maximum divisions of the world has led to increase in the probabilistic use of conventional locally possible materials for the reinforcement. Above content is of the growing nations whose about 78% settlement is in village. Nowadays, rate of steel have raised. For growing nations, steel is stiff to get because of high rates and for construction industry, application of steel presently limited hardly. The manufacture output of steel results more usage of fossil fuels, so the steel release in the construction of framework or structure has been offered, showing the possibility stiff shortage by research organizations. In village areas bamboo is mainly used for the peopling. The growing rates of these woody bushes are very fast other than any type of bushes in the world. The growth rate of bamboo plants are about 7.5 cm to 40 cm in 24 hours with a world record being 1.2 meter in 24 hours. Commonly the main types of bamboo are seasoned about four to five year time period. In production of biomass, it is also dominating biomass more than 40 tons per hectare in a year.

2. General Uses

- Used as Building Material
- Decoration purpose or Room dividing screens
- An amazing trend of bamboo is Bamboo fiber
- Weapons
- Agriculture
- Musical and other instruments
- Boards and Furniture
- Medicine
- Paper
- It is durable source of biomass for industry
- It can produce 1000-6000 cal/g for some small industries and homes.

3. Properties

• Tensile Strength

Bamboo is good in tension more than the compression. There is highly tensile strength in outlying layer of bamboo. The fibers of bamboo take more tension force than the steel, but

connection is not possible that can transfer tensile strength. Fibers of bamboo can be found with a tensile strength upto 400 N/mm².

• Compressive Strength

There is a relation of higher compressive strength value on comparing bigger bamboo tube cross section and smaller tube cross section. Tubes of similar cross section have good material property.

• Fire Resistance

In bamboo there is high content of silicate acid that shows its fire resisting ability.

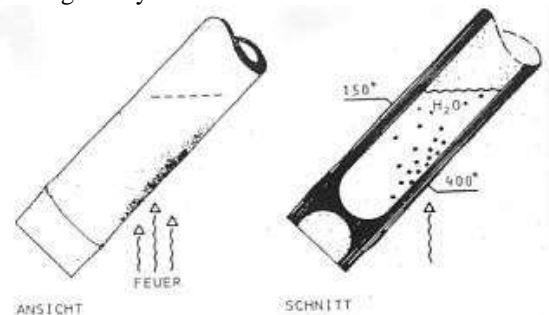


Figure: Fire resistance bamboo cane filled with water

• Shrinkage

The shrink rate of bamboo is more than the wood when it losses water. The shrink rate is 15-17% of wall thickness.

4. Construction Principles

- Bamboo less than the size of 1.5 inches should not use for reinforcement purpose.
- The criteria of clear spacing of bamboo rods should not less than maximum size of aggregate with adding 0.25 inches.
- It should be tight securely while placing the concrete with regular interval of 3 to 4 feet to prevent it from floating up in concrete.
- It has similar reinforcing design to steel reinforcement.
- In columns it resists same compressive load tat taken by concrete bamboo displaced.

- It has low modulus of elasticity; in flexural members some cracks are developed.
- When crack can't tolerable, steel reinforcement design or other designs are required.

5. Conclusion

Bamboo is material have excellent engineering qualities can be utilized housing projects. It is easily available than the other type of reinforcement like steel etc. So it is economical for reinforcement use. Many countries of the world are rich in bamboo production which is a good point for the reinforcement use having good engineering quality. In urban areas and poor areas it is very useful for construction purpose and also economical. Bamboo is weak at node section failure can occur. According to research in next few years production of steel will reduce hence the utilization of natural and eco-friendly materials should be used.

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