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Utilization of Bamboo as a Substitute Building Material

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Abstract: This paper presents the utilization of bamboo and bamboo based composites in the region of wood substitutes and building materials. BANBOO HAVE VERY IMPORTANT PROPERTY LIKE tensile strength, SHER STRENTH, BENDING STRENTH SO ITS has been assuming an essential part in the day by day life of people and community for construction of houses agricultural tools and implements, as food material, medicine. The diversified applications of bamboo such as building material will bring attention to prefer bamboo as a better substitute to wood and other materials. Bamboo play vital role for sustainable development of country Because now a days of the growing human population on our planet in combination with an increase of consumption per capita, more and more pressure is put on global resources.

Keywords: bamboo, substitute building material.

INTRODUCTION

Bamboo play vital role for sustainable development of country. Bamboos are of notable economic and cultural significance in Asia region. It is a significant source of employment for the rustic society. Bamboo is cropped in a 3 to 5 year cycle. Grows 3 times as rapid and can be collected 4 times and also as regularly as rapidly growing trees. Certain species of bamboo can achieved grow rate almost 90 cm per day. The growth rate is dependent on soil and climatic conditions.

Now a days the change of technology and limited availability, valuable woods so bamboo is important alternative in such use in industrial production as well as building materials like roof, wall and floor etc…Many agencies like National Mission on Bamboo Applications (NMBA), Department of Science and Technology (DST), Government of India are focus on to promote a bamboo as substitute as building materials Indian bamboo region produce around 432million workdays yearly. Billion of people groups overall use bamboo. Ideal utilization of Bamboo as substitutes a significant building material Like Bamboo is important Bamboo in board structure is suitable to substitute wood.

AIM

Improve a probability of sustainable development.

- Enhance advance design abilities, manufacture strategies, and testing techniques exchange
- Develop and advance environment agreeable worth included bamboo based items, practices innovation, including wood substitutes to reduce the pressure
- Improve industry-lab-user linkages for communitarian technology development
- Effect between institutional/industry collaboration, in the domestic and global fields for innovation sourcing,
- Develop small and medium enterprises.

PROPERTY OF BAMBOO

The properties as top evaluation building material and expanded accessibility of bamboo in our nation makes it possible to utilize, bamboo in the field of construction widely. Bamboo is a persisting, flexible, and practical material that individuals and groups have used for a number of years. Following mechanical properties of bamboo is generally required for use as building materials.

TENSILE STRENGTH

A tensile strength of bamboo is higher than compression because the fiber of bamboo runs axial. In the outer zone get highly elastic vascular bundle, The outstanding exploration work is contributed by Fugl-Meyer (1937)tested the bamboo as per ASTM (American Standard for Testing Materials) links utilized as a part of the development of suspension bridge and discovered their rigidity to be around 179.20Mpa. Anditis found that bamboo has a excellent tensile strength similarly a steel. Famously known as the 'black bamboo'. Has higher rigidity of the external layer Culm divider was 300.85 MPa.

COMPRESSIVE STRENGTH

The compressive STRENGTH depends on the ability of the bamboo fibers to resist longitudinal pressure. The compressive strength of bamboo increments with age and the maximum values for compressive strengths occur in specimens which are 3-5 years old it means that

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there is increase strength from the green to the air-dry condition.

Uno (1932) tentatively found that the upper part of a bamboo Culm is stronger than its center and lower segments in compression.

BANDING & SHEAR STRENGTH

The bending property of the bamboo fibers at external layers is more than that of those at the internal layers. It has an inverse relation between height and thickness. So that specific Gravity and mechanical quality in a bamboo is difference to inner and outer layer. This low shear is helpful in manufacturing bamboo strips essential for weaving or for making links, however is in the sometime disadvantageous for building development purposes.

FIRE RESISTANCE

Bamboo has high content of silicate acid. A Silicate acid has a very good fire resisting property. When it is filling up with water, it can resist a temperature around 350°C.

DURABILITY OF BAMBOO

With no protective treatment, most bamboo species have a normal common strength of less than 2 years without any protective treatment; most bamboo species have an average natural durability of less than 2 years. Stored under cover, untreated bamboo may last 4-7 years. These variations in bamboo durability strongly depend on the species, the length and thickness of the Culm and also season of crop.

APPLICATIONS OF BAMBOO

Bamboo is extensively used as a wooden substitute in construction of rural housing for ex. Laminates, flooring, panel, particle board, roofing, ceiling and insulation material, chi p board, BMB, pIy , veneer posts, walls, roofing, fencing etc. so bamboo utilized in various areas. Presently technology is accessible for commercial manufacture of items which can be changed over into wood substitutes and in addition structure application

In a structure application these include earthquake resistant construction, scaffolding and ladder, shuttering, road reinforcement network, embankment and slope protection.

Bamboo based composite products for uses in construction are increasingly in availability.

Considerable research had been undertaken by research institutes for converting low cost bamboo into valuable wood substitutes.

1) CORRUGATED BAMBOO SHEETS

This is a unique product made from woven bamboo mat Mates are soaked in adhesive resin. The dried slivers are manually woven in mats of different sizes and patterns. The bamboo mats are molded under high pressure and high temperature in a specially designed hot process with corrugated plates Bamboo sheets are durable and strong with excellent internal bond strength it is also eco friendly so it is excellent substitute of plastic and valuable wood and other building materials.

2) BAMBOO MAT BOARD (BMB)

The bamboo mats depend on woven strips, which can be woven in a wide range of ways and patterns, providing many opportunities from an aesthetic, but also a mechanical point of view, facilitating efficient load resistance and force flows .The material has great physical and mechanical properties. It is easy to make low cost paneled doors by laminating panels of BMBs and stiles and rails of these sections of wood with either gluing or nailing. BMBs can be utilized for partitions, furniture making, roof making etc.

3) BAMBOO COMPOSITES

Bamboo composite are used in combinations with bamboo products for obtaining products for high strength applications, especially for manufacturing of thick panel.

From a mechanical point of view a composite material is efficient since it combines the virtues of two materials. In case the bamboo fiber is used as a reinforcing material in a resin in the form of small sticks. The isolated bamboo fibers are not yet commercially available in high quantities and in sufficient quality. The use of resin commonly provides a longer durability to a bamboo composite as compared to regular bamboo materials, and may even facilitate use outdoors. However, the same resin which makes the material more durable makes the material as a whole less environmentally friendly. It is a variation of BMB which makes utilization of veneers from quickly developing manors, utilized as a part of combinations with bamboo mat for getting items for high strength applications, particularly to manufacture of thick panel.

Some of the typical applications of bamboo composites are:

- Pre-fabricated low-cost building products-roofing panel, wall panel, partition panel
- Pre-fabricated, low-cost bamboo composite shelter for rural housing
- Pre-fabricated, low-cost community toilet block for rural sanitation
- Pre-fabricated bus shelter, and compound wall fencing

4) BAMBOO PARTICLE BOARD

Bamboo particle board can be compared technically with the medium density fiber board (MDF) and found to be as good as the technical specifications for such use.

CONCLUSIONS

The enhanced applications of bamboo such as building material will bring attention to prefer bamboo as a better substitute to wood and other building materials. Bamboo is very important natural resource for sustainable development Because of the growing human population on our planet in combination with an increase of consumption per capita, more and more pressure is put on global

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resources, causing the three main interrelated environmental problems: depletion of resources, deterioration of ecosystems and deterioration of human health, and their effects BAMBOO IS economic building material, bamboo's rate of productivity and cycle of annual harvest higher than of any other naturally growing resource, Bamboo is a renewable and versatile resource, characterized by high strength and low weight, and is easily worked using simple tools. The increasing importance of sustainability has had a direct impact on product design 3 and product development4 approaches Value added bamboo products have huge possibility to generating income and employment especially in rural areas. Development of bamboo based new products and building design can be culturally accepted.

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