

Can Whole Bamboo Be Used For Low Cost Mass Housing Near Bamboo Growing Regions For The Urban Poor?

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Abstract - Despite the fact that Bamboo has known qualities and an established reputation of being a wonder building material it has not penetrated the urban housing market. Despite the fact that there is an acute housing shortage caused primarily due to the rising unaffordability, owing to the total dependence on conventional building materials like cement steel concrete, It has not become a popular building material even among the among poor. Bamboo houses are not preferred and as such do not seem to be socially accepted. It is ironical that people prefer to remain houseless in the hope of being able to construct /afford a conventional “permanent” house rather than to construct one out of bamboo, especially in urban areas. Alternative materials for superstructure, roofing and doors windows alone are known to reduce costs up to 40% .Substituting bricks, cement, steel, and timber alone can reduce costs up to 40%.

Keywords— Affordability, Alternative Materials, Low -Cost. Housing, Urban Poor.

I. INTRODUCTION

THIS study explores the possibility of using bamboo as one of the key building materials in the construction of dwelling units which can offer safe, durable, affordable and pleasantly accommodated in the mainstream housing market. It therefore required a thorough investigation into the finer aspects of the extent to which the material could live up to its qualities of being a handy, cheap, and a sustainable material, in the context of mass housing for the homeless in large urban agglomerations. The use of the term “shelter” has deliberately been omitted for obvious reasons.

II. KNOWING THE MATERIAL

Through literature study, secondary data, and on site data, by talking to those who have been perpetually working with

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bamboo since years, either for building houses or articles, furniture etc. also reading manuals which provide data about the specific species which are used in construction of houses.

A. Technical potential possibilities and limitations

Reading technical specifications and referring to properties, physical, chemical, understanding all the methods that have been used for countering the shortfalls/limitations in the use of bamboo for building purposes. This may involve a tactic which reviews all the best practices used around the globe to increase the durability and vulnerability of the material. It may take one into the realm of treatment of bamboo to increase its possibilities and decrease its vulnerability at the same time convert the material into handy and coveted material. Inherent qualities include Eco friendliness, being highly regenerative, possessing high tensile strength. Finally, one would believe that, it being a low cost material should attract at least the millions of homeless. However statistical data reveals that even this has not been happening.

B. Codes and policies currently in existence

This may involve interviews with the bureaucracy, personnel from various Govt. and non Govt. organizations, secondary data, about the origin, purpose and objectives of the policies and also the effectiveness of such policies during their implementation and the machinery that has to be put in place before they can be made public. Also about the system by way of which such policies trickle down to the target group which is most likely to use this alternative technology.

C. Innovative breakthroughs and best global practices

This may involve examining the works of bamboo users in other countries (Through internet or liasoning with academicians, practitioners in other countries) for construction details used in their dwelling units and also picking up minute innovations made by them in the use of material or even something as small as developing a new joinery detail. This way can effectively be used for creating a knowledge base for integrating and/or drawing parallels for use in similar situations. Some of the best practices used elsewhere can even be directly lifted / duplicated if they have proved to be useful in that specific location on the world map.

land creating an artificial freeze in the land market. This would create an imbalance in the demand and supply for public projects and lead to unwarranted increase in land prices.

B. Bamboo Reinforced Concrete

While analyzing case studies it was observed that bamboo dwelling units have comfortably gone up to Ground + 2 floors, and even appeared like conventional houses. However it was found that in these houses, bamboo had been used as a replacement to steel in Reinforced Concrete.

Since steel constitutes a major part of the cost for the structural components it implied that the research be realigned in order to eliminate or minimize the use of steel for the key structural components of a dwelling unit. The research intention was to harness the tensile strength of bamboo.

C. Ideal for short span building typologies

Large spans are not possible in bamboo; hence it would prove to be ideal for a small dwelling unit.

D. The Revised Scope of the Research

The scope of the research is narrow and deep, restricted to identifying that very specific template treatment process that can convert bamboo into a suitable reinforcement material in concrete for structural elements in a humble dwelling unit.

E. Resolution of Primary Issues

The primary issues and concerns are resolved. Why bamboo construction is not popular even despite its qualities required for structural members in tension.

F. Limitations and Potentials

Given its limitations and potentials, how can best harness its potentials, and counter its limitations.

G. Detailed analysis of Individual Structural Components

Detailed analysis of beams, slabs, columns and walls, using Bamboo Reinforced Concrete has been undertaken. In this way steel may get replaced in the key structural elements of a house.

H. Comparison between SRC and BRC

Later a comparison will be made showing the percentage saving in the cost of two similar houses, had they been reinforced with steel and bamboo respectively.

In the conclusion of the main study (of which this paper is only a part), some guidelines or a national level (special area) policy / strategy will be proposed.

The objective of the analysis is for making a house thus designed, to become a part of the mainstream housing, with a limited agenda of a) Streamlining the financial/ administrative /local level machinery so that special bye laws are framed for dwelling units using bamboo for their construction. These could extend over seismic zones which may have bamboo readily available b) Special relaxations in criteria for housing finance for bamboo houses meant for the urban poor to increase access to loans cross subsidy and property insurance

etc. c) *Training for pre-processing / treatment and customizing bamboo for its use as reinforcement.*

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BIOGRAPHY



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The Title of the Thesis is: Investigating the Prevalence, Relevance and Appropriateness of Bamboo Technology for Housing in India. The Study is currently at the stage of ABD (All but done). It is a qualitative research; few of the findings even as the research is in progress, are of great relevance to the Profession.