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Engineering & Technology in India www.engineeringandtechnologyinindia.com
Vol. 1:5 December 2016
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An Organisational Study about Eco Friendly Structure

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Abstract

The diminishing wood resource and reduction in natural forests, particularly in the tropics, have focused world attention on the need to identify a substitute building material that should be renewable, environment friendly and widely available. In view of its rapid growth, a ready adaptability to most climatic conditions and properties, superior to most new fast growing wood, bamboo emerges as a very suitable alternative. This paper deals with some of the main properties and the major uses of bamboo and its culms. It also recommends on the various preservation techniques to be adopted in order to enhance the durability and various Indian Standard codes (IS codes) for bamboo and bamboo products.

Key Words: Green building, low carbon building, green house effect, Eco-friendly construction.

Introduction

When the need for a new structure arises, an individual or agency has to arrange the funds required for its construction. The individual or agency henceforth referred to as the owner then approaches an architect. The architect plans the layout so as to satisfy the functional requirements and also ensures that the structure is aesthetically pleasing and economically feasible. In this process, the architect often decides the material and type of construction as well. The plan is then given to a structural engineer who is expected to do locate the structural elements so as to cause least interference to the function and aesthetics of the structure. He then makes the strength calculations to ensure safety and serviceability of the structure.

This process is known as structural design. Finally, the structural elements are fabricated and erected by the contractor. If all the people work as a team then a safe, useful, aesthetic and economical structure is conceived. However in practice, many structures fulfill the requirements only partially because of inadequate coordination between the people involved and their lack of knowledge of the capabilities and limitations of their own and that of others. Since a structural engineer is central to this team, it is necessary for him to have adequate knowledge of the architects and contractors work. It is his responsibility to advise both the architect and the contractor about the possibilities of achieving good structures with economy.

Other Eco-Friendly, Energy Efficient Product Choices

While affordable eco-friendly alternative carpets and rugs can be purchased and installed, the most eco-friendly flooring option is usually to avoid their use altogether. Better flooring choices include the aforementioned cork or bamboo, hardwood from Forest Stewardship Council (FSC) certified forests, recycled glass tiles, and natural, hypo-allergenic, biodegradable linoleum. There are other interior product options that qualify as green material, too. Better for house occupant s health and their pocketbooks; enhancing the home s eco-friendly design, positively impacting the environment. Including:

- Lightweight concrete countertops, made from recycled newspaper and fly ash
- Walls finished using non-toxic eco-friendly paint
- Energy efficient lighting such as fluorescent lighting or the use of solar energy (note: in some provinces a solar energy rebate or else solar energy grants might be available)
- Energy smart appliances such as an energy efficient water heater or refrigerator
- Kitchen cabinets and furnishings free of formaldehyde a toxic chemical that causes off-gassing, widely used to manufacture building materials and various household products
- The use of an exhaust fan over the stove, to remove carbon monoxide and other gases
- The use of bathroom fans and ventilation to remove water vapors, reducing the risk of mold and mildew

- The installation of properly filtered ventilation systems to remove dirt, dust, pollen, and other pollutants.

It might also be well worth the expense to hire a building envelope consultant or indoor air quality consultant to assess your home and help find ways to conserve energy and make your home more eco-friendly.

Features of Ecological Building and Some Techniques

In more conventional building construction, it is how technology and building materials merge and create ecological resources that are the key to green success, as well as using simple and readily available materials.

For example, using pulped recycled paper for roof insulation is a simple but highly effective ecological resource. The damage to human health from asbestos insulation, laid out in rolls in thousands of UK homes, is now well known. Asbestos also takes hundreds of years to decompose in landfill.

Other features of an ecological building might include:

- The varied use of solar panels for domestic hot water heating,
- Water conservation, possibly including biological waste water treatment and re-use, and the simple collection and recycling of rainwater for garden use,
- Low energy lightbulbs, which can last up to 100 times longer than regular bulbs,
- Cellulose insulation (like the paper in the above example),
- Non-toxic or lead-free paints and wood preservatives,
- Locally-grown and harvested timber from sustainably managed forests.

The Range of Ecologically Built Structures

Many options are now available to those wishing to design and build an eco-friendly dwelling. Architects, engineers and builders worldwide are now using construction techniques that have been developed throughout human history, in response to local environmental concerns

and the physical resource opportunities available, coupled with 21st century technological refinements.

These range from rammed earth construction, which involves clay-based material mixed with water and then rammed into brick or solid wall form, suitable in hot and dry climates, to straw bale houses, literally using bales of straw as the core structure. Straw is a great insulator, is a breathable material that filters the air passing through it, and contrary to expectation, is fire-resistant when compressed. And it is low cost.

Other options are so-called earth ships, which use recycled car tyres filled with earth as the buildings walls, or Yurts or Gers, the semi-permanent nomadic tents of Inner Asia, that utilise local wood, wool and canvas, to literally live on, with the land. These examples can be seen as development that has a low impact upon the environment, which utilise and blend in with the local environment, and could be dismantled and moved easily.

Find Examples of Ecological Building

Local Councils and Housing Associations in the UK are now exploring the benefits of ecological construction, and estates constructed on these principles have been built in Edinburgh, in the Cambridgeshire village of March, and several in London.

An interesting project in the capital is BedZED, in the borough of Sutton, which utilises solar heating and heat given off by the occupants, combined with a small power plant using wood off-cuts, to heat and power each house, and achieves zero carbon emissions.The estate was planned to be built with materials that were sourced from within 35 miles. This development consists of 82 housing units, owned and managed by the Peabody Trust. It is a great example of a sustainable development building estate, combined with the principles of social housing.

To provide inspiration to those of us who want to build ecologically, many UK regions have a demonstration eco-house as a feature within a local Centre for Sustainability, such as The Centre for Alternative Technology, near Machynlleth, Wales, the Create Centre in Bristol, and at

the Findhorn Foundation, near Forres , Scotland. These are all set up as educational centres with ecological and sustainable development at their core, which offer eco-construction courses and advice.

Other European Countries, particularly Germany, are making eco-construction a national priority, as part of a Governmental response to sustainable development. Currently, there is no Internationally-agreed target for reducing carbon emissions, but several Governments and Non-Governmental Organisations (NGO's) are recognising that the built environment plays a huge role in this.

There are now many examples of eco-building around - from simple designs to elaborate constructions. They can be a challenge to conceive and create, but by doing so, we benefit from being in them, and the Environment appreciates it too!

Literature Review

In the 21st century greenhouse gases discharge resulting in climate change (basically carbon dioxide) in the environment (CE Report & EB Report, 2015), is being marked as the biggest challenge (Perez-Lombard et.al. 2008). In the overall greenhouse gas emission the infrastructural sector hazs been recognized as the most outsized contributor (Per-Anders Enkvist, Thomas Naucler and Jerker Rosander, 2007, IPCC, 2007, Nicholas Stern, 2008). Statistics shows that global energy (UNEPSBCI, 2009) consumption in residences, commercial areas, and other buildings (Horvath, 1999) is above 40%. Electric equipment are being used for conditioning the buildings and so the energy consumption is acute (Harvey, 2009). The prediction projects that as India and neighbor countries are in the moderate level the figure will be double (UNEP Kyoto, 2008). It indicates that within 14 years major ecological threats will come for the over populated nations as well as imbalanced unstructured building.

Living in a life hazardous place is not expected by all. Green building or eco-structure construction has become major topic (Olanrewaju, 2011) for the property industry (Robinson, 2007). Today; unlike traditional buildings “Green” building has gained popularity in

environmental (Zigenfus, 2008 & Edwards, 2011) and health perspective which consumes major natural sources like energy, water, substances, and surface with more efficiency. Incr efficiency (EPBD, 2002), can have large effects on life-cycle of building. With the demand of developed countries (Matthew E. Kahn, 2009) and sophistication of developing economies (Edward L. Glaeser and Matthew E. Kahn, 2010, Siqi Zheng et al., 2009) the energy efficiency in building will significantly increase with time. Green buildings or sustainable building (EPA,2013) or 'green potential' (Ben Avraham & Capeluto, 2011) involves using sustainable methods (Berardi ,2013) and materials for planning and structuring properties (or in existing properties renovation) and operations, where the aim is to lower operations and maintenance costs including energy efficiency (EPBD,2002) in lighting technologies and air quality, redeveloping brown field sites, or using green roofs that allow for runoff water to be recycled and also contribute to enriched workforce and student fitness, comfort, and productivity. The global environmental discourse and guiding ecosystem protection (Walsh, 2004; EPA, 2008), reduction or elimination of the negative impact of buildings (LEED, 2004) are being dominated by sustainable development. Though the average additional costs of green buildings require an amount, the advantages of those buildings are comparatively ten times higher. (Kats, 2003; Wiley, 2008; Wiley et. al, 2010).

According to Karlenzig, 2005; the procedure of creating buildings and supporting infrastructure is referred to Green buildings that: 1) makes a decrease in resource usage, 2) decreases the negative effects on the environment, and 3) ensures well-conditioned environments for people Cost savings, developed human performance (including productivity and health), and increased social value (Nalewaik and Venters, 2009) are connected with Green Buildings. Presently people are more concerned about climate change, cost and lack of resources, health issues so they are emphasizing in Eco-structure building (USGBC Report, 2008).

According to Federal Environmental Executive of U.S. (2008), "Eco-structure building has developed as a holistic approach and practical answer to the environmental and health burdens of the conventional built environment". Green buildings not only have some commercial

benefits, but also have some social and environmental advantages (Yap, 2007). According to one federal report, eco-structure can also be defined as: "the practice of (1) maximizing the efficiency with which buildings and their sites use, generate and recycle energy, water, and materials, and (2) minimizing – and ultimately eliminating – buildings' impacts on human health and the environment, through better sighting, design, construction, operation, maintenance, and removal—the complete building life cycle". Recycled, recyclable and non-toxic are used to build the Eco-structure buildings in order to lowering the effects on environment. (Ng, 2008) It is important to keep in mind, a building constructed today will realistically still be standing and in use at least For the next fifty years or more from now (Jablonska et al., 2010) we will be using the buildings constructed today. From the production to the demolition a building's 10-20% energy consumption depends on the whole process including manufacturing, construction and renovation.

Importance of Green Design & Construction for a Better Tomorrow

Sustainable buildings have been the way of life in India for centuries. All the ancient structures were skillfully built, using locally available resources and incorporating features in harmony with Nature.

All our ancient places of worship, palaces & homes were conceived and built as Green Buildings. For instance, The Kashi Vishwanath Temple in the City of Varanasi, and The Taj Mahal in Agra, are excellent examples of this approach.

Conclusion

While managing urban growth, urban expansion and urban development, Bangladesh faces enormous challenge. To battle climate change, reduce energy bills, and diminish our reliance on fossil fuels it is mandatory to construct new eco-friendly projects, renovate existing construction in ecofriendly buildings which will also lower the cost. In an up growing trend of population, it is obvious to follow eco-structure for our well-being. Goals of eco-structure construction can be attainable if there is cooperation between the public-private partnerships. By embracing the future and the change it will bring, we will achieve a balance between ourselves,

our lifestyles, and our environment. Though Bangladesh will be an urbanized country in demographic statistical term in less than four decades from now, but the nature of urbanism in the future remains rather indefinable. Political and cultural bindings, the threat of the climate change phenomenon and the crisis of governance at the national as well as urban local levels, all tend to make one feel uncomfortable, to state the least. Though we are facing acute urbanization problem, we have the hope to grow up with eco-constructive city within a few decades.

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