Journal of Advances in Science and Technology
Vol. 19, Issue No. 2, April-2022, ISSN 2230-9659

DOI:

Study of Construction Material for Energy Efficient Building

Exploring Sustainable Construction Materials for Energy Efficient Buildings

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Abstract: In India various tremendous environmental problem are rising in construction industry due toleading urbanization. Increasing demands of housing sector which lead to consumes more energy,resources and raw materials which are responsible for the rise in carbon content in air and which areharmful to environment and human health. Nowadays we are facing various environmental impacts dueto which we need to build with more sustainable materials which will lead to reduction of impacts onenvironment. In cities like Pune we are already noticing the change in weather patterns, hotter summers,shorter winters, insufficient monsoons. So taking the preservation of the city's ecology and finite energyresources seriously is now more than important.Developers need to find better, more sustainable methods of designing their buildings in order to reducetheir negative environmental impact. Therefore it is need of hour to use more sustainable methods andlocally available materials which are eco-friendly and a lead for better tomorrow. Considering to all thisimpacts this paper consist a five green construction materials with their advantages, disadvantages,durability and economical aspects in construction industry which can be an effective alternate materialfor conventional materials.

Keywords: construction material, energy efficient building, environmental problem, carbon content, sustainable materials, weather patterns, finite energy resources, sustainable methods, locally available materials, green construction materials

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INTRODUCTION

Buildings are actually responsible for maximum resource consumption therefore green building is an effective solution to the present construction. Green building is described as people with healthy, comfortable and safe living, working and activities of the space, while the building full life cycle (material production, construction planning, design, construction, operation and maintenance) process to achieve efficient use of resources (energy, disabilities, the water, materials) with minimum impact on the environment of buildings, also known as eco-building, sustainable architecture.

The green building uses materials which are locally available energy efficient, sustainable, and durable. Material such as lime which reduces carbon foot print as compare to cement in the building construction. Using lime in building it absorbs carbon rather than emitting which also lead to reduce hazardous impact on environment.

METHODOLOGY

As the energy required for manufacturing of cement and other construction material is more so it is major contributor to the consumption of our total energy source. Using such materials described below with their benefits towards environment. Following are the materials which we have selected looking in to their local availability, benefits, cost and durability.

1. Lime

Lime is our chief material which replaces the cement in building construction. It gives the good air quality by absorbing the carbon and emitting oxygen in the atmosphere. By looking at the ancient construction we can make it out the durability of lime in terms of quality and life of it as it get strengthen by time to time.

2. Sand Lime Bricks

Sand Lime Bricks replaces the conventional bricks in the market of construction industry. The main constituents of sand lime bricks are sand, lime, fly ash, water. Using sand we can achieve the adhesiveness to hold the particles together. Its brittleness helps us to recycled it and reuse in other works.

3. Eco-Friendly Tiles

An Eco-friendly tile replaces the conventional flooring and uses less energy in their production. It is cheap as compare to the conventional tile. They are available as per the client requirement in various patterns and also easy to place. This tile improves performance of indoor environment quality.

4. Coloured Lime Plaster

Though low VOC (Volatile Organic Compounds) paints are available but by using coloured lime plaster as paint it reduces the painting for whole structural life. It is maintenance free, washable and water proof. Its shine and glossiness increases as the time passes. It gives better aesthetics look than conventional painting work.

5. Reflectasol Glass

Reflectasol glass gives better indoor quality than the normal clear glass. It keeps the inner temperature cool in hotter summers which reduce the energy consumption. This glass reduces the solar heat gain but allows the optimum lighting through the day which reduce electricity load. It is a good resistant of U.V rays which reduces the cause of skin retention of occupants. It also gives privacy as compare to the normal clear glass.

Environmental benefits-

By reducing the impacts of construction on environment through energy efficiency, water conservation, waste reduction, and use of environmentally-friendly materials. Smart strategies can improve air and water quality, facilitate redevelopment of contaminated properties, and preserve open space.

Economical benefits-

Studies show that installing green building technologies can be cost-efficient in the long run. It can create jobs and expand the local tax base to create economically competitive communities.

Development plan also allowing extra FSI to the developers and some extra discount in registration to customers for successful implementation to the route level. of life of users.

Social benefits

Improving indoor environmental quality results a healthier environment for the occupants of a building, which may help increase their productivity. Sustainable development using ecological enhancement serves communities by preserving green space and creating opportunities for environmental education. It creates healthy communities by creating a cleaner environment and builds stronger neighbourhoods that create a greater sense of community.

For the present Study some of the specific conclusions are as follows

The current study focuses on various criteria and mandatory requirements according to the various Green Building certifying codes where five credits were focused namely, Site Facilitation, Water efficiency, Energy efficiency, Health & Comfort and Innovation to make building sustainable

Though India is a country whose footprint for sustainable development is second in the world, awareness at root level is very less. For awareness, sustainable awareness programmes should be carried out at root level.

To get certified for new building from various agencies is to facilitate a holistic approach to create environment friendly building through Sustainable Architecture and Design, Site Selection and Planning, Water Conservation, Energy Efficiency, Building material and resources, indoor air quality. There is need to work to minimise the initial cost of green projects.

One of the strongest aspects of nationally certified building is its design. All the systems are integrated in a way so that they can function as naturally as possible. It is the most economical aspect in the green building which does not add to extra cost and it saves 30 percent energy consumption.

From the detailed case study of nationally certified building, it can be concluded that there will be a tremendous saving in the electricity bills per year which will ultimately save the natural resources. It saves coal require for energy generation and reduces CO_2 emission.

For small and medium scale projects having limitations to adopt such practices like a systematic cost analysis has not been done after final design and prior to actual construction phase. This problem can be overcome and improve through implementing project management policies like Fixed Ratings System Implementation, Policy Adjustments, Economic and feasible Changes.

Green building practices is not a mathematical formula or any thumb rule that everyone anywhere can achieve same self sufficiency and energy efficiency. But it is depending upon the yearly environmental condition which is not same everywhere throughout the year. Also it is depends upon existing built environment, available sustainable materials, smartly planning designing, construction and maintenance of

building through pre-construction activities, construction activities and post construction activities

FUTURE SCOPE

Green building reduces the impact on environment and indirectly helps to reduce the global warming effects. Green buildings and the concept of smarter living offers tremendous opportunity for changing an average Indian's lifestyle.

As the general public becomes more aware of the benefits of green buildings, developers will get creative and find new ways to brand, market and sell green buildings, hence creating a conductive atmosphere for the sector to grow exponentially.

CONCLUSION

We have studied features of all construction material which are socially, economically benefits for construction industry and human health. Green construction material reduces side effects on environment.to make efficient sustainable structure as well as will lessens the environmental pollution content, and like greenhouse gas emission, resource depletion, soil pollution , health hazards , ozone depletion etc. Hence there is an urge to use the eco-friendly materials for the better tomorrow and healthy life of coming generation.

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