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GREEN BUILDING MATERIAL

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Abstract

Due to enhancing urbanization, In India various tremendous environmental problems are arising in construction industry. Increase in demand of houses which consumes more energy, resources and raw materials which are responsible for the increase carbon content in air and which are harmful to environment and human health. A day we have facing various environmental impacts due to more sustainable materials which we need to build. Which will lead to reduction of impacts on environment. In cities like Pune the weather are being notice by us that the change in weather patterns, hotter summers, shorter winters, insufficient monsoons. So taking under consideration, the preservation of the city's ecology and finite energy resources seriously is now more important. Developers need to find better, more sustainable methods of designing their buildings in order to reduce their negative environmental impact. Therefore there is a need of use more locally available materials and sustainable materials which are eco-friendly and a lead for better tomorrow. Considering to all this impacts 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 material for conventional materials.

Index Terms: ***Eco-friendly construction Materials, Cost efficiency of green materials, Durability, Sustainability & Energy efficiency.***

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1. INTRODUCTION

1.1 General

It is only solution to the present trend of construction. Buildings are actually responsible for maximum resource consumption therefore green building is described as people with healthy, comfortable and safe living, working and activities of the space, hence the building full life cycle process to achieve efficient use of resources with minimum impact on the environment of buildings.

1.2. WHY GREEN?

The atmosphere is getting proliferated with dangerous toxins and the world is becoming a more difficult to place in live. This is not the legacy that we should leave behind for our latter generations. The environmental benefits of green building include the protection of ecosystems and biodiversity, improved air and water quality, and the conservation of natural resources. Green buildings can also result in lower operating costs because they use less energy and materials and improved indoor air quality, which improves the health of occupants.

1.3. Benefits of green building

Various benefits from green buildings are discussed below the immediate and most tangible benefit is the reduction in operating energy and water costs right from day one, during the entire life cycle of the building.

- Energy costs can be reduced by 25%- 30% in green buildings.
- A number of peoples are now seeing green building rating as a tool to enhance marketability.
- Green buildings provide financial benefits. These benefits include energy and water savings, reduced waste, improved indoor environmental quality, greater employee comfort or productivity, reduced employee health costs and lower operations and maintenance costs.

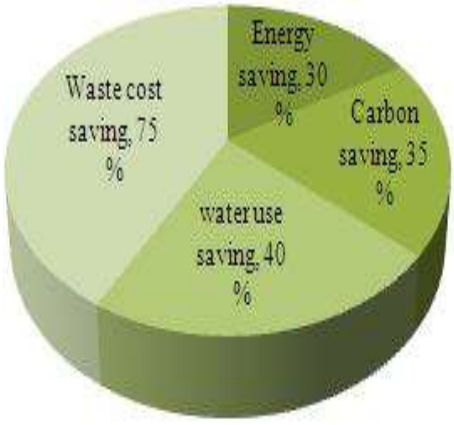

Fig-1.3.1: Benefits of green building construction

1.4. Objectivities of Green Building:

- Conserve natural resources
- Increase energy efficiency
- Improve indoor air quality

2. METHODOLOGY

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.

2.1 Lime

Lime is a 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 passes . The comparison of lime and cement in cost is, cost of lime is Rs. 7.5/kg. And that of lime is Rs. 6/Kg. Life span of lime building is much more as compared to cement building.

Fig-2.1: Cooling of lime before use in construction

Lime used as plaster in building it reduces the internal room temperature by 4 to 5oc as compare to cement. Lime reduces the carbon footprint in the environment and cement contributes the increase in carbon. The manufacturing of lime uses less energy as compared to cement production.. The energy use in cement production is 57% and in lime manufacture energy use in only 31% so it is indirectly reduces the carbon emission in the atmosphere

2.2 Sand Lime Bricks

Sand Lime Bricks replaces the conventional bricks in the construction industry. The sand lime bricks are made by sand, lime, fly ash, and water. The size of brick is 240 × 115 × 53 mm. Using sand we can achieve the adhesiveness to hold the particles together. The Cost of sand lime brick is more as compare to the conventional brick. Cost of conventional brick is Rs. 5/ brick and sand lime brick cost is Rs. 8/ brick it is more as compare to conventional brick, but sand lime brick is more durable than conventional brick. And its brittleness helps us to recycled it and reuse in other works.

Fig-2.2: Sand lime bricks

2.3 Eco-Friendly Tiles

An Eco-friendly tile replaces the conventional flooring and this tile uses less energy in their manufactured. It is cheap as compare to the conventional tile. They are available as per the client requirement in various shapes or patterns and it is also easy to place. This tile improves performance of indoor environment quality. Regular tiles are replaced by the eco-friendly tiles. The cost of Eco-friendly tiles are cheap as compared to regular tiles, these tiles are manufactured on the construction site so the transportation charges are reduced. Cost of regular tiles is Rs.40 and the cost of eco-friendly tiles is Rs. 35. Eco – friendly tiles are durable as compare to ceramic tiles and made from locally available materials this are sand, lime, fly-ash and fibers. They are washable and waterproof and laid directly on floor as similar to plastering work.

Fig-2.3: Eco -friendly tiles

2.4 Coloured Lime Plaster

The coloured lime plaster use as paint. In the market 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. It is made by sand, lime, pigment and also used fibers to increase the strength. It gives better aesthetics look than conventional painting work. Its shine and glossiness increases as the time passes. Regular paints are replaced by coloured lime plaster. It is very cheap and long lasting as compared to regular paints. Cost of regular paint is Rs.10/sq. Ft. And cost of coloured lime plaster goes Rs. 35/sq. Ft. Including three coats of plaster.

Fig- 2.4: Coloured Lime Plaster

2.5 Reflectasol Glass

Reflectasol glass keeps the inner temperature cool in hotter summers which reduce the energy consumption. It gives better indoor quality than the normal clear glass. Reflectasol glass reduces the solar heat gain but 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.

Fig-2.5: SGG Reflectasol

The regular glass is replaced by the Reflectasol glass and the cost comparison of the glass is, Reflectasol glass is 20% high as compared to normal glass. It is more but the advantages of Reflectasol glass are more and its life span is also more. The amount of heat transfer through 6mm thick glass in 1m2 area is Ug = 5.7 W/m2 . Ug is depends upon the mass, which is less as compared to normal clear glass. The Glazing thermal insulation is characterized by Ug.

3. ADVANTAGE OF GREEN BUILDING MATERIAL

Green building materials offer some or all of the following benefits to the building owner and building occupants:

- Reduced maintenance and replacement costs over the life of the building
- Energy conservation
- Improved occupant health and productivity
- Life cycle cost savings
- Lower costs associated with changing space configurations.
- Greater design flexibility

4. CONCLUSION

Construction material are studied of all features. This material which are economically, socially benefits for human health and construction industry. Green building construction material reduces side effects on environment. to make efficient sustainable structure as well as will lessens the environmental pollution content, and like green house gas emission, resource depletion, soil pollution , health hazards , ozone depletion etc. The green building materials are urgent to use for coming generation of healthy life and better tomorrow.

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