

COMPARISON OF SUSTAINABLE AND CONVENTIONAL BUILDING

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Abstract - In present senior energy consumption has increased a lot. The increase in energy consumption is due to increase in number of building that is being constructed these days. These are health hazardous and less eco-friendly too. In this research we will observe the effect of some of the component of green building like roof, glass etc. and its different kinds which is used to construct the green buildings. This study attempts to identify potential carbon emission reductions from the reuse and reduction of housing materials and propose ecofriendly development potentials in the housing market.

Key Words: Low carbon Technology, Life Cycle Assessment, Green Building, Building materials, Carbon emission

1. INTRODUCTION

In Green building thought in broader terms is a building which is planned, built, operated, maintained or reused with objectives to defend inhabitant health, improve employee efficiency, use wisely natural resources and reduce the environmental impact. This process focuses on the design, construction, process and maintenance phases and takes into account the lot design and development effectiveness, energy and water effectiveness, resource efficiency, indoor environmental excellence, building-owner maintenance and the building's overall impact on the environment.

In general, buildings contribute approximately 30% total global GHG (greenhouse gas) emission. In efforts to reduce global warming, GHG reductions in this area would make a significant contribution. Along with GHG emissions, energy consumption is often used to measure the environmental performance of buildings. Any delay in stabilizing and reducing the atmospheric CO₂e concentration would only exacerbate the global warming crisis and increase the difficulty to tackle the disastrous consequences in the future.

1.1 Objective of the study

The objective of the green buildings is to develop buildings which utilize the natural resources to the minimal at the time of construction and operational stage. Green buildings emphasize on the resource usage efficiency and also press upon the three R's - Reduce, Reuse and Recycle. Green

Building is a team effort and the designing and construction includes consultants from architectures, landscaping, air conditioning, plumbing, energy and electrical field.

1.2 Scope of study

Green building industry in India will grow by 20 per cent mainly driven by environmental regulations and demand for healthier neighbourhoods.

The increase in consumer demand has pushed the world's green building market to a trillion dollar industry, a surge that has led to a corresponding increase in the scope and size of the green building material market.

2. MATERIAL SELECTION

2.1 Terracotta floor tiles

Terracotta floor tiles are known for their durability and toughness. These tiles can withstand abuse without breaking, fading or chipping. It can be sealed to improve its moisture and stain resistance. Terracotta tiles are extremely easy to clean. Properly sealed terracotta tiles are also resistant to the growth of mildew.

2.2 Filler slab

One of the advantages is, if the filler material is just a waste, i.e. for extemporary Mangalore tiles that are removed from the roof to construct a pukka roof, you can save upon nearly 15% on your roof concrete construction cost. It has better thermal comfort if a cavity is kept between the filler material or the filler material itself has a cavity.

2.3 Gypsum

Gypsum is a soft sulphate mineral composed of Calcium sulphate di hydrate (CaSO₄:2H₂O). It is widely used as a fertilized, in mould, in sculptures and as plaster material. Gypsum is chalk-like material and is light in weight. It is available in crystalline form in nature. Gypsum can be directly applied over brick/block work without separate finishing Unlike Traditional Cement Plaster; Gypsum plaster does not need any curing saving water and time during construction.

2.4 Low VOC paint

Volatile Organic Compound (VOC) is organic chemical compounds which have significant vapour pressures and which can affect the environment and human health negatively. For a more eco-friendly option, use paints with low or no VOC to not only benefit the environment but your health too. It is easier to clean with soap and water than other paints. Low-VOC paints are less toxic and cause less toxic emissions.

2.5 Double glazed window

Double glazing insulates your home against extremes of temperature, trapping some of the summer sun rays and minimizing the heat which Burns' through your windows on hot Sundays. Double glazing reduces noise for a calmer, quieter home. High-performance double glazing can reduce outside noise by up to 60%, making it a great investment if you live by a busy road or beneath a flight path.



Fig -1: Double glazed window

It is not so easy to qualify building materials ecologically since they may have both positive environmental qualities and also negative ones. Wood is a natural, renewable, long-lasting, process able and visual material. Furthermore, it is renewable and recyclable, when it completes its life time; it has the quality of self-destruction in the ecological cycle.

Pumice is a natural material of volcanic origin produced by the release of gases during the solidification of lava and it has been used as aggregate in the production of Light Weight Concrete in many countries in the world. Cellular concrete is a building material which contains a mixture of sand, cement, lime, plaster, aluminium and water and is produced as a result of a series of industrial processes. Cellular concrete is manufactured as unreinforced wall blocks, hollow block and insulation plates, and manufactured as reinforced wall, roof and floor stuffs, division panels.



Fig-2: Pumice block



Fig-3: Cellular concrete

3. METHODOLOGIES

3.1 Carbon foot print of concrete building

A carbon footprint is historically defined as the total greenhouse gas (GHG) emissions caused by an individual, event, organization, or product, expressed as carbon dioxide equivalent. A measure of the total amount of carbon dioxide (CO₂) and methane (CH₄) emissions of a defined population, system or activity, considering all relevant sources, sinks and storage within the spatial and temporal boundary of the population, system or activity of interest.

Direct carbon emissions come from sources that are directly from the site that is producing a product. Indirect carbon emissions are emissions from sources upstream or downstream from the process being studied.

Table -1: Energy in basic building materials

Insulation Type	The Energy Spent (Mj/kg)
Glass Wool	27.9
Mineral Wool	15.1
Stone Wool	16.9
Cellulose	1.75
Expanded Polystyrene	111.6

Transportation of materials is a major factor in the cost and energy of a building. Bulk of the building materials in urban and semi-urban centers are transported using trucks in India. The transportation distance may vary depending upon the location of construction activity.

Long haul of cement and steel is handled through rail transport. Fancy building materials such as marble, paints, etc. are sometimes transported from great distances (>1500 km) in India.

Table -2: Energy during transportation

Energy (MJ) Transportation			
Type of material	Production	50 km	100 km
Sand (m ³)	0.0	87.5	175
Crushed aggregate (m ³)	20.5	87.5	175
Burnt clay bricks (m ³)	2550	100	200
Portland cement (tonnes)	5850	50	100
Steel (tonnes)	42000	50	100

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4. CONCLUSION

The goal of this project was to learn and understand green buildings are far better than that of conventional buildings. Green and healthier environment anticipate less illness and therefore reduce absenteeism. So, more and more institutes should promote green buildings concept and green model villages as a result our earth planet will be healthy planet to live in as it reduces global warming.

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