

PLAN AND DESIGN OF GREEN BUILDING PROJECT AND SOLUTIONS FOR SUSTAINABLE DEVELOPMENTS

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Abstract - A green building uses less energy, water and natural resources, creates less waste and is healthier for the people living inside compared to a standard building. There is a rapidly expanding market for green building materials. Green building provide suitable environment by controlling solar radiation temperature, energy efficiency, water conservation using domestic treatment plant and indoor air quality. The main aim of green buildings is to reduce the environmental impact of new buildings. The sustainability in the environment can be well achieved by reducing the energy emission and consumption by the buildings. Sustainability means using the energy efficiently.

Key Words: Net Zero concept ,HVAC, Low Emitting Material, Solar power, Green Insulation , Water conservation, LEED, GRIHA, BIM ,EDGE

1.INTRODUCTION

India is a fast growing country. Rapid industrialization, increasing population, infrastructure development and destruction of natural resources lead to construction of green building. Green building is a structure that is environmentally responsible and resource efficient throughout its life cycle. Green building is also known for its sustainability and high performance. A 'Green' building is a building that, in its design, construction or operation, reduces or eliminates negative impacts, and can create positive impacts, on our climate and natural environment. Green buildings preserve precious natural resources and improve our quality of life. Any building can be a green building, whether it's a home, an office, a school, a hospital, a community center, or any other type of structure.

1.1. Study of green building

Thermal comfort studies on traditional residential buildings of Kerala that is known for its use of natural and passive methods for a comfortable indoor environment, are under progress. Passive methods of achieving thermal comfort inside the buildings are the best solution to provide a healthy and energy efficient indoor environment. This is of supreme importance for buildings in the tropics where mechanical systems with high energy consumption are used to condition the indoor environment for thermal comfort. The people are forced to depend on such systems because, majority of the buildings are designed without giving adequate importance to passive methods for controlling the indoor environment. Water is a critical and finite resource. It covers over 71% of the Earth's surface and is essential for life, playing a key role in the

production of food, human health and sustaining the natural environment.

1.2 Feature of a green building

Important feature of a green building is its design aimed at providing comfortable and safe environment for the human occupants. The most fundamental benefit of Green Building is that it is environmentally friendly and safe for people occupying the building. Its aesthetic appeal of carefully designed and well integrated architectural features, such as efficient use of space, intuitive layouts, and pleasant lighting offer psychological benefits to people. While, elements such as clean air monitoring and circulating systems, handicap access, clean water and other elements make it safe and beneficial to human health.

Another important benefit of Green Building is Energy Efficiency, which deals with a building's energy consumption for cooling and Heating needs. Green building elements dealing with energy efficiency include the use of environmentally friendly insulation, energy efficient windows, and solar-reflective building envelope materials such as metal roofing, and metal wall panels that help minimize unwanted heat gain or loss inside a building. Other elements of a green building include effective use of natural lighting, and renewable energy generating systems all aimed at reducing energy consumption, which results in cleaner environment and direct cost savings for building owners.

1.3 Green building technology

- **Net Zero Concept** : A building that can generate power by itself using renewable energy sources. This technology produce more energy than required hence it is also called energy plus building.
- **HVAC (Heating Ventilation & Air Conditioning)** : It have 50% of the energy of any building is used in its heating ventilation and air conditioning ,in this context HVAC system proves to be very effective .
- **Low Emitting Materials** : It means that of which dose not cause any harm to chemical reaction air quality, human health, productivity and environment.
- **Solar Power** : Talk of green building, solar power is not used , it cannot happen. There are two type (1) Active solar power ,(2) Passive solar power .
- **Green Insulation** :Cellulose is mainly used in green building which is made from recycled newspaper insulation is very necessary for any building .

- **Water Conservation** : It is the basic principle of green building. To ensure low water can be used to minimum in day to day life by building and using water

2. LITERATURE REVIEW

Hwang and Tan (2012) “Green building project management :obstacles and solutions for sustainable development” aimed to The recent advances on green building design and implementation. Reviewed that we have explained that buildings consumed about 32% of total global final energy and consumed 19% of energy-related GHG emissions and would contribute to global warming. The main barrier for a wide adaptation of green and sustainable buildings in the construction industry includes higher initial expenses and the risks involved in such activities, which could be reduced by utilizing a green project management process.

Avinash Shivajirao Pawar “Green buildings” to design green building in order to minimize the demand on non renewable resources, maximize the reuse, recycle and optimize the use of onsite resources. Green building is define as the one which focuses on increasing the efficiency of resources and thereby reducing building impact on human health and environment. Paper outlines that the green building experiences in India have been exciting and challenging as well and serves to assist the country to conserve energy and natural resources by spurring increased recovery and recycling of building materials.

Sunita Bansal, S.K. Singh, Srijit Biswas (2013) “Green quotient evaluation of existing buildings” Case Study at Delhi regarding an organization’s methods to improve a building’s performance. Issues were evaluated regarding. Water audit to establish the areas of the building consuming large amounts of water and targeted for improvement. Waste audit to find out total amount of solid waste generated and how much of it being recycled and sent to incineration and landfill. Condition audit to determine the current condition and expected remaining economic life of building’s components. Thermal audit encompasses thermal comfort, air quality, lighting levels and noise levels. These were audited to find how they currently perform & where improvements can be made.

Usman Aminus Ummar , M.F Khamidi and Hasan (2012) “Sustainable building material for green building construction, conservation and refurbishing” In Construction Research Association Sustainable building materials by definition are materials which are domestically created and sourced which decreases transportation costs and CO2 emissions, they could consist of reused materials, they possess a lower environmental effect, they are thermally effective, they need less energy than conventional materials, they make use of renewable resources, they are lower in harmful emissions and they are economically sustainable. A sustainable building material needs to be used properly and contextually in every community development. The application of sustainable building materials not just minimizes transport costs, carbon emissions, and in most cases materials costs, it also offers employment and skills development opportunities for community members.

S. Nazeer Ahamed and R. Kiran Kumar (2013) “Eco efficient construction material for green building” There are now many tools and techniques for selecting construction materials that are less damaging to the environment. Detailed analysis of the impacts of materials using these techniques can then be reduced to relatively straightforward guidance for the designer. Use natural materials that have low embodied energy and / or environmental impact, Timber (in preference to steel). Concrete reinforced with timber, bamboo or natural fibers. Building wastes, industrial wastes and recycled products. Aerogel materials may also be applied to a building's walls, attics, grounds and appliances. The unusual properties of aerogels open the way to a new range of opportunities for their application in buildings.

Chen Min Ann, Hussein Mohammed Abualrejal (2018) “Energy efficient / Green and their related issues” Identify the benefits of energy efficiency, explore the methods to apply efficient energy usage in green building, and explore the obstacles in attaining energy efficiency in green building. Implementation of energy efficiency practices should be minimized and enhance the effective of energy efficiency practices to attaining sustainability to the company.

M.N. Uddin, A. Muthu Selvam (2018) “Optimize of green building for low income ”Sustainable building model by using these tools based on energy efficiency, water efficiency, locally available and low carbon content materials, generate less waste and afford improved spaces for inhabitants, as compared to a traditional building. Observed as there are various sustainability concept for green building optimization such as site selection, orientation, materials selection, energy efficient appliance heating , cooling etc. Low income with the help of Autodesk Revit as well as EDGE Green Building Analyzer. The buildings mainly use the locally available building materials likes terracotta tiles and fly-ash based stabilized blocks. Therefore, it will help to optimize the building materials, construction cost and reducing ecological degradation.

3. CONCLUSIONS

In this survey, we have reviewed the implementation and current advantages of green building design. It will ultimately serve to improve not only the energy performance of buildings but will also assist energy conservation , techniques and natural resources by increased recovery and recycling of building materials .From the study, it can be concluded as the sustainable building is acceptable in terms of energy, water, and materials. Also eco friendly & cost effective . Improvements in energy efficiency are generally achieved by adopting a more efficient technology or production process or by application of commonly accepted methods to reduce energy losses.

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