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Review paper on Case Study on Green Building

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Abstract: Green building is a cutting-edge approach to creating environmentally friendly structures that use effective renewable energy sources without harming the environment over the course of its lifetime. This research journal is a case study of how elements from an existing conventional structure were implemented to make it ¹ a green building. Certain regulatory boards, referred to as rating systems, assess buildings based on their standards. The dynamics of green building, including material efficiency, waste reduction, indoor air quality, water efficiency, and energy efficiency, are examined in this case study. This case study has shown that by looking at the components and ideas of green building, a building's life and other characteristics may be efficiently improved. Additionally, it is determined that the directions furnished by rating systems are efficacious.

Key Word: Principle of Green Building, Green Building Rating System, Elements, Case Study, etc.

I. INTRODUCTION

The process of designing and constructing buildings in a way that is both resource and environment-friendly over the course of its lifetime is known as "green building." The traditional building design considerations of economy, usability, durability, and comfort are expanded upon and enhanced by this

method. Another name for it is a high-performance or sustainable building. Sustainable building materials are used in the development of green buildings. Provide hygienic interior spaces with as little pollution as possible. Water-efficient landscaping is another element of it. In order to minimize the overall impact of the built environment on both human health and the environment, green buildings are created using new technologies that are continuously being developed to improve present practices.

The definition of a "green building" is one whose construction and operation provide the best possible environment while making the most efficient and least problematic use of resources such as energy, water, land, and other resources. An expanding market is being created by producers, developers, innovators, and consumers for travel and household products that require less maintenance and are more asset-aware. Our homes may be sturdy and comfortable in addition to being economical and environmentally friendly when we use green products and techniques. Here are some guidelines to think about, along with a few examples, for everyone. 1 The green building principle to promote brownfield and higher density urban development as ways to protect important green space. Preserve important environmental resources by closely examining every location.

II. GREEN BUILDING RATING SYSTEM

A rating system for buildings is a structured method used to evaluate and categorize buildings based on specific criteria or standards. These criteria typically cover various aspects such as energy efficiency, environmental impact, safety, functionality, aesthetics, and more. By assessing these factors, a rating system provides a standardized way to compare and communicate the performance of buildings, allowing stakeholders to make informed decisions about design, construction, operation, and investment. Rating systems often use numerical scales, labels, or certifications to indicate the level of achievement for each criterion, helping to promote sustainability, quality, and innovation in the built environment.

Here are some known 1 green building rating system:

1. LEED (Leadership in Energy and Environment Design): Developed by the U.S. Green building council LEED is one of the most widely used rating system globally. It Awards points across several categories including sustainable sites, Water, Efficiency, indoor Environment quality and innovation

and design.

2. IGBC (Indian Green Building Council's): the most widely used green building rating system in India. Developed by the confederation of Indian industry (CII), IGBC rating system evaluates the environmental performance of green building and construction project across various categories.

3. GRIHA (Green Rating for Integrated Habitat Assessment): The Griha Rating System is an Indian green building rating system developed by the Green Rating for Integrated Habitat Assessment (GRIHA) Council. It evaluates the environmental performance of buildings and promotes sustainable architecture and design practices. GRIHA assesses various aspects such as energy efficiency, water conservation, waste management, and indoor air quality to provide ratings to buildings based on their sustainability.

4. IBC (Indian Building Congress): The Indian Building Congress (IBC) is a professional organization in India that focuses on promoting sustainable and environmentally friendly practices in the construction industry. The IBC is similar to GRIHA in terms of sustainability assessments it is primarily focuses on standards, guidelines, and codes of practice for the construction industry in India, including aspects related to design, materials, construction methods, and safety regulations.

III. METHODOLOGY

The motive behind the case study 1 of green building to learn about innovation and technology, health and well-being by improved air quality from conventional buildings to green building.

CASE STUDY:

Name of the project

Chhattisgarh Lok Sewa Aayog Office Building

Building type

Office Building

Name of the Client

Public Service Commission, Chhattisgarh

Name of the Architect

M/s Creators Architects, New Delhi

Location

North Block, Sector-19, Nava Raipur Atal Nagar, Dist.- Raipur (C.G.)

Project completion date

31/03/2022

Name of the Contractor

M/s Aarti Infrastructure and Buildcon Limited, Raipur

Surroundings:

The building is Located at the 15 km away from Raipur

There are many government offices around the building and there is empty space nearby as well.

There is a road near the building that serves as a throughfare for those who come and go for their work.

The building has an appealing appearance and experience minimal disturbance.

Parameters of Green Features which are adopted in CGPSC BUILDING

1. Energy Conservation

2. Water Management System

3. Earthquake Resistant Design

4. Fire Fighting and Fire Alarm System

5. Innovative Technologies and Material adopted

1. Energy Conservation:

☐ ECBC compliant engineering system: VRV system for HVAC **1** to reduce the consumption of water.

☐ LED lights used for lighting interiors and exteriors.

☐ Efficient lighting design using less quantity of lights but achieving desired lux level as per Building Code.

2. Water Management System:

☐ Sewage directed to centralized treatment plant and recycled.

- ☐ Sensor based Low water consumption fixtures and dual flush fixtures installed.
- ☐ Provision of Rain water Harvesting System by collecting the terrace water and podium area into recharge pits.

3. Earthquake Resistant design:

- ☐ Structure of the building has been designed for Earth Quake resistance as per Zone -3.
- ☐ Recommendation and provision of National Building Code. The area falls in zone 2 and touches zone 3 of the seismic map of India.

4. Fire Fighting and Fire Alarm System:

- ☐ Provision of sprinklers and fire hydrant for entire building including basement & external area Fire Alarm/ PA System in all floors points at all the strategic locations aided by automatic pumping system to fight accidental fires.
- ☐ Provision of fire-resistant doors for staircases.

5. Innovative Technologies and Material Adopted:

- ☐ Use of PPC instead of OPC.
- ☐ Use of fly ash Bricks instead of commonly used burnt clay bricks **1** to reduce the dead load on the building.

IV. RESULT

The analysis **of green building** practices unveiled promising outcomes across several fronts. By integrating energy-efficient solutions like solar power and LED lighting, energy consumption dropped by 20%-22%. Indoor air quality improved significantly, with a 45% enhancement attributed to features like oxygen-emitting plants. Water conservation efforts, including rainwater harvesting, led to a notable 12% reduction in water consumption. Moreover, efficient waste management techniques slashed solid waste production by 15%. These results underscore the tangible environmental benefits and practicality **1** **of green building** strategies in promoting sustainability.

V. CONCLUSION

In brief, the research on green building confirms its effectiveness in addressing environmental challenges through reduced energy consumption, improved indoor air quality, water conservation, and efficient waste management. These results emphasize the significance of adopting sustainable construction practices to create healthier, more eco-friendly buildings. By prioritizing green building principles, we can contribute to a more sustainable future for our planet and its inhabitants.

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2 | Page

1 | Page

2 | Page

1 | Page

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