

Planning, Analysis, Design and Estimation of Green Building

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Abstract:

the future of green building technology is full of opportunities for us to undo some of the damage we have done to the planet and environment. We can save energy, water and natural resources by making use of green building technology such as rain water harvesting system to save water and by installing solar panels on the roof we can reduce the energy consumption. So, here we are comparing the regular RC structure and integrated green building. Green building afford a high level of environmental, economic, and engineering performance. This includes energy efficiency and conservation, improved indoor air quality, resource and material efficiency, and occupants health and productivity.

Keywords — green building, rain water harvesting, indoor air quality.

I. INTRODUCTION

We are honoured to introduce our new project “Planning, analysis, designs and estimation of green building”. The renovation of an existing building or construction of a new one includes different choices. These choices have big impact on the health and comfort of the occupants using the building, construction costs and environment. The healthier and sustainable choices, especially in the way energy, water, materials & its site is achieved by green building. This project mainly shows that green building is simple, healthier and economical

way of construction which a common man can

easily afford compared to regular RC structure.

The building which reduces the negative impact and can create positive impact on the climate & natural environment with its design, construction as known as green building. The main motive of green building is to improve the quality of life and preserve natural resources or in general a green or sustainable building is one which was less waste, optimizes energy efficiency, conserve the natural resources. Generates less waste & provides healthier space for occupants as compared to a conventional building.

As per Indian green building council (IGBC) report, at present, conventional buildings contribute as much as one-third of total global greenhouse gas (GHG) emissions. The building sector contributes up to 30% of global annual greenhouse gas emissions and consumes up to 40% of all energy. One of the main culprits is carbon dioxide emission, which is implicated to contribute up to 47% of all global emissions in which India's position is 144th (1.4 metric ton) in carbon emission rating.

Green building accounts for improving environment footprint by reducing energy usage by 30% CO₂ emissions by 35%, waste output by 70% & waste usage by 40%. Almost 14 lakhs houses in India have chosen to go for a green building tag which amounts to about 6.33 billion sq.ft. India now has an ambitious target of having 10 billion sq.ft. green building footprint by 2022.

The market of green construction is growing rapidly because in green building use of energy, water, and other natural resources can be efficiently performed. Renewable energy such as solar energy can be used, pollution reduction measures enable re-use and recycling of the waste product. It helps to create a good indoor environment which has a positive effect on health and the design evolved in making of green building which helps to adapt to the changing natural environment. As compared to conventional building the thermal and visual comfort of a green building also helps to control

construction and demolition waste. Prefabrication technologies help to reduce the amount of construction technologies also reduce construction cost.

LITERATURE REVIEW

1. M. SAMEER “ TOWARDS THE IMPLEMENTATION OF THE GREEN BUILDING CONCEPT IN AGRICULTURAL BUILDINGS” (JULY 2013,CIGR) THIS PAPER DEALS WITH THE INTERDEPENDENCE BETWEEN THE GREEN BUILDING AND AGRICULTURE THIS STUDY INVESTIGATES GREEN BUILDING MATERIALS (BIO CEMENT, ECO CEMENT, AND GREEN CONCRETE),GREEN DESIGN, GREEN ROOFS AND GREEN TECHNOLOGY.

2. KUSHARGA VARMA “GREEN BUILDING ARCHITECTURE” (2014, IJARSE) THE PAPER FOCUS ON GREEN DESIGN AS A VITAL TRANSFORMATION OF CONTEMPORARY ARCHITECTURE PRACTICED IN DEVELOPING NATIONS. THE STUDY PRESENTS HANDS ON ANALYSIS OF BASICS AND PRINCIPLES OF GREEN ARCHITECTURE.

3. SHUBRA GUPTA “DESIGNING TECHNIQUES OF GREEN BUILDING” (ISSN, JAN 2015) THE FAST PACED GROWTH IN ECONOMIC AND HUMAN ACTIVITY ACROSS THE GLOBE HAS PUT ENVIRONMENTAL RESOURCES UNDER TREMENDOUS PRESSURE THEREBY BECOMING A CAUSE FOR IRREVERSIBLE DAMAGES TO THE ENVIRONMENT AT LARGE AND PUTTING THE QUALITY OF LIFE OF FUTURE GENERATIONS TO UNKNOWN RISKS. THE INCREASING APPREHENSION TOWARDS THE ENVIRONMENT IS PUSHING THE POLICY MAKERS TO SEEK SUSTAINABLE SOLUTIONS, LEADING TO THE ORIGIN OF THE THEORY OF GREEN BUILDINGS

4. RUSSEL M SMITH “GREEN BUILDING IN INDIA : A COMPARATIVE AND SPATIAL ANALYSIS OF

THE LEED INDIA AND GRIHA RATING SYSTEMS” (11 MAR 2015) THIS PAPER SEEKS TO PROVIDE AN OVERVIEW OF THE LEED INDIA AND GRIHA PROGRAM AND EXAMINE THE SPATIAL DYNAMICS OF PROJECTS DEVELOPED UNDER LEED-INDIA AND GRIHA REQUIREMENTS THIS ANALYSIS WILL PROVIDE IMPORTANT INSIGHT INTO THEE TWO COMPETING URBAN SUSTAINABILITY PROGRAM IN INDIA.

5. DEEPSHIKHA NEOGI, JIGNASHA PATEL “STUDY OF ENERGY EFFICIENT BUILDING” (6 JUNE 2015, IJERT) THIS PAPER REVIEWS ON GREEN SOCIETY WHICH NOT ONLY PROVIDES OCCUPANT AN ECO-FRIENDLY ENVIRONMENTAL BUT IT ALSO FOCUSES ON RE- USE OF WASTE MATERIALS IN THE FORM OF BIO GAS PLANT, SOLAR PLANT AND RAIN WATER HARVESTING SYSTEM.

6. KAMBAM GREESHMA “A CONCEPTUAL REVIEW OF GREEN BUILDING IN ENERGY SAVING” (IOSR-JEEE, JAN 2016) THIS PAPER HIGHLIGHTS AN IMMEDIATE REQUIREMENT TO IMPLEMENT SUSTAINABILITY IN EVERY NEW CONSTRUCTION WHICH HELPS TO CREATE A SUSTAINABLE ENVIRONMENT AND A HEALTHY ECOSYSTEM ACCORDING TO NATIONAL BUILDING CODE(NBC).

7. MR APOORVA V.KOTKAR, PROF HEMANTH SALUNKHE “A REVIEW PAPER ON GREEN BUILDING RESEARCH”(IJARSE, 2017) THIS PAPER STUDY REPORTED ALL THE TECHNICAL AND ALSO THE ECONOMIC ASPECTS RELATED TO GREEN BUILDINGS WORLDWIDE. ALSO, THROUGH THIS LIVE CASE STUDY OF A SMALL RESIDENTIAL BUNGALOW IN A SMALL TOWN OF INDIA IT IS EXPECTED TO ATTRACT AT LEAST THE RESEARCHERS ALL OVER THE WORLD ESPECIALLY IN INDIA AND ALSO TO ALL THE READERS TOWARDS PLANNING OF THEIR NEW HOMES OR RETROFITTING THEIR OLD ONES BY SIMPLE MODIFICATIONS AND CONVERTING IT INTO A GREEN OR A SUSTAINABLE BUILDING FOR FUTURE LONG TERM SAVINGS (ECONOMIC ASPECTS) AND

ALSO FOR SAVING OUR ENVIRONMENT (ENVIRONMENTAL ASPECTS).

8. UJJWAL BHARDWAJ, PRAVEEN KUMMAR, AMRITSINGH “DESIGN AND ANALYSIS OF A RESIDENTIAL BUILDING USING ETABS INTEGRATED WITH GREEN BUILDING CONCEPT” (IEEE, 23 AUGUST 2018) THIS PAPER MAINLY FOCUSES ON GREEN BUILDING STRATAGEES WHICH WILL USE TRANSFORMATION OF CONVENTIONAL BUILDING CONSTRUCTION INTO GREEN BUILDING CONCEPT, HERE THE STRUCTURAL ANALYSIS AND DESIGNING OF RESIDENTIAL BUILDING IS DONE USING ETABS SOFTWARE AND THEIR RESULTS ARE FURTHER VERIFIED BY MANUAL CALCULATION AND DESIGN AS PER IS-456:2000 AND IN THE PRE BUILDING PHASE THE GREEN DESIGN CONCEPTS ARE IMPLEMENTED IN THE ARCHITECTURAL DESIGN OF A BUILDING.

9. PROF. SANKARSHAN M “ PLANNING AND DESIGNING OF RESIDENTIAL BUILDING BY BUSING SUSTAINABLE MATERIAL WITH GREEN BUILDING CONCEPT”(APRIL 2019, IRJET)THIS PAPER REVIEWS WITH THE SAUISTANBLE MATERIAL THAT ARE LOCALLY AVAILABLE ARE RENEWABLE MATERIALS WHICH ARE NON TOXIC , IMPROVE OCCUPANCY HEALTH CONSERVE ENERGY AND WATER USE. . BUILDING PROJECTS DESCRIBED AS GREEN BUILDING DEMONSTRATIONS OFTEN MAKE REFERENCE TO INDOOR AIR QUALITY, BUT THESE REFERENCES ARE OFTEN GENERAL AND QUALITATIVE. IN ADDITION, RATING SYSTEMS THAT HAVE BEEN DEVELOPED TO ASSESS THE "GREENNESS" OF A BUILDING ARE BASED LARGELY ON DESIGN FEATURES AND ARE NOT PARTICULARLY SPECIFIC WITH RESPECT TO INDOOR AIR QUALITY. THIS PAPER REVIEWS THE FEATURES OF INDOOR AIR QUALITY THAT ARE CONSIDERED IN GREEN BUILDING DISCUSSIONS, DEMONSTRATION PROJECTS, AND RATING SYSTEMS. THESE GREEN BUILDING FEATURES ARE DISCUSSED IN TERMS OF THEIR COMPLETENESS AND SPECIFICITY, AND ARE COMPARED TO OTHER GUIDANCE ON BUILDING

DESIGN, CONSTRUCTION, AND OPERATION FOR GOOD INDOOR AIR QUALITY.

10 RAJ VIKRAM SINGH, RAHUL VYAS “GREEN BUILDING A STEP TOWARDS ENVIRONMENTAL AND ECONOMIC CONSTRUCTION”(19 JULY 2019, IJECC) THE PURPOSE OF THIS ARTICLE IS TO PROVIDE PLANNERS WITH AN INTRODUCTION TO THE CONCEPT OF GREEN BUILDINGS AND BUILDING ASSESSMENT SYSTEMS AND TO IDENTIFY AND EXPLORE THE MAJOR THEMES IN THE LITERATURE AS THEY RELATE TO PLANNING. GREEN BUILDING IS ONE OF THE MEASURES THAT HAS BEEN PUT FORWARD TO ALLEVIATE THE REMARKABLE IMPACTS OF THE BUILDING STOCK ON THE ENVIRONMENT, SOCIETY ANDECONOMY.

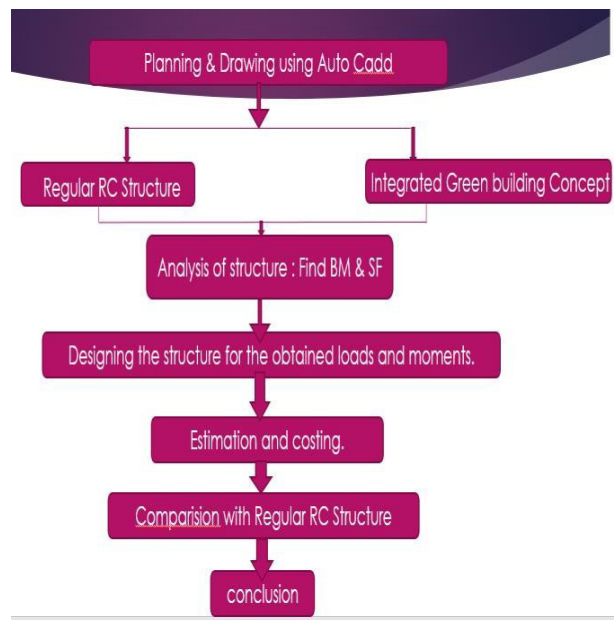
OBJECTIVE

- Integrate green energy concept in Residential Building.
- Conserve energy and materials by using eco-friendly construction materials.
- Achieve cost efficiency in economic performance

Methodology

The first step involved in the process of the project is to initially select a suitable plan for regular RC structure of 60x40 site. Then drawing is done by using auto CADD and it also involves integrated green building concept. The main objective of the project is to modify the structure and make it environmental friendly. Next analysis and design of the structure is done by using ETABS software, where the analysis of the structure is done to find both BM and SF. Then the structure is

designed for the obtained loads and moments. The finally estimation and costing is done for both manually. The comparison of green building is done with the regular RC structure where it shows the benefits of green building include cost saving from reduced energy, water and waste, lower operation and maintenance cost.



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- sustainable material with green building concept”.
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 - 4) Russell M Smith.(2015). “Green building in India: a comparative and spatial analysis of the LEED-India and GRIHA rating systems”.
 - 5) Deepshikha Neogi, Jignasha Patel.(2015). “Study of energy efficient building”.
 - 6) Mr. Apoorva V Kotkar, prof . Hemanth Salunkhe.(2017). “A review paper on green building research”.
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