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DESIGN OF ECO-FRIENDLY VILLA

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***Abstract*— Green building concept deals with the optimum use of natural resources for the development beneficial or non-harmful to the environment. In other words, green building is a building which utilizes very less amount of manmade energy and can produce sample amount of energy without causing any harm to the environment. The term 'Green' environmentally friendly from building to the landscaping choices it also. It also encompasses energy use, water use, and storm water and wastewater reuse.**

***Keywords*— Eco-Friendly Green House Villa**

I. INTRODUCTION

A green building depletes as little of the natural resources during its construction and operation. It involves design and construction practices that reduce the negative impacts of the buildings and its occupants on the environment.
One of the most inspiring definitions of a green building is as follows –
"A Green Building should create delight when entered, serenity and health when occupied and regret when departed."
The aim of a green construction is to:

- Minimize the demand on non-renewable resources
- Maximize the utilization efficiency of these resources when in use
- Maximize reuse and recycling of available resources, and
- Utilization of renewable resources.

II. DATA COLLECTION AND METHODOLOGY

Data Collection: The data collection is the first stage in implementing this study on reduction of footprints. Detailed collection of data is done in this stage. Details include the evolution of Green Movement in the World and in India, the need for Green Buildings, the advantages of Green Buildings over Normal Buildings, the projected costs, case studies.
Rating Systems: A thorough study on the rating systems is done in this stage. The role of the Indian Green Building Council, the Leadership in Energy and Efficient Design (LEED), LEED Rating System – credit requirements, proposals, pre- requisites etc are observed and studied.
Site Selection: Site selection is done based on the various requirements and on the various criteria that are to be fulfilled with the study.
Site Specifications: Once the site is selected, a detailed study of the site is done. Visual aids such as Site Inspection details, CAD drawings, Site Plans are used in this regard.
Layout Plan for Buildings: The Layout Plans for buildings envisages looking into the proposed plan of the buildings that are proposed at the site and also on further modifications that could be done onto it so that the objectives of the study are met with in the best possible manner.
Construction Project Site Planning: A detailed analysis on the site plan is conducted and all the possible alternatives that improve the objective of the study are considered for implementation.
Design & Analysis: Based on the data available, the building is designed as framed structure in STAAD PRO Software.

III. STRUCTURAL AND MATERIAL PROPERTIES

4.1.1 Structural Properties	
Description	**Properties**
Number of Stories	G+1
Floor to Floor Height	3.75m
Plinth Height	1.0m
Size of Column	0.45x0.45m
Size of Beam	0.4x0.4m & 0.4x0.35m
Slab Thickness	0.150m
Outer Wall Thickness	0.30m
Inner Wall Thickness	0.23m

4.1.2 Material Properties	
Description	**Properties**
Grade of Concrete	M25
Young's modulus of (M25) concrete, E	21.7185kN/mm^2
Poisson's ratio of Concrete	0.17
Density of Reinforced Concrete	25KN/M^3
Grade of reinforcing steel	Fe500
Young's modulus of steel E	205kN/mm^2
Poisson's ratio of Steel	0.286

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Fig. 1. Architecture 2D model

Fig 2 Staad Frame model

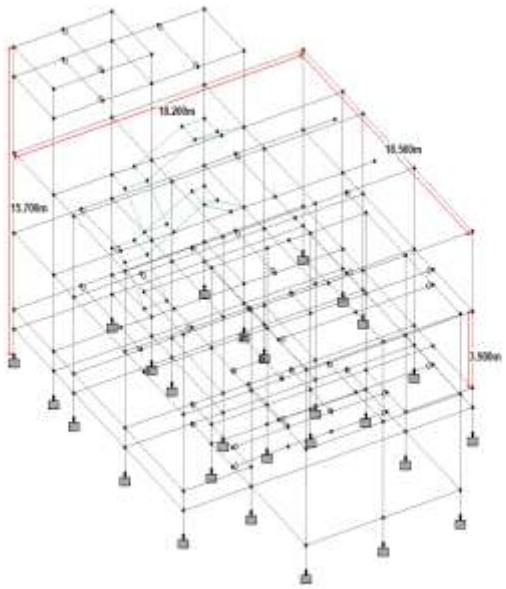
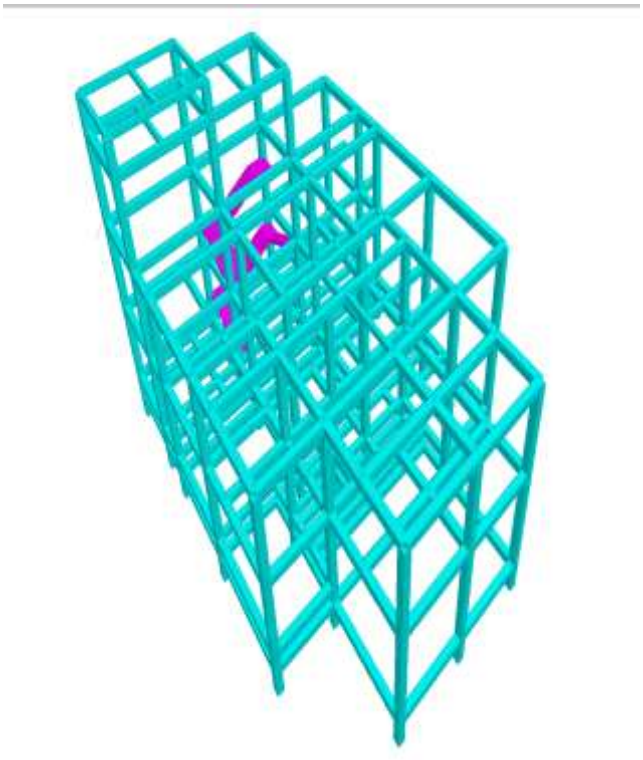


Fig 3 Staad 3D model



TYPICAL FEATURES OF GREEN BUILDINGS:

- Eco-friendly building Materials
- Environmentally friendly construction
- Green Power

- Water use efficiency
- Energy efficient and Eco-friendly equipment
- Gray water gardening · Plantation
- BENEFITS OF GREEN BUILDING:
- High performance green building emerged that will prevent pollution, save energy,
- natural resources, and money.
- The 60% cost reduction in energy expected.
- Human performed better with the skylight and windows that bring natural, non-glare
- light inside the classroom.
- They can reduce respiratory disease by 10 -20% and healthy occupants in green
- building.
- Improved Indoor Air quality and occupant comfort due to no- VOC emissions from
- building materials.
- They increase occupant performance by up to 25 %
- Their occupants have 15% less absenteeism compared to those in building.
- To Improved Productivity
- Green Building have higher market value.
- Tax benefits for Green Building.
- To Improved Retail sales.
- The Lower utility Demands in green buildings.
- To improved Quality of Life

IV.CONCLUSION

The aim of the project was to understand, plan and design Green Building. That has been achieved by studying different green technologies for building.

By planning and designing building layout, development of plan, elevation, section etc.

Various Green technologies and materials proposed with their feasibility study and cost comparison.

The structure of the building is designed using STAAD PRO Software.

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