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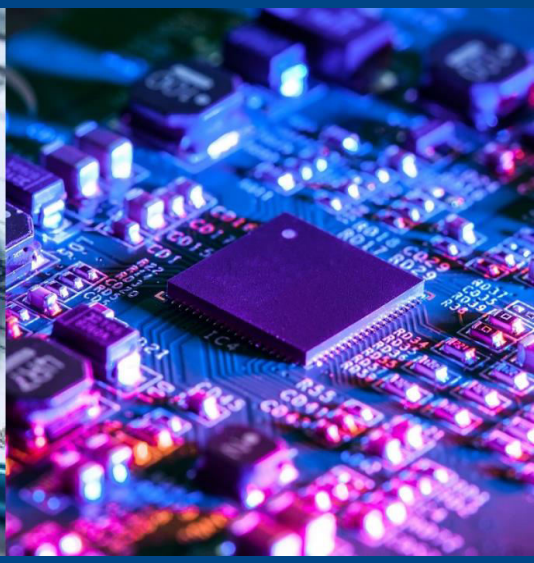

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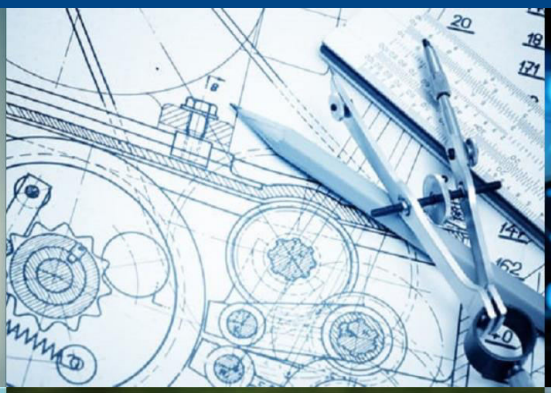

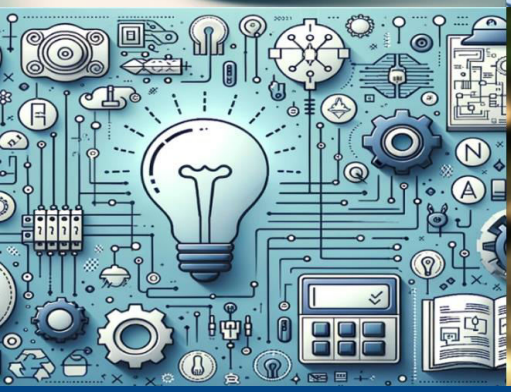

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International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

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Analysis and Design of G+6 Building in Different Seismic Zones

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ABSTRACT: In order to compete in the ever-growing competent makatites very important for a structural engineer to save time. As a sequel to this an attempt is made to analyse and design a residential building by using a software package STAAD Pro.For analysing a residential building one has to consider all the possible loadings and see that the structure is safe against all possible loading conditions. There are several methods for analysis of different frames like Kani's method, cantilever method, portal method, and Matrix method, The present project deals with the analysis of a residential building of G+6. The dead load &live load Sare applied and the design for beams, columns, slab is obtained using STAAD. Pro with its new features surpassed its predecessors, and compotators with its data sharing capabilities with other major software like AutoCAD. We conclude that STAAD.Pro is a very powerful tool which can save much time and is very accurate in designs. Thus it is concluded that STAAD. Pro package is suitable for the design of a residential building (G+6).

KEYWORDS: Residential Building, Ground (G) + 6 floors, Structural Design, Analysis, Earthquake Resistance, Load Calculation, Materials (e.g., concrete, steel), and Planning and Construction.

I. INTRODUCTION

Design is not just a computational analysis; creativity should also be included. Art is skill acquired as the result of knowledge and practice. Design of structures as thought course stands to consist of guessing the size of members required in a given Structure and analyzing them in order to check the resulting stressed sand deflection against limits set out in codes of practice.

Structural Design can be seen as the process of disposing material in three dimensional spaces so as to satisfy some defined purpose in the most efficient possible manner The Industrial training is an important component in the development of the practical and professional skills required by an engineer. The purpose of industrial training is to achieve exposure on practical engineering fields. Through this exposure, one can achieve better understanding of engineering practice in general and sense of frequent and possible problems.

II. LITERATURE

1. Thompson. (2015). Design of Multi story Reinforced Concrete Buildings for Earthquake Motions: Thompson's work focuses on the specific challenges of designing multi-storied buildings to resist seismic forces, it offers practical design strategies, performance evaluation techniques, and case studies, making it an essential reference for engineers working in earthquake engineering and structural design.
2. FEMA (2009). Designing for Earthquakes: Guide for Architects and Engineers: This publication provides guidelines for designing buildings that can withstand seismic forces, emphasizing risk reduction and safety. It discusses engineering. principles, design strategies, and best practices for creating resilient structures in earthquake-prone regions
3. Ching, F. D. K. &Binggeli, C. (2018). Building Construction Illustrated: This comprehensive guide provides detailed illustrations and explanations of construction methods and materials, making it an invaluable resource for architects and engineers. It covers various aspects of building design and construction, including structural systems, materials, and environmental considerations, all presented in an accessible format that enhances understanding
4. Taranath, B. S. (2013). Structural Analysis and Design of Tall Buildings: This book offers in- depth coverage of the principles and practices involved in designing tall buildings, including both steel and composite structures. Taranath

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emphasizes structural behaviour under various loads, providing readers with advanced analytical techniques and design strategies for high-rise construction.

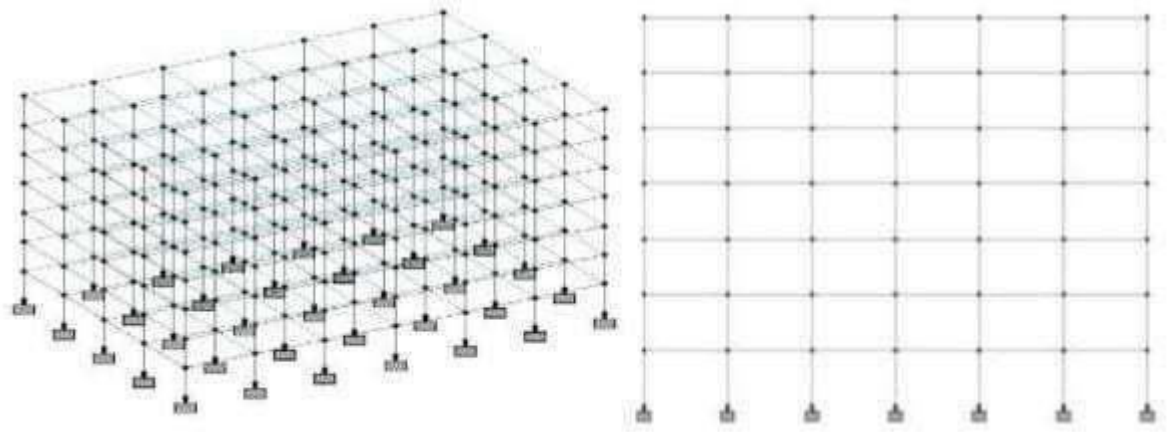
III. METHODOLOGY

To model the residential building using the STAADPro software and analysis the same structure using STAAD Pro State to analysis the residential building and structural elements like beams, stairs, columns, slabs.

Step:1
To design the residential building using STAD Pro- To design the structural elements like beams, stairs, columns, slabs using software.

DESIGN PROCEDURE:-

- Go to Geometry
- Run structure wizard
- Model type
- Frame model
- By frame
- select parameter
- Give Dimension, Height, Length, Width
- Click on Hydro snap load grid
- We should add slab to ground section
- Select the ground
- Select cut section view
- Window/Rubber Band
- Go to 3D view
- And select the ground floor NODES to all section



GIVE THE SUPPORT:-

- Go to support
- Click on create
- Add and click on support
- Select front view
- Select all nodes
- Click on Assign to selected Nodes
- Click on assign
- Click on 3d view

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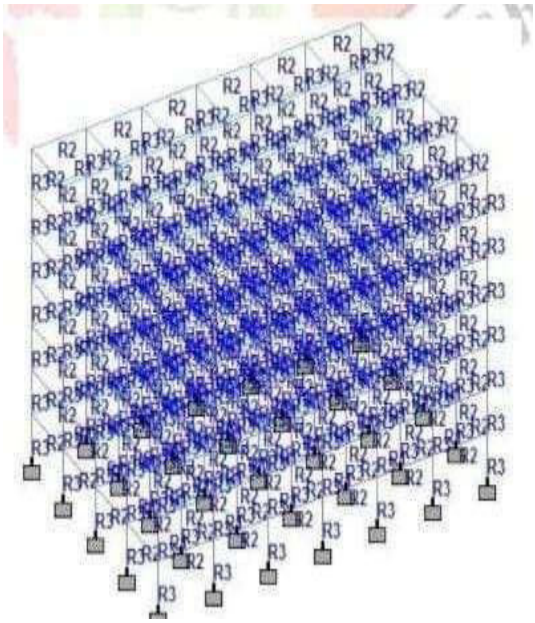

LIVE LOAD :-

Live loads are important to consider when designing and analyzing structures because they can change in magnitude and location over time. They can include Occupancy loads: People, furniture, and equipment

Dynamic loads: Moving machinery, vehicles on a bridge, and elevators

Environmental loads: Accumulated snow, rain, and wind Live loads are different from dead loads, which are the permanent or static weight of the structure itself, including materials and fixed parts .The weight of temporary or movable objects within a building, such as people, furniture, equipment, and appliances .Live loads can also include impact loads, such as those from moving vehicles or

dropped weight. Structural engineers consider dead loads and live loads when designing a building to ensure safety and prevent structural failure. Dead loads determine the overall strength and stability of a building, while live loads influence the design for anticipated usage scenarios.

DESGIN LIVE LOAD:-

□ Click on live load Select on floor load Pressure[-6]
Click on add button
Select the y range 6 floor 6 Gy Add
Assign to view.

DEAD LOAD:

Dead load is the weight of a structure's permanent parts, which are constant over time: The structure itself, including its materials like walls, floors, and ceiling Fixtures that are permanently attached to the structure, like plumbing, lighting, and HVAC equipment Dead loads are also known as permanent or static loads. They can occur in structures like buildings, bridges, and machines. To determine dead loads, engineers use architectural drawings and other documents to preliminarily size members. They then use information from codes and civil engineering literature to determine the weights of the member. The process is repeated until the final member size can support its weight and any superimposed loads. The weight of a building's permanent components, such as the walls, floors, ceilings, beams, columns, and roofs. Dead loads also include the weight of any fixtures that are permanently attached to the structure.

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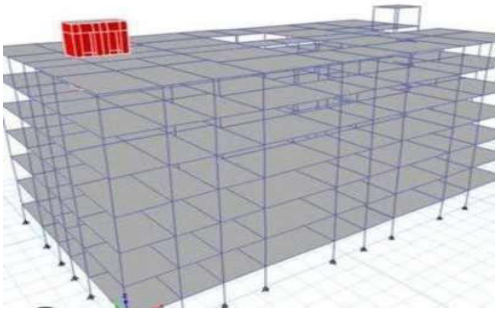

SEISMIC LOAD:

Aseismic load is a force on structure that results from the earth's movement during an earthquake. Seismic loads can cause a structure to shake, twist, or rock, depending on the earthquake's intensity, frequency, and duration. Seismic loads are dynamic, meaning they change indirection and magnitude over time. They can also cause soil liquefaction, which is when the soil loses strength and stiffness due to increased pore water pressure. Seismic loads are a key conception earthquake engineering, and are used to design structures that can withstand the forces of an earthquake. Engineers use seismic load analysis to determine the forces a structure will experience during an earthquake, and then use that information to design the structure's component stores is those forces. O Factors that affect seismic loads include: The seismic hazard, The geotechnical parameters of the site, The structure's natural frequency. The anticipated parameters of the earthquake, and the characteristics of any anticipated tsunami gravity waves.

DESIGN SEISMIC:-

- Go to load and definition
- Click on seismic load
- Add
- Select the type 15 1893-2000/2005
- Click on generate option
- Select the zone [ex: HYD :2[0.2]
- Response Reduction [Special RC moment resisting frame
- Click on for all building
- Medium soil
- RC frame building
- Damping road [0.02]
- Click on generated
- Add the properties to seismic parameter
- Click on add button
- Add self weight factor
- Click on assign to view
-

WIND PRESSURE:

Wind pressure is the force exerted on a building by wind, and it's an important consideration for building design, especially in areas prone to high winds or hurricanes. ∟ Wind pressure is expressed in pounds per square foot or kilopascals Wind pressure can cause a variety of effects on a building, including: ∟ Uplift forces: Can damage roof sand horizontal structures ∟ Shear forces: Can damage walls Lateral forces: Can cause issues with the foundation ∟ Collapsed door sand windows: Can happen if the wind pressure is high enough. ∟ Destroyed roof in sand decking: Can happen if the wind pressure is high enough. ∟ The design of a building's foundation is critical to ensure it can withstand the forces of wind pressure.

IV. CONCLUSION

After obtaining STAAD Analysis and Design the results are seemed to be more accurate when compared to manual design results. During the project work many obstacles were faced too error less STAAD output the future work can be carried in continuation of this work. The main drawback of STAAD is Designing slabs is tedious job .In Estimation the overall Cost

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of the project is determined and the Item rates are taken from Standard Schedule of Rates.

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