ANALYSIS AND LAYOUT OF MULTISTORY CONSTRUCTING THROUGH THE USE OF STAAD PRO

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ABSTRACT

The main aim of structural engineer is to design the structures for a safe technology in the computing field; the structural engineer can dare to tackle much more large and complex structure subjected to various type of loading condition. Earlier the loads acting on the structure are considered as static, but strictly speaking , with the exception of the self-weight (dead load) no structure load is static one Now a day large number of application software`s are available in the civil engineering field. All these software`s are developed as the basis of advanced. Finite element analysis which include the effect of dynamic load such as wind effect, earth quake effect bets etc. in the present work, an attempt has been made to study the efficiency of certain civil engineering application software`s For this purpose an on-going project has been selected. This project is owned by Unity Builders which will be implemented in the city of Gulbarga. The name of the project is Bharat Pride.

Keyword - *Analysis, Design, STAAD PRO, Residential building, gravity, shear force, bending moment and axial force.....*

1. INTRODUCTION

In every aspect of human civilization we need structure to live or get what we need. But it's not just about building buildings, it's also about building efficient buildings. So it can serve the main purpose for which the building was built. This is where the role of civil engineering, or more precisely, the role of design analysis, comes into play. The project consists of residential and commercial buildings C+G+5. The building is designed for 6 residential apartments. The residential apartments consist of one 3-room apartment and 3 2-room apartments. The floor-to-floor distance is 3 meters. There are many classic ways to solve design problems, and new software emerges over time. Here, in this project, the work is based on a software called "STAAD". agree." Also "STAAD. Pro" can be used in other cases. These common problems have been addressed using the basic concepts of loading, parsing, and state according to IS code. These basic methods can be useful for further problem analysis. STAAD Pro has a powerful analysis and design engine with a modern user interface, visualization tools, and advanced finite element and dynamic analysis capabilities. From model generation, analysis and design to visualization and result verification, STAAD Pro is the professional`s choice for steel, concrete, timber, aluminum and cold-formed steel design of low and high-rise buildings, culverts, petrochemical plants, tunnels, bridges, piles and much more. To perform an accurate analysis a structural engineer must determine such information as structural loads, geometry, support conditions, and materials properties. The results of such an analysis typically include support reactions, stresses and displacements. This information is then compared to criteria that indicate the conditions of failure. Advanced structural analysis may examine dynamic response, stability and non-linear behavior. Also "STAAD. Pro" can be used in other cases. These common problems have been addressed using the basic concepts of loading, parsing, and state according to IS code. These basic methods can be useful for further problem analysis.

1.1 Structural design phase:

The structural design process includes the steps of structural planning, load calculation, analysis method, element design and detailing, graph drawing and preparation.

2. LITERATURE REVIEW

V. Varalakshmi: Design and analysis of a G+5 multi-story building in Kukatpally, Hyderabad, India. This study includes the design and analysis of columns, beams, foundations and slabs using the popular civil engineering software called STAAD.PRO. A test for the safe bearing capacity of the soil was obtained. P. Jayachandran: Design and analysis of a G+4 multi-story building in Salem, Tamil Nadu, India. This study includes the design and analysis of foundations, columns, beams and slabs using two programs: STAAD.PRO and RCC Design Suite. LG Kalurkar: Design and calculation of a multi-storey building G+5 using composite structures in seismic zone-3. 3D modeling and structural analysis are performed using SAP 2000 software, and both composite structures and reinforced concrete structures are analyzed using the equivalent static analysis method and response spectrum analysis method. Comparison of the results showed that the composite structure was more economical.

3. METHODOLOGY:

Modeling:

- (C+G+5) Residential and commercial buildings.

Load:

- 1.5 (dynamic load + static load).

Analysis:

- Analysis of reinforced concrete frame structures.
- Calculation of shear forces and bending moments.

Design:

- Design of floors, beams, columns, footings and stairs.

Geometric parameters:

- Beam = 230*300mm. Pillar = 230*300mm. Plate = 150mm.

4. GOAL:

- Test the safe bearing capacity of the soil.
- Drawing up the plan of the support frame
- Create a model in STAAD PRO
- Apply load to the bar
- Structure Analysis
- Design the structure (manual design).

5. ABOUT STAAD PRO

It is one of the effective software that civil engineers use to analyze and design structures. Our project aims to do with Staad.pro. STAAD Pro provides better and more accurate results than manual techniques. Features • Analysis and design tools • Graphical user interface simulations • Input/output files • Results according to India and other standards • Report generation

5.1 DESIGN ANALYSIS OF STRUCTURAL ELEMENTS

Simulation analysis is performed in STAAD PRO,

STAAD Pro is a powerful program used for structural analysis and design. It focuses primarily on the analysis and design of structures, but also includes a 3D modeling component that can be used to create and manipulate models.

To create a 3D model in STAAD Pro, you must first define the geometry of the structure. This can be done using the software's graphical user interface (GUI), which includes tools for drawing lines, circles, rectangles, and other shapes. After creating the basic geometry of the structure, you can add additional details such as columns, beams, and other structural elements. STAAD Pro uses a process called extrusion to create 3D models from 2D geometry. Extrusion involves taking a 2D shape and extending it along a given path to create a 3D object. For example, you can extrude a rectangle to create a column or extrude a circle to create a curved beam.

After creating a 3D model, STAAD Pro can be used to analyze and design the structure. The software includes a variety of analysis tools including static, dynamic and nonlinear analysis, and tools for designing steel, concrete, timber and other types of structures. Overall, STAAD Pro provides a powerful toolset for creating, analyzing and designing 3D structural models. Whether designing bridges, buildings or other structures, STAAD Pro can help you create accurate and reliable models that fit your needs.

In STAAD PRO, a beam number is a unique identifier assigned to each beam element in a structural model. This number is assigned automatically by the program when the beam is created and is used to reference a specific beam during analysis and design.

Beam number is important for several reasons. First, engineers can quickly and easily identify specific beams in a model that are essential for change or troubleshooting. Second, it is used to refer to the analysis results such as internal force and moment acting on the beam. Finally, beam numbers are used to create detailed engineering drawings and reports used in construction.

In general, the number of beams is an important component of any structural analysis and design process and plays a key role in ensuring the safety and reliability of the final structure.

STAAD Pro is a structural analysis and design software mainly used for analysis and design of structures such as buildings, bridges and other structures. It has some 3D rendering capabilities, but its main focus is structural analysis and design.

To create 3D visualizations in STAAD Pro, you can use the View/Plot Graphical Display option in the program. This allows you to view structures in a 3D environment and adjust display settings to create more realistic renderings.

Some of the customizable settings include lighting, colors, and building materials. You can also add textures and images to create more detailed and realistic renderings.

However, it should be noted that STAAD Pro is not dedicated 3D rendering software and may not have the same level of detail and realism as dedicated rendering software such as Autodesk 3ds Max or SketchUp.

In general, STAAD Pro has some 3D visualization capabilities, but its main focus is structural analysis and design. If you need to create high-quality 3D renderings, it may be more appropriate to use dedicated 3D rendering software.

5.2 CONSTRUCTION OF REINFORCED CONCRETE ELEMENTS

RCCs are slabs, beams, columns, foundations, ladders, etc.

5.2.1 SLAB CALCULATION

Slabs are the most widely used structural elements that form the floors and roofs of buildings. Plates mainly take transverse loads and transfer them to supports due to bending action in several directions or in one direction. Depending on the direction of coverage, there are two types of double sided slabs and double sided slabs.

5.2.1.1 Section slab: When a slab is supported on two opposite parallel edges, it moves only in the direction perpendicular to the supporting edge. It is bent in one direction and cast steel is provided in the span direction. Such slabs are called single-sided slabs.

5.2.1.2 Double sided slab: Where the slab is supported at four corners and the load is also distributed to the four corners of the panel. Reinforcements are provided on both sides. These plates are known as duplex plates.

5.2.2 Beam Structure There are three types of reinforced concrete beams. 1 single bar beam 2 double bar beam

5.2.2.1 Reinforced Single Beam: In a single reinforced shear beam, a steel bar is placed near the bottom of the beam that effectively resists bending tensile stresses.

5.2.2.2 Double stiffened beams: stiffened in compression and tension regions. Compression steel is needed for two reasons. When the beam depth is limited. A single reinforcing beam is not strong enough.

5.2.3 COLUMN A column may be defined as an element used primary to support axial compressive loads and with a height of a least three times its lateral dimension. The strength of column depends upon the strength of materials, shape and size of cross section, length and degree of proportional and dedicational restrains at its ends.

5.2.4 FOOTING Foundations are structural elements that transfer loads from the building or individual column to the earth .If these loads are to be properly transmitted, foundations must be designed to prevent excessive settlement or rotation, to minimize differential settlement and to provide adequate safety against sliding and overturning.

5.2.5 Design of stair case The purpose of a stair case to provide access to pedestrian in a building. The geometrical forms of staircase may be quite different depending on the individual circumstances involved. The shape and structural layout of a staircase usually depends on two main factors. 1. Structure type of stair perimeter structure: load-bearing brick structure or reinforced concrete frame structure. 2. Availability of space. The stair type provided in the proposed building is a two-story branch stair. The first span is from plinth level to lintel level, and the second span is from lintel level to roof level.

6. CONCLUSIONS

1. Short-term deflection of all horizontal elements does not exceed 20 mm.

2. Structural elements of buildings are resistant to shear and bending.

3.The amount of steel provided for the structure is economically advantageous.

4. There is no significant difference between the results of STAAD Pro analysis and the Kanis method.

5. Elements of suggested sizes are available for design.

7. REFERENCES

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BIOGRAPHIES (Not Essential)

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