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BY USING STAAD PRO & MANUAL CALCULATIONS ANALYSIS &DESIGN OF MULTI STORIED RESIDENTIAL BUILDING

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ABSTRACT

This is a project report analyzing and crafty the multi-story construction. The project report uses STAAD.Pro spreadsheet. The project is established most of the spreadsheet and you need to experience allure analyses. The main objective of the project search out design and analyze multi-story constructions, containing manual load forethought. This project is a limited state project that gives in accompanies the Indian Standard Code of Practice. STAAD-Pro has the most advanced level user interface, imagination finishes, state-of-the-art restricted elements and active reasoning, strong data. This is a monetary alternative that determines and redirects the consumer to view and validate results. Our last work was a correct design and study. It was analyzed utilizing various load associations. Each floor had 97 beams and 24 beams. Each floor had a crest of 3.5 meters. With the help of STAAD-Pro, determined from wind substance at various altitudes and rigidly obedient accompanying IS : 875 qualifications. shock load forecast was fashioned after IS: 1893-2002. Complicated and elevated explanation demands plenty of forecast opportunity utilizing normal manual means. So STAAD-Pro spreadsheet offers the united states of America a fast, adept, handy, and correct program to analyze and design makeups.

I. INTRODUCTION

Evaluation and layout of a multi-story building for use for residential purposes with the use of STAAD pro and manual calculation. the main motive of this project is to apply the knowledge of the school room to the real world by designing a multi-storied residential building. those systems require massive and clear areas now not blocked through pillars. The large ground area offers adequate flexibility as nicely a center for the later exchange of production shape without important structural exchange. The residential homes are constructed with adequate overhead use. A well-known architectural software program for model development, analysis, and object composition is STAAD PRO. V8i. It seamlessly integrates with a few other modeling and design software programs and has an intuitive, simple-to-use GUI, visual tools, dynamic analysis, and design sections. All versions of Windows are fully compatible with the software, however, Windows XP was the focus of its design. To examine the structure and integrated design of steel, concrete, timber, and aluminum, use a general-purpose calculator engine. Before testing the correctness of the results, we first used STAAD PRO to solve some sample issues. The outcomes were correct and pleasant. We began our study by performing basic arithmetic on building loads and keeping track of earthquake and wind loads. A collection of learned statistics and natural laws are part of structural analysis, which also forecasts structural behavior. It is extremely evident that the analysis of the structure can be used to steer the engineering design process or to demonstrate the soundness of the design without relying on direct inspection.

- PROJECT STATEMENT :

The design data will be as follows:

Live load = 2.0 KN/m2.
Floor finish = 1.0 KN/m2.
Partition weight = 2.0 KN/m2.
Location = Nagpur city (Zone II).

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Depth of foundation underground = 2.5 m.
The safe carrying capacity of the ground = 200 KN/m2.
Floor height = 3.5m.
Plants = stilts + G + 4 upper floors.
Ground beam = to be provided 100 mm below GL.
Plinth level = 0.6m.

II. WORKING

The stoner, or GUI, communicates with the analysis machine through the input train of the STAAD analysis machine. This train is a textbook example, following a sequence of commands that must be executed in order. The STADD enter train can be created via a textbook editor or GUI Modelling setup. In popular, any textbook editor can be employed to edit/ produce the STAAD input train. The GUI Modelling installation creates the entrance train via an interactive menu-drivenplates familiar method.

- Support :
  Supports are categorized as Pinned and Fixed, each with its own set of conditions. A Pinned Support restricts translational movement in all directions but does not restrict rotational movement. This means that it will offer reactions to all forces but will not resist any movement. On the other hand, a Fixed Support restrains movement in all directions.
- Load : In a structure, the load can be categorized as member loading, joint loading, fixed-end member loading, and temperature loading.
- Design parameter : Well-known all of the parameters which can be used to perform layout as according to IS: 456. Some other parameters are required to apply IS: 13920. Default parameter values have been decided on for a traditional layout requirement.
- Beam design : The beam design is executed as in line with IS: 13920 the width of the member shall no longer be much less than 200mm. the design procedure is equal to IS: 456.
- Column Design: Column layout is done as per IS 456: 2000
- Deflection check: In this installation, the user can use deflection as a criterion for CODE CHECK and Member Selection.
- Check for Earthquake Collapse:
  This tests at every column/ beam interface, and the schedule tests that the ability of the column exceeds the whole capacity of all beams that conjugate to it. The earthquake takes a look at only uses the outcomes from layout businesses that have layout missions from the named design code.
- Loading: The loading has been calculated partially manually and the rest became generated by the use of STAAD.pro load generator. The loading cases have been labeled as:

1. Wind load
2. Dead load
3. Live load
4. Seismic load
5. Load combinations

III. MANUAL CALCULATION

❖ DESIGN OF SLAB :

After manual calculation some results may be found: Load calculation for floor slab:
Fy = 415 N /mm^2
Fx = 25 N / mm^2
The thickness of the slab:
D = 150mm

❖ Effective span:

Lx = 4.5 + 0.1 = 4.6m

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Ly= 4.93 + 0.1 = 5.03m

❖ Loads:

Self -Weight of slab and floor finishes = 3.5KN /m^2
Weight of partitions = 2KN /m^2
Live load = 2.00 KN/m^2
Total loads on floor slab = 7.5 KN /m^2
Factored load =1.5×7.5 = 11.25 KN /m^2
Ly/Lx Ratio = 5.03/4.6 = 1.09 < 2
Hence two-way slab will be designed.

❖ DESIGN OF FOOTING: Data of column C16 :

Column load (P) = 4030.83 KN
SBC = 200 KN / m^2
Self-weight of footing is 10% of P
Self-weight = 403.083 KN
Total load = 4433.913 KN
Size of column = 300×900mm
Area of footing = 4433.913/20 = 22.169m^2
Size of footing = 5 × 5 m^2
Depth of footing = 1057.7mm

❖ DESIGN OF STAIRCASE:

According to the given plan, the stair measures 2.13m × 6.22m, Floor height is 3.5 m.
Let us keep the width of each flight = 1.0 m
Height of each flight = 3.0/2 = 1.50 m

IV. CONCLUSIONS

1. This project is mainly focused on the analysis and fashion of a multi-storied residential building with all possible instances of the loadings using STAAD.pro assembly the planning demanding situations are defined conceptually.
2. We can also test the deflection of various individuals beneath the given loading.
3. Similarly simply in the case of rectification it's easy to differ the values at the region in which the error befell and consequently the acquired results are generated in the output.
3. Very much less space is required for the storage of the info.
4. STAAD. Pro V8i is a complicated software that presents us with a quick, green, platform for analyzing and designing systems.

V. REFERENCES

[1] IS 875 (Part 5)-1987 for special loads and combinations
[2] IS 1893 (Part 1)-2002 criteria for earthquake-resistant design
[3] IS 456-2000 for plain and reinforced concrete
[4] 1S 875 (Part 1)-1987 for dead load
[5] IS 875 (Part 2)-1987 for Imposed load
[6] IS 875 (Part 3)-1987 for wind load
[7] Reinforced concrete - Limit State Design by join