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Analysis and Design of G+ 10 Apartments Building Using Staad Pro

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Abstract
The aim of this paper is to determine as a equal to this an attempt is made to analyze and design a Multistoried building by using a software package STAAD Pro For analyzing a multi storied building one has to consider all the possible ladings and see that the structure is safe against all possible loading conditions. STAAD Pro stands for Structural Analysis and Designing program. The main objective of this project is to analyze and design a (G+10) multi-storey building using STAAD Pro.
Keywords: *STAAD PRO, AUTO CAD MULTI-STOREY BUILDING, DESIGN AND ANALYSIS.*

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I. INTRODUCTION

A Structure can be defined as a body with can resist the applied load without appreciatable deformation .Civil engineering structure are created to serve some Specific Function like human habitation ,transportation ,bridges ,storage , etc.. In a safe and economical way. A structure is assemblage of individual element like pinned element (truss element), beam element, column, shear wall slab cable arch. Structure Engineering is concerned with the planning .Designing and construction of structure. Structure analysis involves the determination of the force and displacement of the structure of component of a structure. Design process Involves the selection and detailing of the components that make up the structural system. The main object of reinforced concrete design is to achieve a structure that will result in a safe economical solution.

- Slab Design
- Beam Design
- Column Design

1.1.1 Stages in structural design:

The process of structural design involves the following stages:

- Structural planning, computation of loads,
- Method of analysis, member design and detailing,
- Drawing and preparation of schedules.

1.1.2 Scope of this study:

i. To understand basic principles of the structure using IS codes. To analyses the structural details of the structure.
ii. To understand the design parameter of the beams, slab, column, Staircase and other structural entities.
iii. To prepare the 3D model of the structure by use of the software for detailed design and analysis.
iv. To design G + 10 residential building using STAAD pro Software in order to design and analysis the building to its maximum accuracy and economic value.
v. The main aim is to analysis and design the multi stored building by using this two software.

1.1.3 Objective of this study:

- Generate structural framing plan.
- Creating model in STAAD PRO.
- Application of loads on the member.
- Analysis of the structure.
- Design of the structure (manual design).

II. LITERATURE REVIEW

- **Aman, NalwadgiM, Vishal T and Gajendra, June 2016, 888-891. Aman, Nalwadgi M, Vishal T and Gajendra**: Analysis and Design of multi-storey building at Gulbarga city, Karnataka, India. The study includes design of columns beams footings and slabs by well known civil engineering software named as STAAD- PRO.

- **Deshmukh D.R, Yadav.A.K, Supekar S.N, Thakur A.B, Sonawane H.P and Jain I.M. July 2016,17-19 Deshmukh D.R, Yadav.A.K , Supekar S.N , Thakur A.B, Sonawane H.P and Jain I.M** :- Analysis and Design of G+19Multistoried Building .The study includes designing of multistory building by well known civil engineering software named as STAAD-PRO and it also includes wind and Seismic load. They also compare the results of earthquake load applied on structure by STAAD-Pro and manual calculations both by seismic coefficient method.

- **P. Jayachandran and S.Rajasekaran, India-2006. P Jayachandran:** The design and analysis of multistoried G+4 building at Salem, tamilnadu, India. The study includes design and analysis of footings, columns, beams and slabs by using two**.**

III. METHODOLOGY

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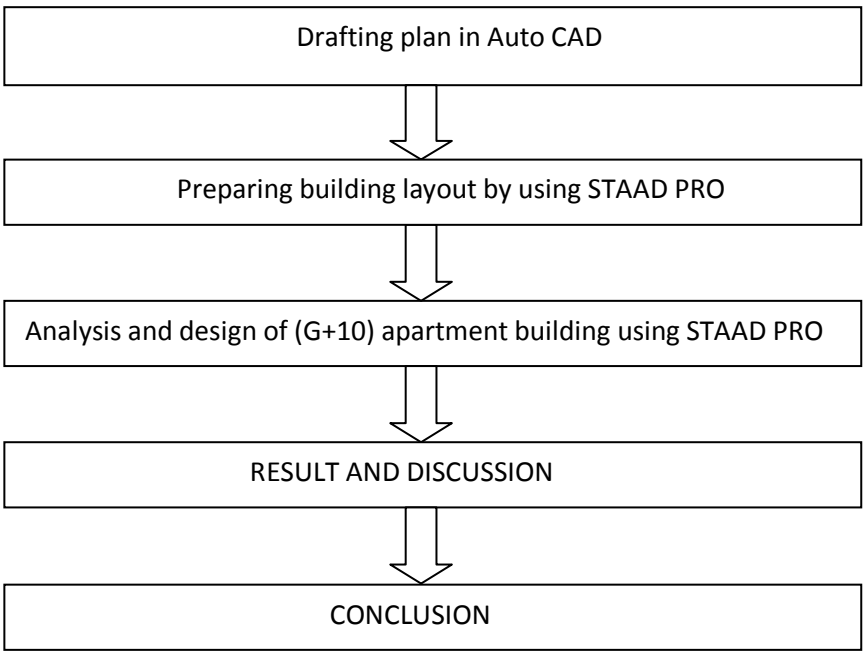


IV. INTRODUCTION OF STAAD PRO

STAAD PRO is one of the most widely used structural analysis and design software products worldwide. It supports over 90 international steel, concrete, timber & aluminum design codes. It can make use of various forms of analysis from the traditional static analysis to more recent analysis methods like p-delta analysis, geometric non-linear analysis, Pushover analysis (Static-Non Linear Analysis) or a buckling analysis. It can also make use of various forms of dynamic analysis methods from time history analysis to response spectrum analysis. The response spectrum analysis feature is supported for both users defined spectra as well as a number of international code specified spectra.

4.1 AUTO CAD

AutoCAD is powerful software licensed by auto desk. The word auto desk company and cad stands for computer aided design. AutoCAD is used for drawing different layouts, details, plans, elevation, section, and different section can be shown in auto cad. It's very useful software for civil, mechanical, and also electrical engineer this important of this software make every engineer a compulsion to learn this software's . We used Auto CAD for drawing the plan, elevation of a residential building. We also used AutoCAD to show the reinforcement details and design Details of a stair case. AutoCAD is very easy software to learn and much user friendly for anyone to handle and can be learn quickly learnig of certain commands is required to draw in AutoCAD**.**

V. SELECTED PLAN

VI. ANALYSIS AND DESIGN OF G+ 10 APARTMENTS BUILDING USING STAAD PRO

The modeling analysis is done in the STAAD PRO

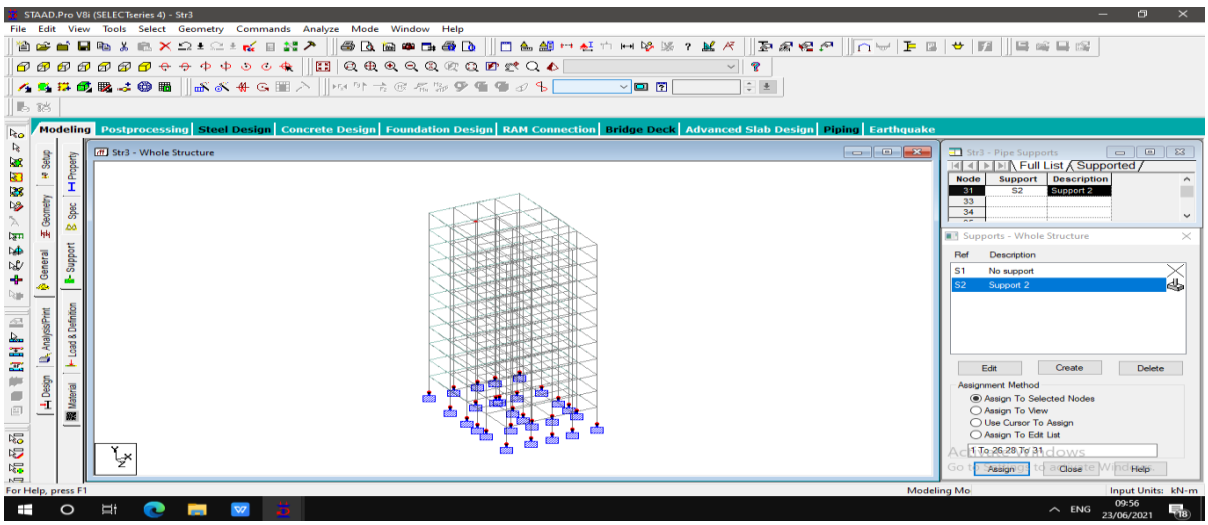


Fig2. 3D modeling view

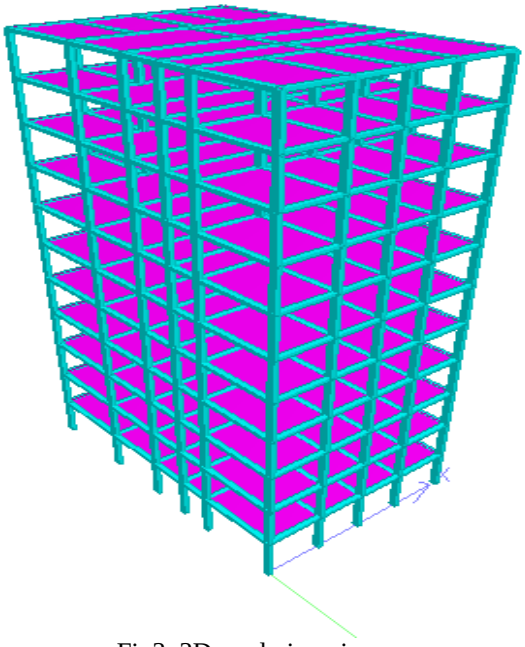


Fig3. 3D rendering view

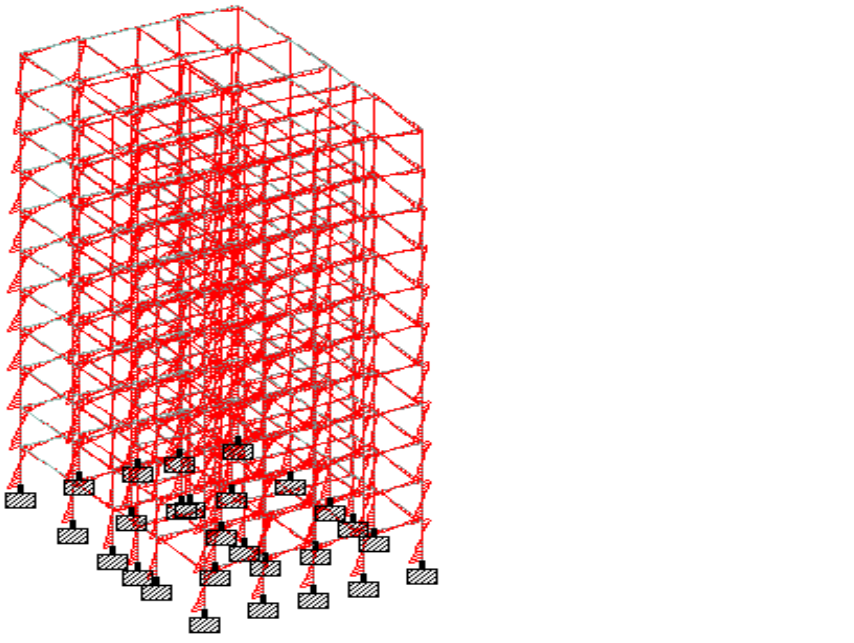


Fig4.Bending moment diagram

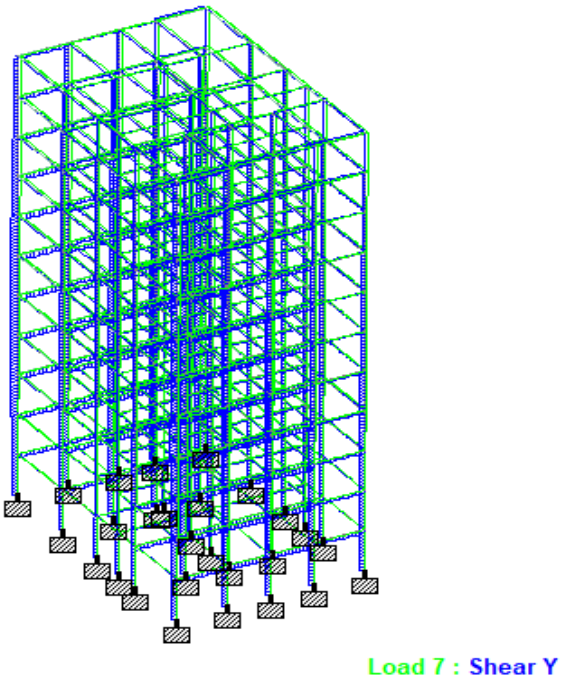
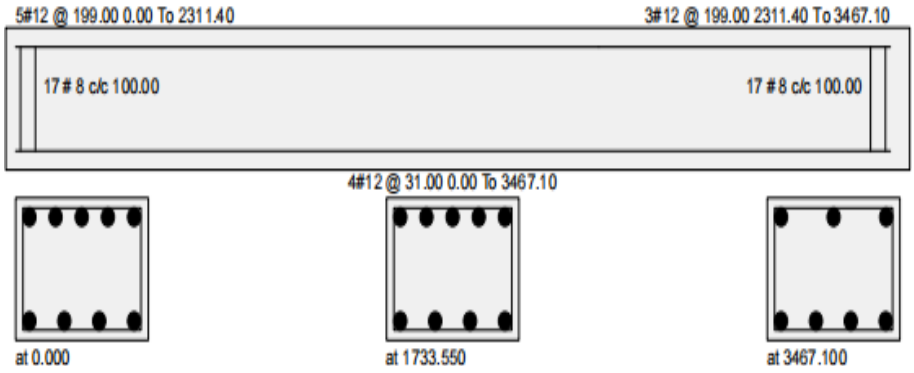


Fig5.Shear force diagram

VII.DESIGN OF BEAM

In each floor there are totally 92 beams which comprises of both singly reinforced and doubly reinforced beams. Beam size of 450mmX600mm is constant throughout the floor and the stirrups provided for all the beams are 2-Legged- 8mm diameter bars at 200mm c/c.

Design Code: IS-456



Design Load

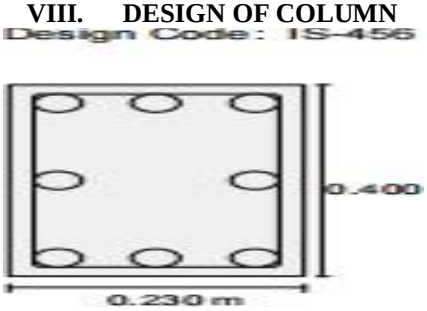
Mz(Kn Met)	Dist.et	Load
26.180000	3.500000	5
-28.990000	0.000000	5
-7.740000	3.500000	1

Design Parameter

Fy(Mpa)	415.000000
Fc(Mpa)	30.000000
Depth(m)	0.230000
Width(m)	0.300000
Length(m)	3.467099

Fig.6 Beam design

VIII. DESIGN OF COLUMN



Design Load

Load	1
Location	Long Col
Pu(Kns)	55.990002
Mz(Kns-Mt)	15.640000
My(Kns-Mt)	13.430000

Design Results

Fy(Mpa)	415
Fc(Mpa)	30
As Reqd(mm²)	1549.000000
As (%)	1.748000
Bar Size	16
Bar No	8

Fig7. Design of column

IX. CONCLUSION

Planning, analysis and design of G+10 multi-storey residential building was done. It's a G+10 storied building with parking in the basement and the rest of the floors are occupied with apartments. All the structural components were designed using AutoCAD. The analysis and design were done according to standard specifications using STAAD Pro for static and dynamic loads. The dimensions of structural members are specified and the loads such as dead load, live load, floor load seismic load, wind load and earthquake load are applied. Deflection and shear tests are checked for beams, columns and slabs. The tests proved to be safe. Hence, I conclude that we can again more knowledge in practical work when compared to theoretical work.

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CONCLUSION

It was observed that the rerun column bottom stream temperature has greater effect on the linear alkylbenzene yield than the temperature variation of the top stream. At higher temperature of both streams , lower percentage yield of average wt. % of linear alkylbenzene was obtained with that of the top stream being the lowest at 87.5% as against 93.3% for the bottom stream. The highest linear alkylbenzene yield of 99.4%was recorded at bottom stream temperature of 280^{o}C and pressure of 115Kpa.

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