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Design And Analysis Of Duplex House by Using E tabs

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Abstract - The scope of our work includes designing the said DUPLEX HOUSE as per the Indian Standard codes. Building can be drawn by hand or can be drawn with the use on computer programs. We have chosen to use programs for this project since it is more efficient than drawing on paper, which takes a lot of time and effort, and can be mistaken, whereas if we use programs, we save time, and get results without mistakes. Software such as ETABS for analysis and design of "Civil Engineering structures" used to be a rarity, but today there are a number of such software packages available on the market. Present work used software's. The advantage of using the software is that it is user friendly and has exceptional features like it designs the structural components individually with their Analysis and Results attributes.

Key Words: Shear force, bending moment, Deflection slabs ,beams,columns,footings, E tab,AUTO CAD IS 456-Plain reinforced concrete

1.INTRODUCTION

We were smoothly driven to operate this assignment owing to daily changes in the designing of the structures. This project was taken because civil engineering is much oriented towards the various designs with the aim of satisfying the need of mankind.

As the land is greatly limited in order to meet the needs of the ever increasing population the construction of multi storied buildings has risen to serve their needs. Since it is more of economical.

1.1 STEEL REINFORCEMENT:

Steel bars are principally utilized in the tension region of members of concrete due to the reason that concrete is weak in tension and also in compression members to improve the load bearing value.

I couldn't help but notice the huge cracks on the steel bars especially on some flexor members with tensions in concrete. There was immeasurable tensile stress placed on these members since the steel was utilized as reinforcement.

1.2 FUNCTION OF REINFORCEMENT IN RCC:

The reinforcement in RCC serves the following different types of functions,

- To resist the bending tension in flexor members like slabs, beams and walls of water tanks etc.
- To increase the load carrying capacity of compression members like columns
- To resist diagonal tension due to shear.
- To resist the effects of secondary stresses like temperature etc.
- To reduce the shrinkage of concrete.
- To resist spiral cracking due to torsion.
- To prevent the emergence of wide cracks in concrete due to tensile strain.

2. LITERATURE SURVEY

2.1 BUILDING PLAN

Kano's, Mann pours in (2000) presented novel methodology for seismic design of RC building based on feasible partial inelastic model of the structure and performance criteria for two distinct limit states. The

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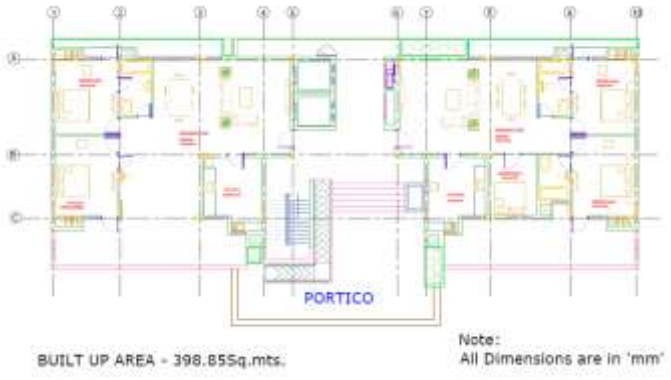
procedure is developed in format which can be incorporated within the design codes like Euro code 8.

Time History (Nonlinear dynamic analysis) and Pushover Analysis (Nonlinear Static) analysis were

undertaken. The adopted method performed better in terms of seismic performance than standard code procedure, at least in case of regular RC frame building. It was observed that the behavior under "life-safety" was easier to control than under serviceability earthquake because of the adoption of performance criteria involving ductility requirements of members for "life-safety" earthquake. Esmail et al. (2008) considered the structural aspect of a 56 stories high tower located in a high seismic zone in Tehran. Non-linear dynamic analysis was applied to evaluate the seismic aspect of the building.

Shiva K.G (2010) investigated the seismic performance of reinforced concrete buildings with concentric steel bracing. Analysis of a four, eight, twelve and sixteen storied building in seismic zone IV was done by using E-tabs software as per IS 1893: 2002 (Part-I). The bracing was provided for peripheral columns, and the effectiveness of steel bracing distribution along the height of the building, on the seismic performance of the building was studied.



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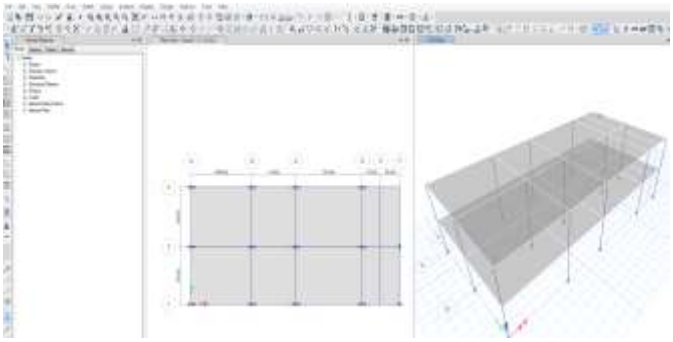
3. ANALYSIS AND DESIGN

3.1 LOADS

1. Dead load:

Dead loads are permanent or stationary loads which are transferred to the structure throughout their life span. Dead loads mainly cause due to self-weight of structural members, permanent partitions, fixed equipment's and fittings. These loads shall be calculated by estimating the quantity of each material and them multiplying it with the unit weight. The unit weights of various materials used in building construction are given in the code IS 875 (part -1) -1987.



2. Live loads (or) imposed loads:

These are the loads that change with time. Live loads or imposed loads consist of loads due to people who occupy the floor, weight of movable partitions, weight of furniture and materials. The live loads to be taken in design of buildings have been given in IS:875 (part-2) -1987. 2. Live loads (or) imposed loads:
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3. Wind Loads

It is also called as wind loads. Its calculation will depend up on wind velocity and shapes and size of

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buildings. The details of calculating wind loads on the structures are given in IS 875(part-3)-1987.

4. DESIGN OF STAIR CASE:

4.1 DESIGNOFSTAIRCASE:

A stair is as eerier steps arranged in such a manner as to connect different floors of building. Stairs are designed to provide an easy and quick access to the different floors. The stairs should be thought fully located, carefully planned, taste fully designed, serving its purpose and being economical in construction.
Stairs are offered in a building to offer a mean so communication between he various floors, they are called

stair case. Since they have to perform the very important function, the lab over which the steps rests should be designed properly to provide maximum comfort,easy&safety.The most important aspect in providing stair case is its location. The location of stair case should be such as to provide an easy access so that in case of any casual occupants should be placed in the centre or to the side of a building. The location depends up on the position of the rooms the type of approach needed. In the commercial buildings, its should be placed centrally so a sto:

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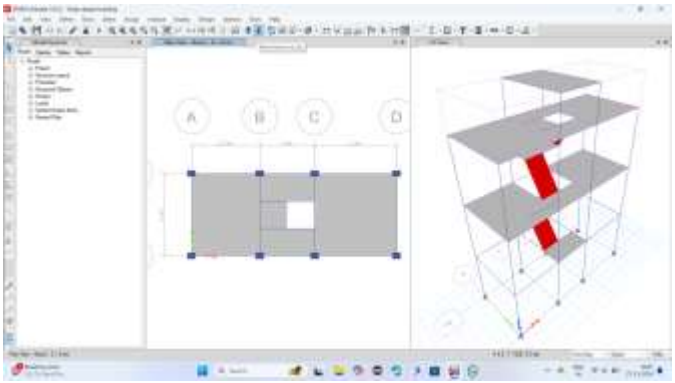

Design of liquid retaining structure has to be based on the avoid an of cracking in the concrete having regard to its tensile strength.It has to been sure in its design that concrete does not crack on its water face.Cracking may also result Rom there strait to shrinkage, free expansion contraction of concrete

due to temperature &shrinkage and Swelling due to moisture effects. Correct placing of reinforcement,

use of small size bar, use of deformed bars leads to diffused cracking. The risk of cracking due to total temperature shrinkage effects may be kept at minimum by keeping within limits the changes in the moisture content temperature, in which the structure as such has been subjected. Cracks can be avoided by avoiding the use of thick timbers Shuttering which prevent the easy escape of heat of hydration from the mass. The risk of cracking can also be minimized by reducing there strain son the free expansion contraction of the structure.

Classification of stairs:

According to structural aspect:

1.Stairs panning horizontally.
Stairs panning longitudinally.

According to arrangement aspect:
1Straight stairs.
2Quarter landing stairs
3Dog-legged Stairs.
4Open wells Stairs.

Guidelines for fixing the dimensions of the component parts of stairs:

1. The rise should be between 150mmto180mm and tread between 220mmto250mm for residential buildings. The riser should be between 120mmto150mm and tread between250mmto300mm for public buildings.

2. The sum of the tread and twice the rise(T+2R)should be between 500mm to 650mm.

3. The width of the stairs should be between 0.8mto1m for residential buildings. The width of stairs should be between 1.8mto2m for public buildings.

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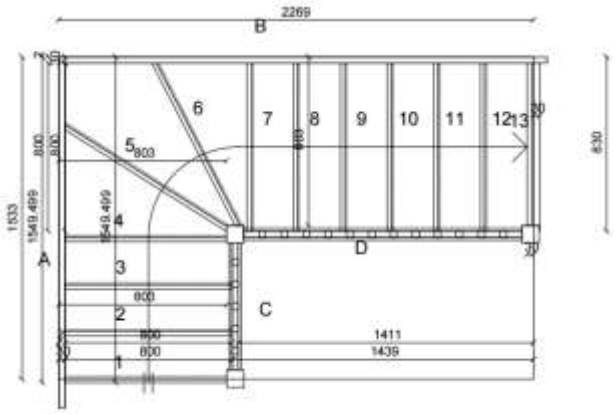
4. The width of landing should not be less than width of stairs.

5. The number of steps in each flight should not be greater than 12.

6. The pitch of the stair way should not be greater than380.

7. The head room measured vertically above any step or be low mid-landing shall not be less than 2.1m.

8. Avoid wind as far as possible.



5.CONCLUSION

We did a dual occupancy with two houses: one portion of building200 Sq. Mt sand one on a difficult block. The good thing about Latitude 37 is that they in-house designed the houses required to a brief and price. The first design of the drawing board was so good that we only altered it in small detail. Once the build started everything moved very quickly. When we were starting to finish, the quality control Latitude 37 demanded from their trades was of a very high standard. The build was finished 4 months ahead of schedule, to standard and under budget. I am very impressed by this company, and can recommend them highly. In the view above project was made it very advantages.

Some of the conclusions that can be drawn from the use of ETABS for the design and analysis of a duplex house are:
Efficient: It saves time and ensures accuracy in design.
Economical: The design can be economical and provide adequate strength and serviceability.
Versatile: ETABS can be used to analyze and design various components, including beams, columns, slabs, shear walls, and retaining walls.

Standard specifications: Standard specifications can be followed in design and analysis.

Soil investigation: The soil investigation report would determine the type of footing to be used.
Design constraints: The design procedure is often difficult and challenging with numerous constraints, which must be considered by the structural engineer.
Future scope: Dynamic analysis can be done in ETABS, and the designed sections can be compared to those designed conventionally or in STAAD.PRO.

Acknowledgment
I would like to take this opportunity to express my heartfelt gratitude and appreciation to the following individuals and organizations for their invaluable support, guidance, and contributions to this project on the Design and Analysis of a Duplex House Building Using ETABS:

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Finally, I wish to thank all those, directly or indirectly, who helped me complete this project successfully. I

really appreciate their contributions and support, and I hope this project will be a very valuable learning experience for me and others in the field.

6. REFERENCE

TEXT BOOKS:
REINFOECEMENET CONCERTE STUCTURES:
M.R.DHEERENDRA BABU
1.DESIGN OF STEEL STRUCTURES:
S.S.BHAVIKATTI
2.THEORY OF STRUCTURES: B.C.PUNMIA
3.DESIGN OF SLABS: Dr.G.P.CHANDRADHARA

IS CODE BOOKS REFERRED:
1.IS RCC CODE 456-2000
2.IS CODE 4326-1993 EARTH QUAKE RESISTANCE
3.IS CODE OF DESIGN STRENGTH 1566
4.IS CODE OF MILD STEEL 432-1982(part-1)
5.IS CODE OF HYSD 1786-1985
6.IS CODE OF LOADS 875 (part-2)-1987