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ANALYSIS AND DESIGN OF G+15 RCC BUILDING SUBJECTED TO LATERAL LOADS

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Abstract- A multi storey building is a building that has multiple floors above ground in the building. Multi-storey buildings aim to increase the floor area of the building without increasing thearea of the land and saving money. Analysis of multi-storey building frames involves lot of complications and edacious calculations by conventional methods. To carry out such analysis is a time-consuming task. Substitute frame method for analysis can be handy in approximate and quick analysis instead of bidding process. Till date, this method has been applied bydesigners for vertical loading conditions. The represented plan given to office purposes canaccommodate with minimum facilities. Generally buildings may be failed by bending moments, shear forces acting on members of the building. By keeping these failures in mind, we designed beams, columns, footings by considering maximum loads on members. For loads calculation, substitute frame method is used for reducing the complexity of calculations and saving time. We know R.C structural system are most common nowadays in urban regionswith multi-bay and multi-storeys, keeping its importance in urban regions especially, Abuilding frame consists of number of bays and storey. A multi-storey, multi-paneled frame is acomplicated statically intermediate structure. A design of R.C building of G+15 storey framework is taken up. The design is made using software on structural analysis design (staad-pro).The building subjected to both the vertical loads as well as horizontal loads. The vertical loadconsists of dead load of structural components such as beams, columns, slabs etc and liveloads. The horizontal load consists of the wind forces thus building is designed for dead load,live load and wind load and seismic loads as per IS 1893.

Key words: R.C structural system, R.C building of G+15 storey, IS 1893.

I.INTRODUCTION

These days earthquakes has become very frequent in the nature due to several reasons, here we don't discuss about the reasons of earthquake rather our subject is how to with stand the earthquake loads on the structures or buildings. This becomes the major criteria for us, as the earthquakes are becoming quite common to us designing the building or analyzing the buildings in general regular format using the static loads such as live load, dead load etc., we can't design a safer building especially in the case of high raised building it is because in high raised building there will be wind pressure on the building at greater magnitude which varies time to time depending upon the intensity, velocity and direction of wind i.e., dynamic in nature similarly to earth quake loads so as to withstand these type of loads, static methods are not enough and hence we go for dynamic analysis and we model the required structure using STADD PRO software and analyze the structure in the STADD PRO using the response spectra method.

In every aspect of human civilization needed structures to live in. Due to rapid growth of population the area is decreasing, so for human needs it is require build multi-storied building. Complicated and high-rise structures need very time taking and cumbersome calculations using conventional manual methods. Here in this project work based on software named staad pro has been used. STAAD.Pro provides us a fast, efficient, easy to use and accurate platform for analyzing and designing structures. Objective of this project is the comparative study on design and analysis of multistoried building (G+15) by staad-pro software and manually design. In this project we are going to analyze (G+15) building for bending moment, shear forces, deflections, reinforced details for structure components of buildings such as Beam, Columns and Slabs to develop economic design. Few standard problems also have been solved to show how staad pro can be used in different cases. These typical problems have been solved using basic concept of loading, analysis, condition as per IS code. The problems which we have done in a staad that we are comparing the problems or designing which done manually. It is the most popular software used now a day.

OPEN STOREY BUILDING

Reinforced concrete (RC) frame buildings are becoming increasingly common in urban India. Many such buildings constructed in recent times have a special feature – the ground storey is left open for the purpose of parking

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(Figure 1.1), i.e., columns in the ground storey do not have any partition walls (of either masonry or RC) between them. Such buildings are often called open ground storey buildings or buildings on stilts.

Figure 1: Open Ground Storey

An open ground storey building, having only columns in the ground storey and both partitiowalls and columns in the upper storeys, have two distinct characteristics, namely:

(a) It is relatively flexible in the ground storey, i.e., the relative horizontal displacement it undergoes in the ground storey is much larger than what each of the storeys above it does. This flexible ground storey is also called soft storey.

(b) It is relatively weak in ground storey, i.e., the total horizontal earthquake force it can carry in the ground storey is significantly smaller than what each of the storeys above it can carry. Thus, the open ground storey may also be a weak storey.

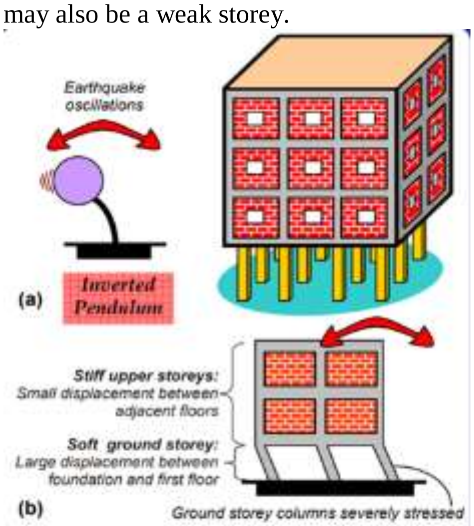

Figure 2: Upper storeys of open ground storey buildings move together as a single block

The presence of walls in upper storeys makes them much stiffer than the open ground storey. Thus, the upper storeys move almost together as a single block, and most of the horizontal displacement of the building occurs in the soft ground storey itself. In common language, this type of buildings can be explained as a building on chopsticks. Thus, such buildings swing back-and-forth like inverted pendulums during earthquake shaking (Figure 1.2 a), and the columns in the open ground storey are severely stressed (Figure 1.2 b). If the columns are weak (do not have the required strength to resist these high stresses) or if they do not have adequate ductility, they may be severely damaged (Figure 1.3a) which may even lead to collapse of the building (Figure 1.3b)

Figure 3: Consequences of open ground storeys in RC frame buildings

The existing open ground storey buildings need to be strengthened suitably so as to prevent them from collapsing during strong earthquake shaking. The owners should seek the services of qualified structural engineers who are able to suggest appropriate solutions to increase seismic safety of these buildings.

LOADS

Structural loads or actions are forces, deformations or accelerations applied to structure components. Loads causes stresses, deformations and displacements in structures. Assessment of their effects is carried out by the methods of structural analysis. Excess load or overloading may cause structural failure, and hence such possibility should be either considered in the design or strictly controlled. Mechanical structures such as aircraft, satellites, rockets, space stations, ships and submarines have their own particular structural loads and actions. Engineers often evaluate structural loads based upon published regulations, contracts or specifications. Accepted technical standards are used for acceptance testing and inspection. Indian standard code IS: 875–1987 and American Standard Code ASCE 7: Minimum Design Loads for Buildings and Other Structures deals with various design loads for structures. The different types of loads acting on a structure are broadly classified into following two types.

1.Vertical loads and 2. Horizontal loads

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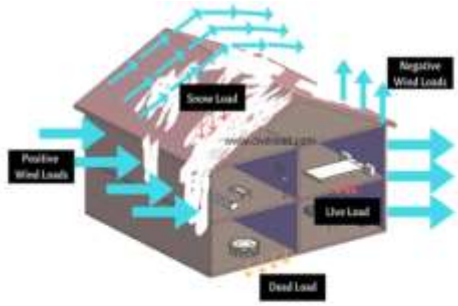

Figure 4: Types of loads on a structure

Vertical Loads:

Vertical loads are further classified into following types:

Dead Loads:

These loads are permanent loads which are carried to the structure throughout their lifespan. Dead loads are also called as stationary loads. These loads occur mainly due to the self-weight of the structural members, fittings, fixed partitions, fixed equipment, etc.

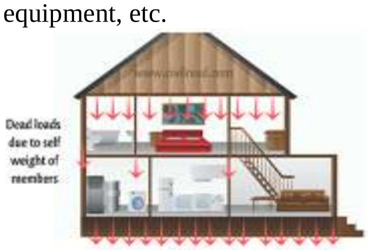

Figure 5: Dead loads on a structure

For suppose, to build a column we need steel bars, concrete, shuttering, etc. Well, concrete and bars are fixed members of the structure which are available throughout their lifespan whereas shuttering is a temporary member, which is used to keep concrete in the desired position. Shuttering is taken off from the structure after curing. From above, concrete and steel bars self-weights are considered as a dead load and load of a shuttering is not.

Live Loads:

As the name itself resembling that these type of loads are real-time loads. Live loads are also called as imposed or sudden loads. Live loads changes with respect to time. This type of loading may come and go. For example, at one moment the room may be empty hence the live load is zero. If the same room is packed with the people, then the live load intensity will vary considerably. The live load includes the weight of furniture, people occupying the floor, etc.

Figure 6: Live loads on a structure

Live loads are considered and added to the total load acting on a member at the time of designing of the building. Some of the common live load values used in the design of buildings is tabulated below:

Table 1.1: Live load values for different types of structures

Types of floors	Minimum Live load KN/m2
Floors in houses, hospital wards, dormitories	2.0
Office floors other than entrance halls	2.5 & 4.0 2.5 when separate storage facility provided, otherwise 4.0
Shops, educational buildings, assembly buildings, restaurants	4.0
Banking halls, office entrance halls	3.0
office floors for storage, assembly floor space without seating, public rooms in hotels, dance halls, waiting halls	5.0
Ware houses, workshops, factories	Light wt loads- 5.0 Medium - 7.5 Heavy - 10.0
Garages	4.0-7.5
Stairs, landings, balconies and corridors for floors but not liable to overcrowding	3.0
Stairs, landings, balconies and corridors for floors liable to overcrowding	5.0
Flat slabs, sloped roofs	Access provided - 1.5 Access not provided - 0.75

Horizontal Loads

Wind loads:

These types of loads are considered in design if the height of the building is more than 15m. Wind loads are occurred due to the horizontal load caused by the wind. As an increase in using lighter materials in the construction, wind load for a building should be considered. The structure should be strong enough with the heavy dead weights and anchored to the ground to resist this wind load. If not, the building may blow away. Wind load acts horizontally towards roofs and walls.

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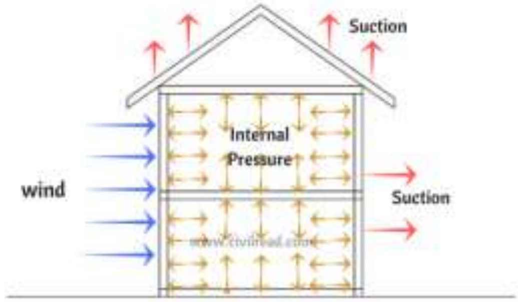

Figure 7: Wind loads on a structure

LOAD PATHS

Multiple elements are used to transmit and resist external loads within a building. These elements define the mechanism of load transfer in a building known as the load path. The load path extends from the roof through each structural element to the foundation. An understanding of the critical importance of a complete load path is essential for everyone involved in building design and construction.

The load path can be identified by considering the elements in the building that contribute to resisting the load and by observing how they transmit the load to the next element. Depending on the type of load to be transferred, there are two basic load paths:

• Gravity load path

• Lateral load path

Both the gravity and lateral load paths utilize a combination of horizontal and vertical structural components, as explained below.

Gravity Load Path

Gravity load is the vertical load acting on a building structure, including dead load and live load due to occupancy or snow. Gravity load on the floor and roof slabs is transferred to the columns or walls, down to the foundations, and then to the supporting soil beneath. Figure 1.9shows an isometric view of a concrete structure and a gravity load path.

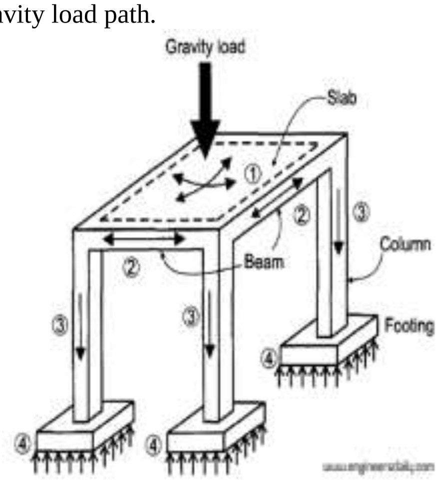

Figure 1.10: An isometric view of a concrete structure showing a gravity load path

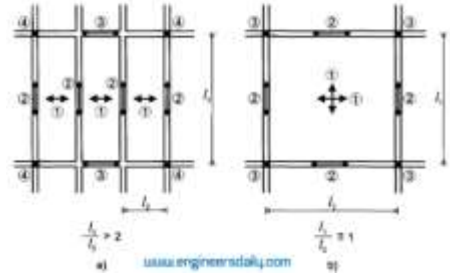

Figure 8: Gravity load path in a floor slab: a) one-way system; b) two-way system

Lateral Load Path

The lateral load path is the way lateral loads (mainly due to wind and earthquakes) are transferred through a building. The primary elements of a lateral load path are as follows:,

• Vertical components: shear walls and frames;

Horizontal components: roof, floors, and foundations.

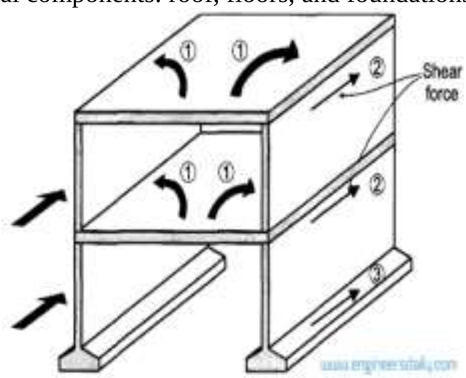

Figure 9: Lateral Load Path

Figure 1.11 shows a reinforced concrete structure and the elements constituting the lateral load path: roof and floor systems (I) transfer the load to the walls (2), which in turn transfer the load to the foundations (3). Roof and floor systems (also called diaphragms) take horizontal forces from the storeys at or above their level and transfer them to walls or frames in the storey immediately below.

Importance of the Study

The importance of this study is to control and reduce the potential damage that the earthquake may cause, although it is hard and uneconomical to design a building for all types of earthquake forces, therefore, this paper tends to find a solution which is safe and economic to stand against maximum considered earthquake in the area. Building failures are frequently due to shortage or lack of suitable local materials. For example, when the design required a certain amount of steel and its reduced to lower the overall cost its critical for the safety condition of the buildings. In seismic resistant building its important that the building joints are strong enough because the earthquake produces tensile and torsional forces on structural elements so a strong joint throughout the building is required to resist the shear loading that acts on the building during an earthquake.

During normal conditions the building elements only have vertical loads acting on the building but during an earthquake besides the vertical loads lateral forces act on the building elements as well, thus leading to high amounts of stress on the buildings joints. So the importance of this study is to show how to make a building that is properly grounded and how well the building is connected to the foundation. Another important point is that the building should not be built on loose soil because this causes more unimportant stress on the building during earthquakes.

II.LITRATURE REVIEW

Bedabrata Bhattacharjee & A.S.V. Nagender in their paper "Computer aided analysis and design of multi-storeyed buildings" states that the design involves calculation of loads manually and analyzing entire structure by STAAD Pro. The design methods used in STAAD Pro analysis is limit state design method with referrence to the IS Code of Practice. STAAD. Pro has a easy to use user interface, visualization tools, powerful analysis and design engines with advanced finite element and capable of dynamic analysis. At initial stage they started with the analysis of simple 2-D frames and manually checked the accuracy of the software with the results. The results proved to be very accurate. They analyzed and designed a G+7 storey building[2- D Frame] initially for various load combinations.

Mr. K. Prabin kumar, R. Sanjaynath in their paper "A study on design of multi-storey residential building - a review" concluded that at first, the planning of the structure is done using AutoCAD. Calculations of loads were done manually and then the structure was analyzed using STAAD Pro. STAAD Pro is straightforward to use so as that the frame are going to be drawn, load values and dimensions are given. The method used in STAAD Pro analysis is limit state method. STAAD Pro is able to calculate the reinforcement required for any concrete section. Different structural action is considered on members such as torsion, flexure, axial, etc. Shear reinforcement is sufficient to withstand each shear forces and torsional moments. Beams are designed for flexure, shear and torsion. Columns are delineated for axial forces at the ends. The building is planned as per IS: 456-2000.

III.OBJECTIVE AND METHODOLOGY

3.1Objective

1. To perform analysis and design of a building without any kind of failure as much as possible.
2. To make a building that is easy to maintain after a seismic activity and survive with the least amount of damage.
3. To get a better understanding of the basic principles of a seismic resistant building and prepare seismic resistant building by staad.pro software program for a better analysis.
4. To get a better understanding of the design from its columns, beams and seismic joints. To make a building that is safe and has a better chance of being safe during a seismic activity.
5. To analysis and design G+15 RCC building using Staad.pro software to with stand the gravity and lateral loads

3.2Methodology

Step 1- With the help of co-ordinate system, firstly we provide the nodes and connect them by using the command "ADD BEAM" to make the plan

Step 2- By selecting all the nodes, use of translation repeat with step spacing= -1.5m, and global direction as Y, No. of steps = 1.

Step 3- By selecting all beams of plan, use of translation repeat with step spacing = 3m, global direction = Y, No. steps = 5.

Step 4- Assigning supports to the structure.

Step 5-Assigning properties to the structure i.e. giving dimension to the beam and column.

Step 6- Seismic Load Definitions: In seismic Load Definitions we input the intensity details i.e., seismic intensities.

Step 7- Wind Load Definitions: In Wind Load Definitions we input the intensity details i.e., Wind intensities with respect to height.

Step 8- Load case details-

- Dead Load (DL)
- Live Load (LL)
- Wind Load (WL+X , WL-X, WL+Z and WL-Z)
- Seismic Load (EQ+X , EQ-X, EQ+Z and EQ-Z)

Step 8- Assigning loads to the structure.

Step 9- Analysis

Step 10- Design

Note : Designing is done as per IS 456:2000

IV.WORKING WITH STAAD.Pro

4.1 Methods of analysis of earthquake loads

All the structures are designed for the combined effects of gravity loads and seismic loads to verify that adequate vertical and lateral strength and stiffness are achieved to satisfy the structural performance and acceptance deformation levels prescribed in the governing building code. Because of the inherent factor of safety used in the design specification, most structures tend to adequately protected against vertical shaking. Vertical acceleration should also be considered in structures with large spans, those in which stability for design, or for overall stability analysis of structures.

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Seismic codes are unique to a particular region or country. In India, IS 1893:2002 (part-1) is the main code that provided outline for calculation of seismic design force. This force depends on the mass and seismic coefficient of the structure and later in turn depends on properties like seismic zone in which structure lies, importance of the structure, its stiffness, the soil on which it rests and ductility. IS 1893:2002 (part-1) deals with assessment of seismic loads on various structures and buildings.

The whole centers on the calculation of base shear and its distribution over height. The analysis can be performed on the basis of external action, the behavior of the structure or structural materials and the type of structural mode selected. In all that treated as discrete system having concentrated mass at floor levels, which include half the column and walls above and below the floor. In addition, appropriate of live load at this floor is also lumped with it.

DYNAMIC ANALYSIS

Structures on the earth are generally subjected to two types of loads i.e. static and dynamic. Static loads are constant with time while dynamic loads are time varying. In general, the majority of the civil structures we design assuming only the static loads. The effect of dynamic load is not actually considered in many cases it is because, in India the structures are rarely effected by the earthquake and more over its considerations in the analysis makes the solution more complicated and time consuming. This negligence is the reason for the cause of disaster in most of the cases, particularly in case of earthquake the negligence of dynamic forces are only the reason for the disaster. Nowadays, there is a growing interest in the process of designing civil engineering structures capable to withstand dynamic loads, particularly, earth quake induced load. The present project is the analysis of a multi-storey structure by considering the dynamic loads on the structure depending up on the zone as per IS code.

India is divided into multiple zones based upon the intensity of the earthquakes depending upon the local circumstances and this division is shown in the Indian map below.

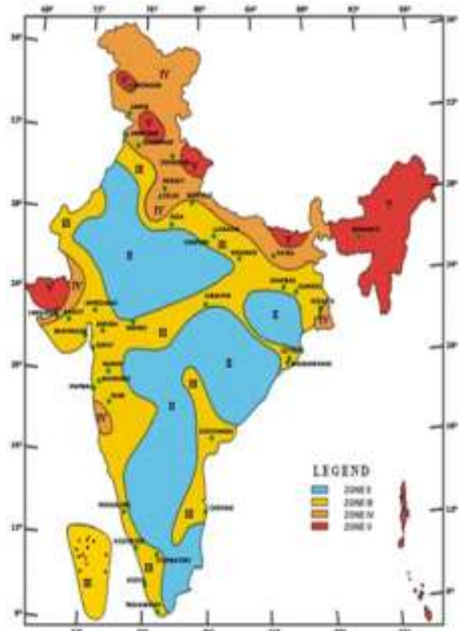

Figure 10: Zones in India

STATIC ANALYSIS

The structural analysis focuses on the changes occurring in the behaviour of a physical structure under observation when provided with a force or in case of structures load. Now if this load is quasi (very slow), the inertia forces from the basis of newton’s first law of motion it can be neglected and the analysis becomes static. The static loads are very slow on the time rate graph.

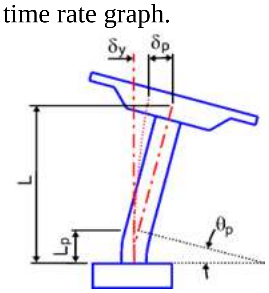

Figure 11. Push over deformation

It represents a direct evaluation of overall structural response, not only on an element by element basis but also allows evaluation of inelastic deformations the most relevant response quantity in the case of inelastic response. Allows evaluation of the plastic mechanism and redundancy of the structure .

LINEAR STATIC ANALYSIS

This method of finding lateral force is also known as the static method or equivalent static method or seismic coefficient method. The static method is the simplest one and it required less computational effort and it is based on formula given in the code of practice IS 1893:2002 (part-1). The design against seismic loads must consider the equivalent linear static methods. It is to be done with an

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estimation of base shear load and its distribution on each story calculated by using formula given in the code.

LINEAR DYNAMIC ANALYSIS

Response spectrum method is the linear dynamic analysis method. In that method the peak response of structure during an earthquake is obtained directly from the earthquake response, but this is quite accurate for structural design applications.

In linear time history analysis overcomes all the disadvantages of modal response spectrum analysis, provide non-linear behavior is not involved, the support points of the model are oscillated back and forth in accordance to a recoded ground motion of an actually occurred earthquake (as recorded by a seismograph and available in tabular form of time vs acceleration).

4.2 Methods of analysis of wind loads

The emergence of modern materials and construction techniques resulted in structures that are often, to a degree unknown in the past, remarkably low in damping, and light in weight. Generally such structures are more affected by the action of wind. The structural engineer should ensure that the structure should be safe and serviceable during its anticipated life even if it is subjected to wind loads. Wind forms the predominant source of loads, in tall free-standing structures. The effect of wind on tall structures can be divided into two components they are

1. Along-wind Effect
2. Across-wind Effect

Along wind loads are caused by the drag components of the wind force whereas the across wind loads are caused by the corresponding lift components.

WIND LOADS ON TALL BUILDINGS

The action of a natural wind, gusts and other aerodynamic forces will continuously affect a tall building. The structure will deflect about a mean position and will oscillate continuously. The wind energy that is absorbed by the structure is larger than the energy dissipated by structural damping then the aptitude of oscillation will continue to increase and will finally lead to destruction. The structure becomes aerodynamically unstable. The structure forms used these days have greater flexibility with less mass and damping than those used in olden days. Knowledge on the maximum steady or time averaged wind loads can ascertain the overall stability of a structure IS 875-part –III deals with wind load. The effect of wind is high in case of buildings over 8 storey. Wind loads must be considered for the design of buildings over 8 storeys.

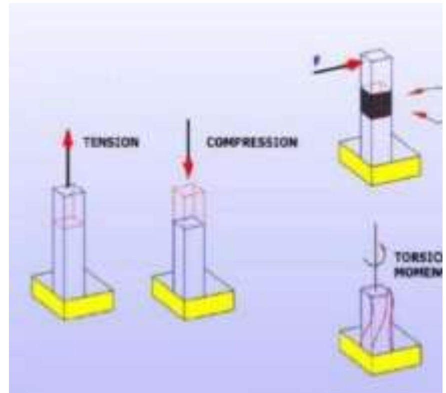

Fig : 12 structural elements

Tension & compression

Two key types of forces involved in building any structure are tension and compression. Every material has the ability to hold up to a certain amount of tension and a certain amount of compression. A tension force is one that pulls materials apart. A compression force is one that squeezes material together.

Shear Force

A shear force is a force applied perpendicular to a surface, in opposition to an off set force acting in the opposite direction. This results in a shear strain. In simple terms, one part of the surface is pushed in one direction, while another part of the surface is pushed in the opposite direction.

Torsional Moment

Torsion is the twisting of a beam under the action of a torque. Other than wind load there are many forces that too act on a building that play crucial role in designing a building structure. Below image gives a brief idea and understanding for such loads that are to be considered.

Wind flow differently at different locations on earth. For our considered region i.e. Dubai, Standards used is ASCE-7 which is American standards.

Fig : 13 Wind flow differently at different locations on earth

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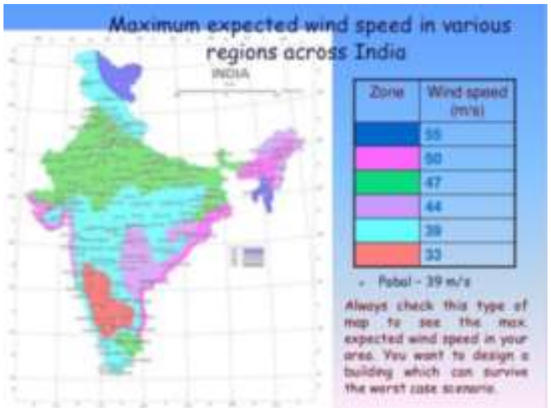

Fig : 14 Maximum expected wind speed in various regions across indi

4.3 INPUT GENERATION

The STAAD input file can be created through a text editor or the GUI Modeling facility. In general, any text editor may be utilized or edit/created the std input file. The GUI Modeling facility creates the input file through an interactive menu-driven graphics-oriented procedure. The input file is a text consisting of series of command which are executed sequentially.

4.4 AUTO CADD DRAWING (PLAN)

Fig : 15 Centre line diagram of plan AutoCAD plan

4.5TYPE OF STRUCTURE

A STRUCTURE can be defined as an assemblage of elements. STAAD is capable of analyzing and designing structures consisting of frame, plate/shell and solid elements.

Almost any type of structure can be analyzed by STAAD. A SPACE structure, which is a three dimensional framed structure with loads applied in any plane is the most general. A PLANE structure is bound by a global X-Y co-ordinate system with loads in the same plane. A TRUSS structure consists of truss members which can have only axial member forces and no bending in the members. A FLOOR structure is a two- or three-dimensional structure having no horizontal (global X or Z) movement of the structure [FX, FZ & MY are restrained at every joint]. The floor framing (in global X-Z plane) of a building is an ideal example of a FLOOR structure. Columns can also be modeled with the floor in FLOOR structure as long as the structure has no horizontal loading. If there is any horizontal load, it must be analyzed as a SPACE structure.

4.6GENERATION OF THE STRUCTURE

The structure may be generated from the input file or mentioning the co-ordinates in the GUI. The figure below shows the GUI generation method.

4.7 SUPPORT

Supports are specified as PINNED, FIXED or FIXED with different releases (known as FIXED BUT). A pinned support has restraints against all translational movement and none against rotational movement. In other words a pinned support will have reaction for all forces but will resist no moments. A fixed support has restraints against against all directions of movement.

4.8 LOADS

Loads in the structure can be specified as joints loads, member load, temperature load and fixed end member load. STAAD can also generate the self-weight of the structure and use it as uniformly distributed member load in analysis. Any fraction of this self-weight can also be applied in any desired direction.

4.9 TYPE FOR CONCRETE DESIGN

The following types of cross sections for concrete members can be designed.For Beams Prismatic Rectangular& Square) & T-shape For columns Prismatic(Rectangular, Square and Circular)

4.10 DESIGN PARAMETER

The program contains a number of parameters that are needed to perform design as per IS 13920. It accepts all parameters that are needed to perform design as per IS: 456. Over and above it has some other parameters that are required only when designed is performed as per IS: 13920. Default parameter values have been selected such that they are frequently used numbers for conventional design requirements. These values may be changed to suit the particular design being performed by this manual contains a complete list of the available parameters and their default values. It is necessary to declare length and force units as Millimeter and Newton before performing the concrete design.

4.11 BEAM DESIGN

Beams are designed for flexure, shear and torsion. If required the effect of the axial force may be taken into consideration. For all these forces, all active beam loadings are rescanned to identify the critical load cases at different sections of the beams. For design to be performed as per IS: 13920 the width of the member shall not be less than 200mm. Also the member shall preferably have a width to depth ratio of more than 0.3.

V.ANALYSIS OF G+15 RCC FRAMED BUILDING

5.1 GEOMETRY

Fig 16: Generation of G+15

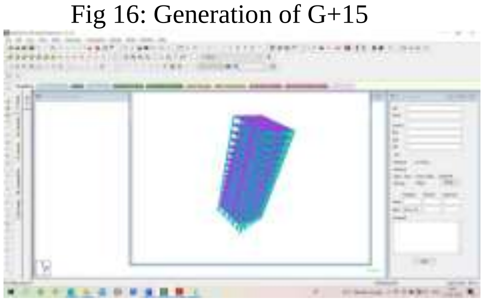

Fig 17: 3-d view

5.2 GENERATION OF MEMBER PROPERTY

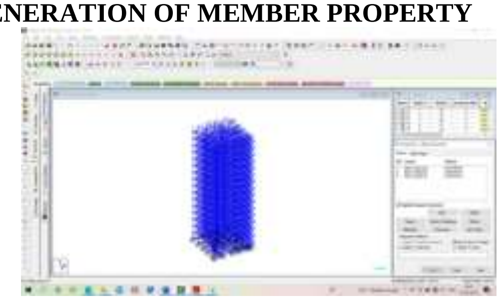

Fig 18: Generation of member property

Generation of member property can be done in STAAD.Pro by using the window as shown above. The member selection is selected and the dimension have been specified. The beams having size of 0.3m x 0.3m and columns size of 0.45m x 0.3m.

5.3 SPECIFICATION

Releasing end moments to the secondary beams both at starting and end of the beams.

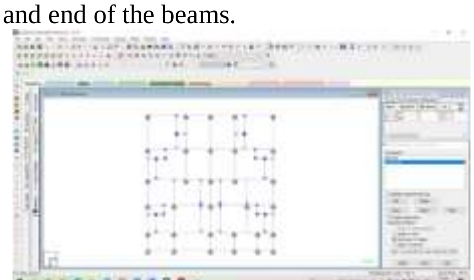

Fig 19: Releasing end movements

SELF-WEIGHT

The self-weight of the structure can be generated by STAAD.Pro itself with the self-weight command in the load case column.

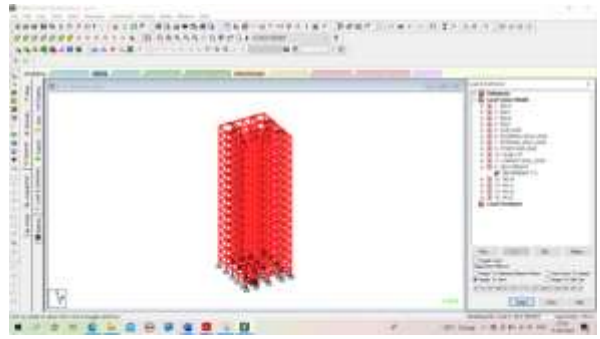

Fig. 10: Self weight

DEAD LOAD

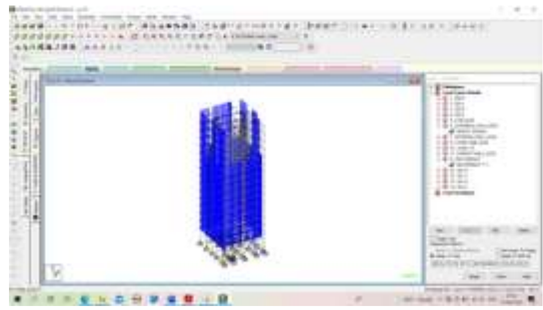

Fig 21: External wall load

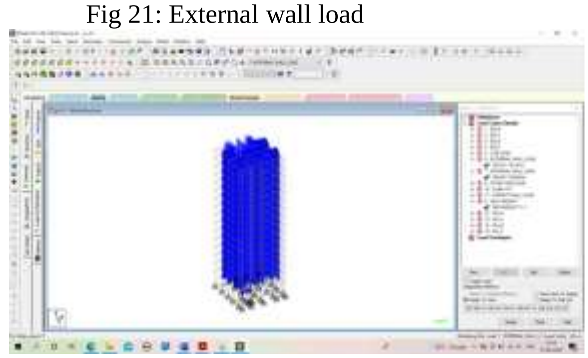

Fig 22: Internal wall load

LIVE LOAD

- The live load considered in floor & terrace was 3 kN/m2. (As per IS : 875 (Part 2)–1987)

The live loads were generated in similar manners as done in the earlier case dead load in floor. This may be done from the member load button from the load case column.

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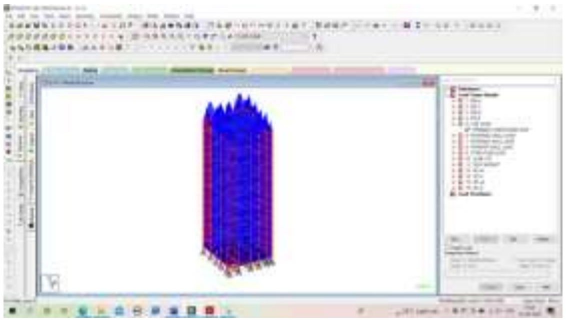
Fig 23: Live load


Fig 24: Analysis and print

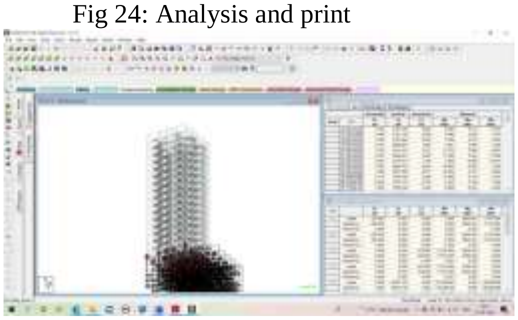
Fig 25: Base reactions

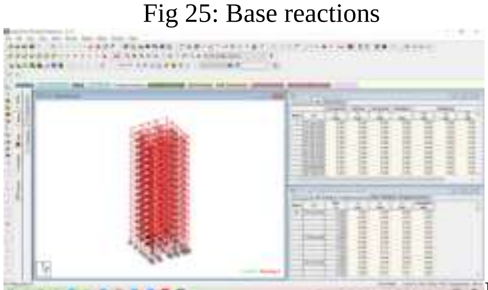
Fig 26: BMD


Fig 27: SFD

VI.DESIGN OF G+15 RCC FRAMED BUILDING
DESIGN OF G+1 RCC FRAMED BUILDING

The structure was designed for concrete in accordance with IS code. The parameters such as Clear cover, Fy, Fc, etc were specified. The window shown below is the input window for the design purpose. Then it has to be specified which members are to be designed as beams and Which member are to be


Fig 28: Deflection (beam : 6565)


Fig 29: Concrete design (beam : 6565)

VII.RESULTS


Fig 30: Stadd output quantities

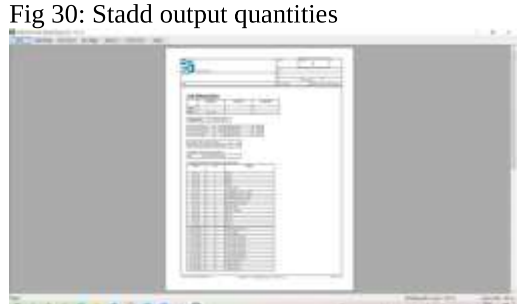
Fig 31: Print preview report

VIII.CONCLUSIONS

This analysis various studies carried out over planning, designing and analyzing a structure with the help of different software. All the studies considered above gives a suggestion of adopting STAAD.Pro over other software for analyzing a building structure. Due to its flexibility and its provision for economic sections both in terms of steel and concrete, STAAD.Pro is adopted for further analysis procedure. The analysis and design is done for hospital building and varioud results of bending moment ,shearforce ,torsion and stresses etc,. are discussed. 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 and wind load are applied. Deflection and shear tests are checked for beams, columns and slabs. The tests proved to be safe. Both theoretical and practical work has been done. Hence, I conclude that we can gain more knowledge in practical work when compared to theoretical work.

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