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DESIGN OF IRREGULAR A - SHAPED MULTISTOREY BUILDING

Mayuri Awale*[1], Shanila Qureshi*[2], Oais Patel*[3], Muzammil Ahmad Ansari*[4], Sumedh Atrahe*[5], Usman Ghani*[6], Prof. Mohd Azaz*[7]

*[1,2,3,4,5,6]U.G Student, Department Of Civil Engineering, Anjuman College Of Engineering And Technology,
Nagpur, Maharashtra, India.

*[7]Professor, Department Of Civil Engineering, Anjuman College Of Engineering And Technology,
Nagpur, Maharashtra, India.

ABSTRACT

This research is on the design of an Irregular A - shaped building. Irregular structure is a revolutionary topic in civil engineering. The two most significant aspects of new structures are form and function, which are growing more sophisticated as elements of equally sophisticated "systems" that we live in. Both the shape and the structural system must be sound in order for the construction to be both aesthetically pleasing and functionally successful. Nowadays, it is usual to see structures that are irregularly shaped or sculptural in nature. The irregular shape building differs from regular building in terms of shape, structure, reliability, economy and aesthetic appearance. The study focuses on design and load analysis of an irregular A shaped (G+3) multistorey mall. The design is performed in AutoCAD software and load analysis in STAAD PRO V8i software.

Keywords: Irregular Shaped Building, Sculptures-Like, Multistorey Mall, Autocad, STAAD PRO.

I. INTRODUCTION

The regularity of the structure refers to the structure's symmetrical and compact shape. The objective of building regularity is to minimise unpredictably high stress concentrations that might lead to local collapses and changes in dynamic behaviour. Irregular structures, such as those with an L-shaped plan, that can be described as "irregular" using both perceptive criteria and irregularity norms supplied by guidelines, show that the irregularity is "visible" if the diaphragms are rigid and the columns are distributed according to the shape The irregularity causes torsional effects in the response, which can be accounted for at the design stage. The majority of the structures are constructed in plain rectangular designs. Uneven structures combined with odd and odd shapes, on the other hand, are frequently destined to become iconic. When compared to traditional buildings, these irregularly shaped structures usually give off a very futuristic look. Such structures quickly stand out as architectural icons, often relating directly to the stakeholders' distinct personality and ideology. These irregularly shaped building designs now rely on digital technologies for their design and construction.

II. METHODOLOGY

The A - shaped irregular building's plan is carried out in AUTOCAD software. Deign is only done in required software. The floor plan can be defined as a drawing sized to a suitable scale such that the positions and orientations of the room are depicted clearly from above that is from a bird's eye view. The floor plan is the top view of the floor of a building or any structure and is regarded as the most fundamental architectural drawing. The floor plan is a two-dimensional representation of the floors of a building including the size and details designer engineer's contractors and Architects use the floor plans extensively to represent the arrangement of the available floor space with in a building. Precisely the floor plan can be defined as the vertical orthographic projection of an object in a horizontal plane cutting through the building such that the walls Windows doors and the other elements such as stairs, within a floor of the building are included. The major importance of the floor plan can be; It act as a medium to communicate the ideas regarding how the available space can be utilized within the building. It also the depicts the scope of work required and the scale of the project. It can be used for the interior designing and layout. A column or pillar in architecture and structural engineering is a structural element that transmits, through compression, the weight of the structure above to other structural elements below. In other words, a column is a compression member. The plan which contains column size & position is called a column layout plan. The column layout plan is very important for a Structure. Because without column layout it's impossible to locate the actual location of the structure.

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AutoCAD Drawing

- First the ground floor plan is carried out composing of space distribution of the given plot and the corresponding carpet area. Featuring the entry, exit, staircase and etc.
- Further second and third floor plan is executed embracing of the shops, escalator, moving space and other.
- Beam layout is carried out showing the placements of beams and further plinth layout is also exhibited.

STAAD PRO Software

STAAD Pro is one of the most widely used structural analysis and design software products worldwide. 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

III. MODELING AND ANALYSIS

AutoCAD Drawing

We have done modelling of our project, irregular building using software AutoCAD. AutoCAD is a commercial computer-aided design (CAD) and drafting software application. Developed and marketed by Autodesk. AutoCAD develops the application in both the 2D and 3D formats and provide the information to the application. It provides tools to design the software used in the industry, architectures and project management. It provides an easy way to design the software with the designs and architect it according to the need. AutoCAD software is used to draw and design the documents and the applications with easy customization options. AutoCAD provides a platform to be used by professionals to create the designs and 3D models. It allows the creation of the professional technical drawings and conceptual designs used for representation of the logics. It allows the drafter to provide the finishing touches and designing with the detailing and linking to the online data. It provides suppliers or operational professionals to review the drawings and modify it according to the requirements. AutoCAD software provides the design and the shape for the products that needs to be created. It provides flexible and user -friendly features with the tools to design the applications and document the workflows. This involves aggregate and import models for the formats and usually allows the design to get created without any change in source model. It provides tools to provide the formats by detailed designing the layouts and drawings using the views automatically. It also has the provision to create detailed design layouts and views can be drawn automatically using the source model.

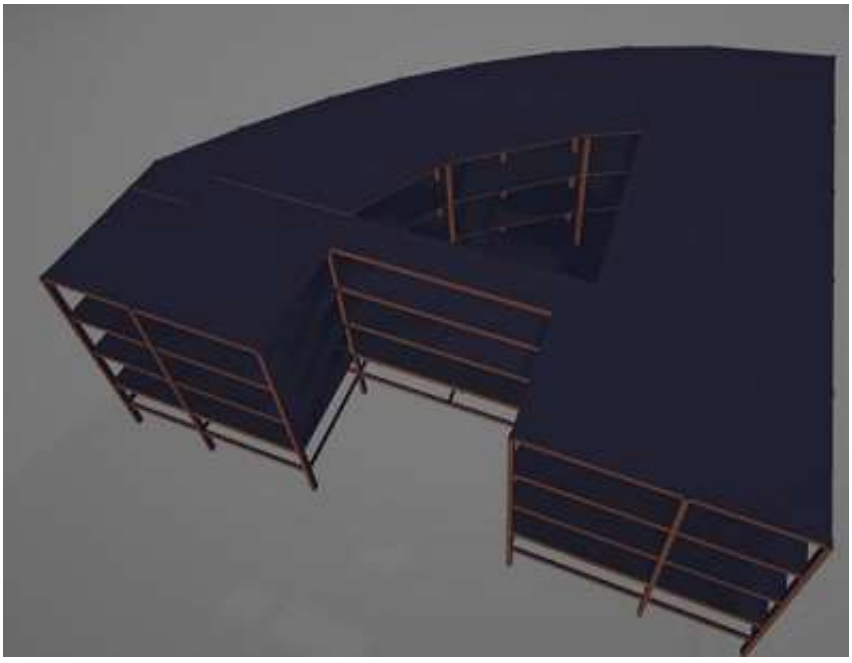

Figure 1: 3D view of building.

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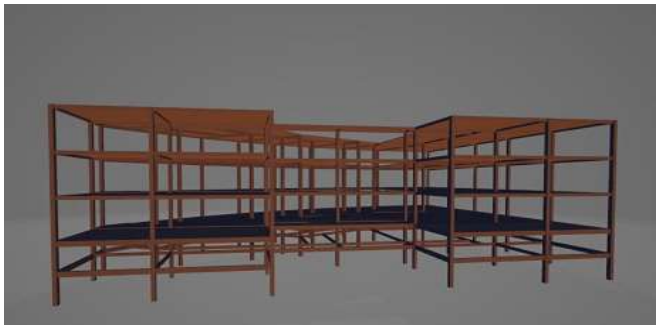
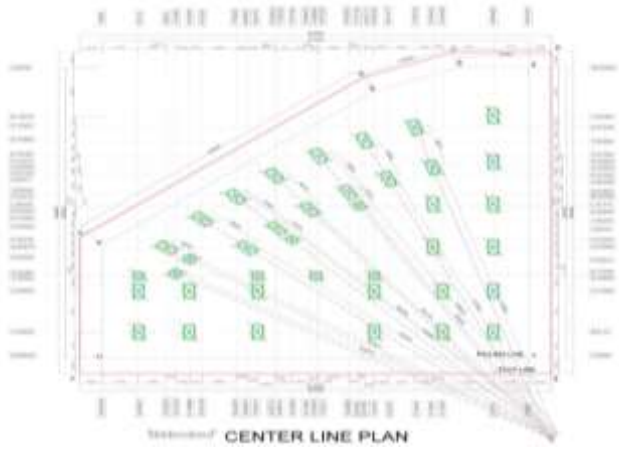


Figure 2: Front view of building



IV. RESULTS AND DISCUSSION

Execution of line plan of all the story was done in AutoCAD software. The seismic zone is considered to be Zone 2, the story drift all the corresponding story in shown in STAAD PRO software. the below graph shows maximum story drift.

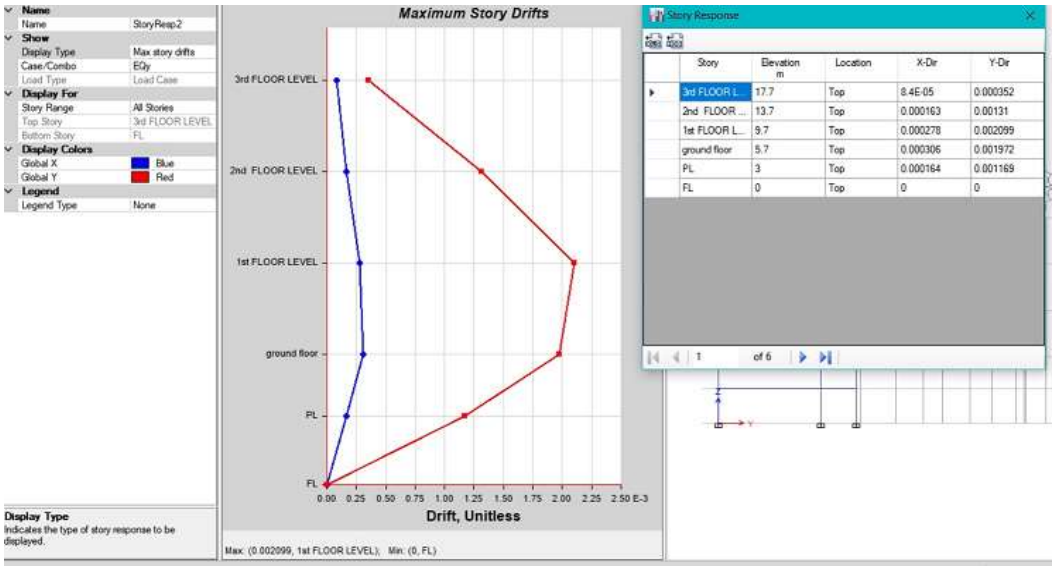


Figure 2: Story drift graph

V. CONCLUSION

Even though building a structure which is not common to regular structure should be emphasized to work on. More areas of construction should be studied to expand knowledge in the construction field. Irregular building requires a skill full mindset to have a proper knowledge of design and analysis. The challenges in the design and other execution can be studied and a solution can be carried out for further work if done in this field.

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