

# Design and Analysis of Irregular Building Using STAAD Pro Without Earthquake Load

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**Abstract:** This paper presents an overview of Design and analysis of irregular building using STAAD pro without earthquake load.

**Keywords:** Earthquake, STAAD pro.

## 1. Introduction

The Building construction is the engineering deals with the construction of building such as residential houses. In a simple building can be define as an enclose space by walls with roof, food, cloth and the basic needs of human beings. In every aspect of human civilization we needed structures to live in or to get what we need. But it is not only building structures but to build efficient structures so that it can fulfill the main purpose for what it was made for. Daily new techniques are being developed for the construction of houses economically, quickly and fulfilling the requirements of the community engineers and architects do the design work, planning and layout, etc, of the buildings. Buildings can be classified as different types as residential and commercial. Residential buildings are those most commonly known as homes or houses for families to live. Residential buildings have various names depending upon their use. Commercial buildings are those known as offices etc., where the public will do their professional works.

*Irregular residential buildings:* - Irregular building has large portion of modern, urban infrastructure. Building structure has mass stiffness and strength irregularity known as irregular building. Irregular buildings are situated in high seismicity zone; the role of structural engineer is more challengeable. Irregular structures, like structures having an L-shaped plan, that can be defined "irregular" according to both perceptible criteria and irregularity rules provided by guidelines, show that, if the diaphragms are rigid and the columns are distributed according to the shape, the irregularity is "apparent". Asymmetry may in fact exist in a nominally symmetric structure because of uncertainty in the evaluation of center of mass and stiffness, inaccuracy in the measurement of the dimensions of structural elements.

1. *Auto cad:* AutoCAD can be defined as the use of computer systems to assist in the creation, modification, optimization of a design In this, we can

create both 2D and 3D drawings used in construction and manufacturing. It was developed by John Walker in the year 1982 with the help of AUTODESK and maintains it successfully.

2. *STAAD.PRO:* - It is structural analysis design program software. It includes a state of art user interface, visualization tools and international design codes. It is used for 3D model generation, analysis and multi-material design. The commercial version of STAAD PRO supports several steel, concrete and timber design codes. It is the one of the software application created to help structural engineer to automate their task and to remove the tedious and long procedures of the manual methods.

## 2. Literature Review

*Aradhanna Chavan et.al (1):* - Analysis, Design and Estimation of G+4 Residential building. The study includes G+4 building with parking at ground floor and rest of floors occupied with 2BHK flats. The design and analysis is done by using STAAD PRO, estimation by MS-EXCEL.

*Deshmukh D.R et.al (2):*- 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.

*Preeti Singhe et.al (3):* - this work consist each regular and irregular geometric shapes. Every shape with G+ 10 storied models was created by exploitation STAAD-Pro code with earthquake and wind load conditions. In regular form building static analysis was dole out within the unstable zones II and particularly in irregular form building T form was choosened and also the dynamic analysis was in dire straits the unstable zones IV and V. Finally calculated base shear, volume of concrete, weight of steel and also the value comparison analysis area unit compared for all unstable zones.

*Aman et.al (4):*- Analysis and Design of multi-storey building at Gulbarga city, Karnataka, India. The study includes

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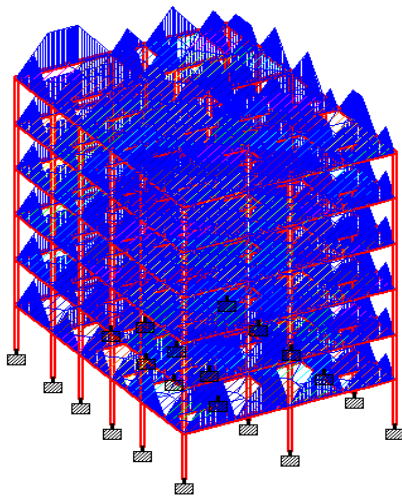


Fig. 6. Structure under Live Load

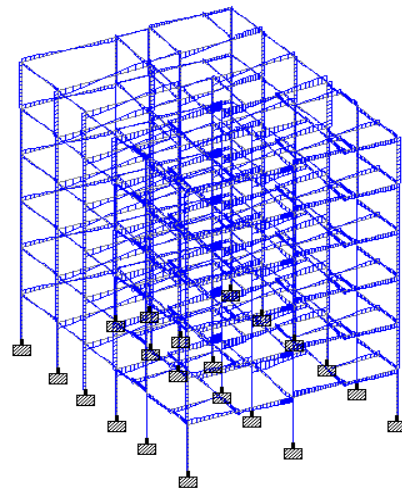


Fig. 8. Shear Force Diagram

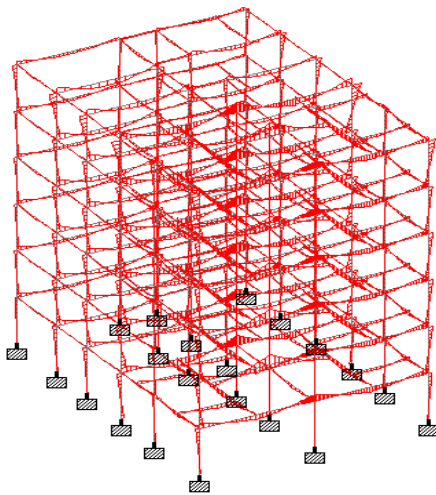


Fig. 9. Bending Moment Diagram

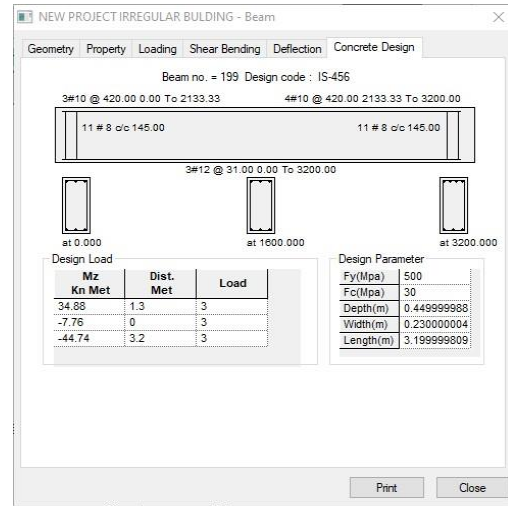


Fig. 10. Concrete Design of Beam

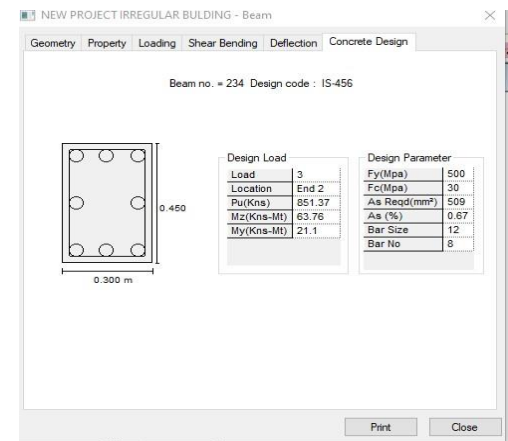


Fig. 11. Concrete Design of Column

### 6. Conclusion

1. The project is mainly performed with analysis and design of multi-storied residential building with all details using Staad Pro.
2. STAAD PRO has the capability to calculate the reinforcement needed for any concrete section.
3. The program contains a number of parameters which are designed as per IS: 456(2000).
4. Beams and columns are designed for shear, bending and deflection.
5. The structural components of the building are safe in shear and bending.
6. Design for Shear reinforcement is calculated to resist both shear forces and bending moments
7. Amount of steel provided for the structure is economic.
8. STAAD Pro is software in which that provides us a fast, efficient, easy to use and accurate platform for analysis and designing structures.

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- [6] IS Code 456-2000 (Design of RC structural elements)
- [7] IS code SP-16 (Depth & percentage of Reinforcement)