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DESIGN AND ANALYSIS OF G+1 RESIDENTIAL BUILDING

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Abstract - *An In order to compete in the ever growing competent market it is very important for a structural engineer to save time. As a sequel to this an attempt is made to analyze and design a residential building by using a software package STAAD.Pro. For analyzing*
Structural engineering professionals, companies, State authorities, and construction agencies departments make use of STAAD.Pro.

Due to its intuitive structure, the STAAD.Pro is quite easy to become familiar with. It should be emphasized that a good understanding of the basic concepts of structural analysis and design greatly facilitates mastering the use of the software and its possibilities.

1.INTRODUCTION

1.1 Building In General:

A Building may be defined as a structure comprising of walls, floors and roof which is made for the provision of shelter for various activities like inhabiting, education, business, manufacturing, storage, treatment, entertainment, and worship among others.

All constructions in principle have plans and specifics that have been drawn up by an architect. Every city has its own prescribed building bye-laws to which all the buildings must conform. The building bye-laws regulate such factors and features as the minimum front, side and rear setbacks, minimum height and area of habitable rooms, a kitchen, bathrooms, minimum area of windows, width of staircase and etc. In addition to the bye-laws, consideration should be given to the building design to the effective use of built space, thermal comfort, ventilation, effective lighting, acoustics, etc. and all the functional requirements of the building utilization by the occupants and workers are to be met.

1.2 Types of buildings:

The National Building Code (NBC) classifies buildings into nine categories based on their occupancy or usage characteristics. Here's a brief overview of each category:

1. Residential Buildings
- Houses, apartments, and other dwellings where people live.

2. Educational Buildings
- Schools, colleges, universities, and other facilities for education.

3. Institutional Buildings
- Hospitals, clinics, nursing homes, and other healthcare facilities.
- Prisons, jails, and other correctional facilities.
- Government buildings and public institutions.

4. Assembly Buildings
- Theaters, cinemas, concert halls, and other places for public gatherings.
- Restaurants, bars, and nightclubs.
- Places of worship.

5. Business Buildings
- Office buildings and complexes.
- Banks, financial institutions, and professional services.

6. Mercantile Buildings
- Retail stores, shopping centers, and markets.
- Wholesale establishments and warehouses.

7. Industrial Buildings
- Factories, manufacturing plants, and processing facilities.
- Power plants, water treatment facilities, and other utility buildings.

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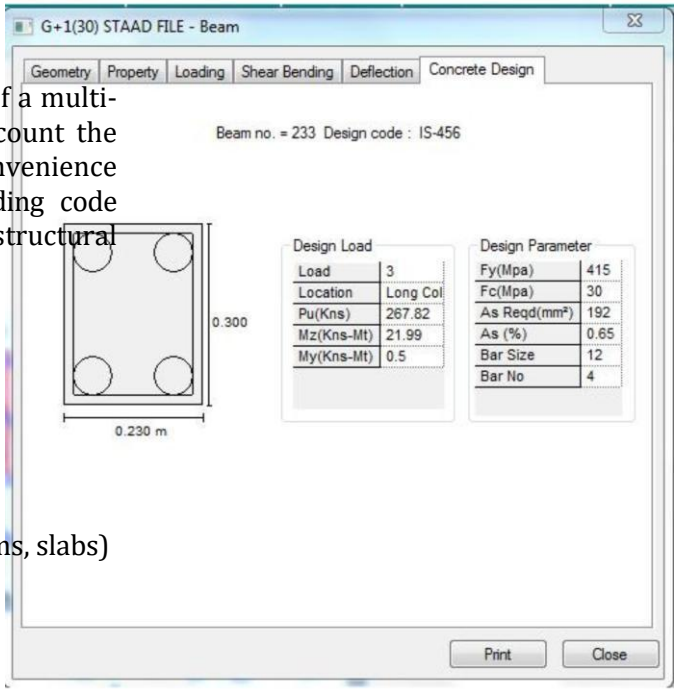
2. METHODOLOGY



This chapter deals with the analysis and design of a multi-storey (G+1) residential building taking into account the considerations made for safety, stability and convenience keeping in mind the economic concerns, building code requirements and other factors that affect the structural design.

1. Data collection

2. Building modeling (3D)

3. Structural analysis (linear, dynamic, modal)

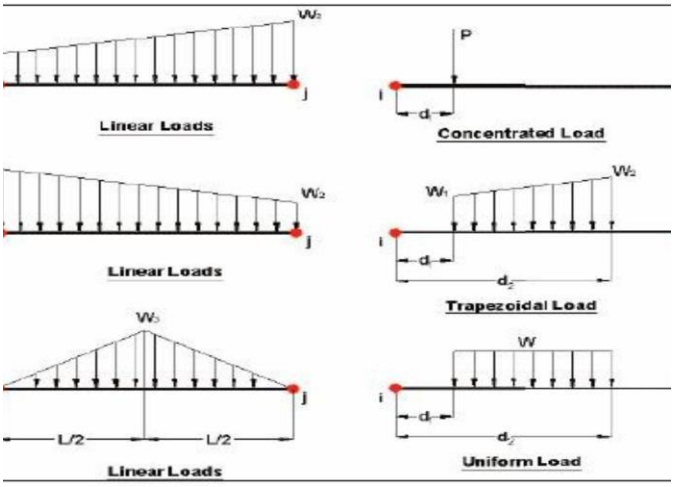
4. Design of structural elements (columns, beams, slabs)

5. Foundation design

6. Seismic and wind load design

7. Verification of results

Documentation and reporting



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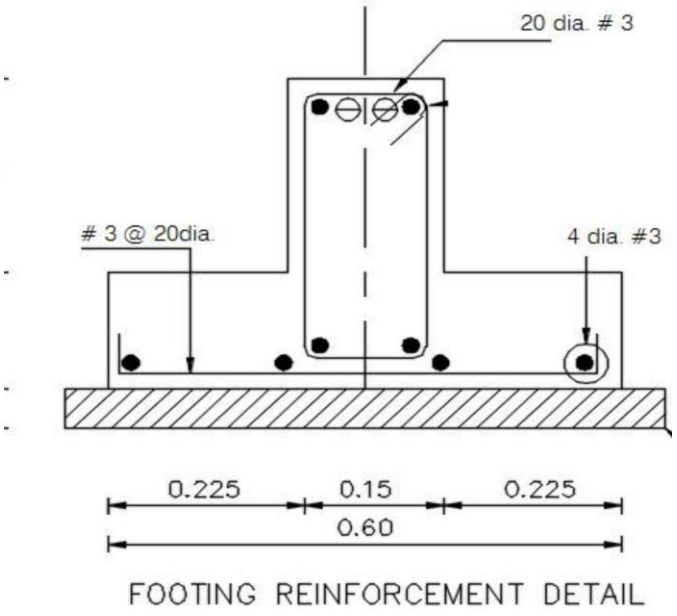

FOOTING REINFORCEMENT DETAIL

3.CONCLUSION

This project aimed to analyse and design a multi-storey (G+1) residential building using STAAD Pro. The analysis revealed that the building's structural system, comprising beams, columns, and slabs, can withstand various loads, including dead loads, live loads, and wind loads. The design satisfied the relevant building codes and regulations, ensuring the building's safety and stability. The use of STAAD Pro facilitated a detailed analysis of the building's structural behaviour enabling the optimization of the design and reducing the risk of structural failures. The software's capabilities in modelling, analyzing, and designing complex structures made it an essential tool in this project .