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ANALYSIS AND DESIGN OF G+3 RESIDENTIAL BUILDING BY USING SOFTWARE (STAAD PRO)- A REVIEW

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ABSTRACT

A high-rise structure requires a significant amount of time for its complex calculations when using conventional manual methods. STAAD-PRO offers a fast, efficient, user-friendly, and accurate platform for analyzing and designing structures. The primary objective is to analyze a multi-story building (G+3) using STAAD-PRO software. The design process involves a comprehensive structural analysis using STAAD-PRO, employing limit state design principles in accordance with the Indian standard code of practice. In conclusion, we find that STAAD-PRO is a powerful software that can save a considerable amount of time and ensure precision in design. In this project, a G+3-storeyed building is considered, and various loads, such as wind load and static load, are applied. The results are then compared with manual calculations.

1. INTRODUCTION

In today's world, the construction of high-rise buildings has become a fundamental necessity due to the scarcity of land. The conventional manual design process for high-rise buildings is not only time-consuming but also prone to human errors. Therefore, it is essential to utilize computer-based software that can provide more accurate results and reduce the time required for design. STAAD Pro is the structural software widely accepted by structural engineers today. It can effectively address typical problems such as static analysis

and wind analysis, using various load combinations to conform to various codes, such as IS 456-2000, IS 1893-2002, and IS 875-1987,
among others.
In the design process, it is crucial to consider accepted theories, experiments, and experience, along with the requirements for designing structures that are durable. Design, including considerations for durability, construction, and service life, should be approached comprehensively. Achieving design objectives requires compliance with clearly defined standards for materials, construction,
workmanship, maintenance, and the use of the structure during its service life.

The design of a structure depends on meeting the minimum requirements as recommended by the Indian standard codes. These minimum requirements pertain to the structural safety of the building and involve defining minimum design loads, including dead loads, live loads, and other external loads that the structure must be designed to withstand.

2. LITERATURE REVIEW

Analysis and Design of an Earthquake-Resistant Structure (G+11) using STAAD Pro.
Authors: Akshay R. Kohli, Prof. N. G. Gore (2017) | [10].

The primary objective of this paper is to create an earthquake-resistant structure by conducting a seismic study using the static equivalent method of analysis and to carry out the analysis and design of the building using STAAD Pro software. For this purpose, a G+11 residential building plan in Mumbai is considered. Seismic calculations are performed for earthquake zone 3, Response Reduction Factor 3, with an ordinary moment- resistant frame, and Importance Factor 1. The structural safety of the building is ensured by calculating all acting loads on the structure, including lateral loads caused by wind and seismic excitation.

Using STAAD Pro: Building Design and Analysis Authors: J. Mohan, C. Selin Ravikumar, and TSS. Thandavamoorthy (2017).
The design process involves manual load calculations and the analysis of the entire structure using STAAD Pro. The design methods utilized in STAAD Pro analysis adheres to the Limit State Design conforming to the Indian Standard Code of Practice. In this paper, the authors analyzed and designed a G+5 story building, considering dead, live, and wind loads. The structure comprises a 3- D RCC frame with 5 bays in the x-axis and 4 bays in the z-axis. The y-axis consists of G+5 floors, each with a floor height of 3m. The structure is subjected to self-weight, dead load, live load, and wind load as prescribed under various load cases presented in the paper. The authors also examined the deflection of different members under the given loading combinations. The design of the building adheres to the minimum requirements outlined in the Indian Standard Codes.

Analysis And Design of Multi-Storied (Stilt+G+4) Residential Building Using STAAD Pro
Authors: P. Anil Kumar, N. Sri Gowri Punnagu, T. Yerrunnn, G. Nnruynna Rao, L. Kantarao (2013) [12].
In this analysis and design project, a multi-story residential building of Stilt+G+4 is analyzed and designed using STAAD Pro. The building consists of 4 flats on each floor. This project relies extensively on software, with a focus on understanding the details of the software used, including STAAD. Pro (v8i) and AutoCAD. The principal objective is to analyze and design a multi-storied building (Stilt+G+4) using STAAD Pro. The design process includes manual load calculations and a comprehensive analysis of the entire structure using STAAD Pro. The design methods employed in STAAD Pro analysis align with Limit State Design principles conforming to the Indian Standard Code of Practice. STAAD Pro offers advanced features such as a user-friendly interface, visualization tools, powerful analysis, and design engines with advanced finite element and dynamic analysis capabilities. From model generation and analysis to visualization and result verification, STAAD Pro is the professional's choice.

CONCLUSION

The analysis and design of the G+3

residential building using STAAD Pro software has proven to be a highly efficient and effective approach. This software facilitated the comprehensive assessment of the structural integrity, load-bearing capacity, and safety considerations of the building. By employing STAAD Pro, the project team was able to streamline the design process, ensuring that the structure met the necessary standards and codes while saving valuable time. The software's advanced features and capabilities, including dynamic analysis and visualization tools, contributed to a thorough and accurate evaluation of the building's performance under various loads, such as dead load, live load, and wind load. Ultimately, this approach not only resulted in a well-designed and structurally sound residential building but also showcased the significance of utilizing modern software solutions for complex engineering tasks, enhancing both efficiency and precision in the construction industry.

Conflict Of Interest

The authors declare that they have no conflict of interest.

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