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A Critique of the Systematic Review by STAAD Pro and Etabs on the Design and Evaluation of Residential Building Configurations

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ABSTRACT. Currently, the two most popular design software programmers are Staad and Etabs. A lot of design firms use this top-notch encoded software. Therefore, this project's venture development focuses primarily on the virtual analysis of the outcomes of the design of a multi-story concrete frame structure when STAAD and ETAB software are used independently. The design process includes a structural analysis and load calculations. Limit State Design in accordance with Indian Standard Code of Practice is the design methodology used in STAAD.Pro and ETABS analysis. The primary goal of a structural engineer is to use technology to create a structure that is both safe and cost-effective, enabling them to take on the design of much larger and more complex structures. A cutting-edge user interface, visualization tools, and potent analysis and design engines with dynamic analysis capabilities are all included in STAAD.Pro is the professional's choice for model generation, analysis, and design as well as for visualization and result verification. Today's structural designers frequently use ETABS, another popular design tool. Here, we had also used the ETABS design software to analyze a regular structure.

KEYWORDS: Staad pro, Etabs, Frame, Load Combinations, Structural Elements

I. INTRODUCTION

STAAD, or structural assisted analysis and design, is its full name. It was created in Yorba Linda, California, by Research Engineers International and later sold to Bentley Systems in late 2005. The structural engineering software package STAAD.Pro is used to analyse and design a wide range of different types of structures. Through its adaptable modelling environment, cutting-edge features, and fluid data collaboration, it enables structural engineers to analyse and design practically any type of structure. Practically all types of structures, including buildings, bridges, towers, structures for transportation, industry, and utilities, can be analysed and designed using STAAD.Pro.

ETABS, which stands for EXTENDED 3D ANALYSIS OF BUILDING SYSTEMS, is a piece of engineering software created by Computers and Structures, Inc. (CSI), an organisation based in Berkeley, California that was established in 1975. Using grid-like geometry, a variety of analytical techniques, and consideration of different load combinations, ETABS is a piece of engineering software that can be used to analyse and design multi-story buildings. An architect is involved in the aesthetic details, while a structural engineer has the most impact on the overall structural design. The dead load, live load, wind load, and seismic loads must be taken into account when designing structures. To balance out all the outside forces acting on the structure, high-quality beam and column reinforcement will be used. The foundation's soil should be sufficiently dense. To evenly distribute the intensity of the load to the foundation, the soil beneath the structure should be sufficiently dense. As Since the number floor keeps growing, manual calculations become more difficult, time-consuming, and prone to error, so we use staad.pro for accuracy as well. Specifically, the design complies with IS 456-2000.

II. METHODOLOGY AND ANALYSIS

The main characteristics and structure of STAADPRO and ETABS, two computer programmes designed for the static and seismic stability assessments of various civil engineering structures and concrete gravity dams, are presented in a study. In our project, we analyse and design a multi-storey building using ETABs and the well-known design

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programme STAAD Pro under all potential loading conditions. This chapter models and analyses a multi-storey building while taking into account wind, seismic, dead, and live loads in accordance with IS standards. Calculating loads in accordance with Indian standards.

III. RESULTS AND DISCUSSION

It has been noted that there are many similarities and flexibility between the two programmes when a G+14 multi-story high rise structure with the same beam and column cross sections is analysed and designed for loads. Using the software STAAD.Pro and ETAB, the structural analysis of the frame model, which includes varying loading conditions on beams, columns, and slabs—has been completed. Shear forces, bending moments, and deflections are the variables that need to be studied, as shown in the figures below. And the following results were obtained:

- 1. Utilizing ETABS software reduces the amount of time needed for analysis and design.
- 2. ETABS provided less required steel area than STAAD PRO.

have an impact on the research presented in this study.

- 3. STAAD.pro in comparison to ETABS software, pro software is more adaptable to use.
- 4. Compared to the STAAD analysis, the amount of steel needed for the design of a G+10 multi-story building using ETABS is 9.25% less.
- 5. The economical sections of the G+10 multi-story building were designed by ETABS software through a thorough comparison of the analysis and design of both STAAD and ETABS software.

IV. CONCLUSIONS

- 1. Some key conclusions are drawn from the behaviour of RCC frames on STAADPro and ETABS. When compared to STAAD PRO, ETABS provided less of the required steel area.
- 2. Due to the same Ast, it is not possible to compare the results in this case from the design results of the columns.
- 3. Since the axial forces calculated by Staad Pro and etabs are almost identical, design purposes may adopt the analysis values.
- 4. It is preferable to use the analysis values for manual design in order to have an economical design since the design values in both software programmes, Staad Pro and ETABS, are only slightly different and uneconomical.
- 5. ETABS and STAADPRO software were used for the analysis, which was successfully manually verified in accordance with IS456.
- 6. The amount of time spent on analysis and design is reduced through the use of ETABS software.
- Compared to ETABS software, STAAD.Pro software offers greater working flexibility. Competing Interests Declaration According to the author, there are no known financial or personal conflicts of interest that might have appeared to

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