Analysis and Design of Multi-storied Buildings using ETABS - Workshop Report

Date: 12/04/2025 to 27/04/2025

Training provided by – Mr. Aakash Dwivedi, PMRF -IIT Bombay

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Introduction

ETABS (Extended Three-Dimensional Analysis of Building Systems) is a powerful software tool used by civil and structural engineers for the analysis and design of multi-story buildings. This 6-day workshop, conducted over three weekends (Saturdays and Sundays), provided participants with hands-on training in modeling, analyzing, and designing structures efficiently. The workshop aimed to bridge the gap between theoretical knowledge and practical application, equipping attendees with industry-relevant skills. The training was attended by interested students of T.Y.B.Tech Civil, B.Tech Civil and M.tech Structural Engineering.

Workshop Objectives

The primary objectives of the ETABS workshop were:

- To introduce participants to the basic and advanced features of ETABS
- To provide practical knowledge on modeling structural elements such as beams, columns, slabs, and shear walls
- To demonstrate the application of different loads (dead, live, seismic, and wind) on building models
- To teach participants how to interpret analysis results and optimize structural designs
- To enhance participants' skills in using ETABS for real-world structural engineering projects
- Introduction to design of foundations using SAFE
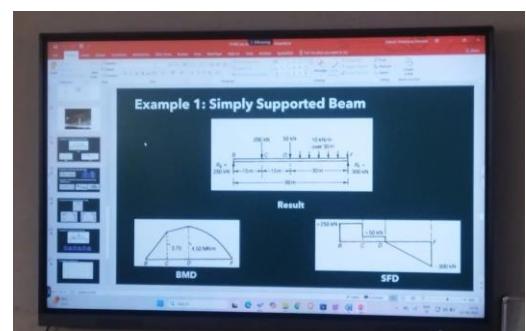
Topics Covered

The workshop covered the following key topics:

1. Introduction to ETABS

- Overview of ETABS interface and tools
- Setting up grid systems and defining material properties

2. Structural Modeling

- Creating beams, columns, slabs, and shear walls
- Assigning load cases and combinations

3. Load Application

- Applying dead loads, live loads, and lateral loads (seismic and wind)
- Understanding load patterns and distributions

4. Structural Analysis

- Running linear and nonlinear static analysis
- Performing dynamic analysis (response spectrum and time history)

5. Design and Optimization

- Reinforced concrete and steel design as per international codes (IS Codes)
- Interpreting design results and optimizing member sizes

6. Results Interpretation

- Reviewing deformation, shear, and moment diagrams
- Evaluating serviceability and safety checks

Outcomes of the Workshop

Participants gained hands-on experience in:

- Creating and analyzing 3D structural models
- Understanding the impact of different load conditions on building behavior
- Using ETABS for efficient structural design and code compliance
- Using SAFE for design of simple foundations

Conclusion

The ETABS workshop was highly beneficial for aspiring and practicing engineers, providing them with essential skills for modern structural analysis and design. By mastering ETABS, participants can improve their efficiency in designing safe and cost-effective structures. Such workshops play a crucial role in bridging the gap between academic knowledge and industry requirements.

Overall, the workshop was a valuable learning experience, equipping participants with the necessary skills to excel in structural engineering.

Sample feedback of students:

### 1. The objectives of the training were clearly defined.
24 responses

- a. strongly agree
- b. agree
- c. neutral
- d. disagree

70.8%
29.2%
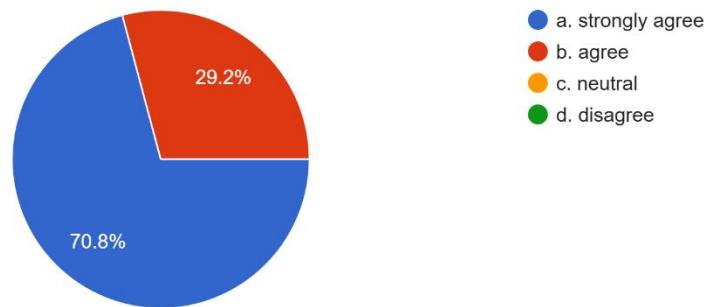
2.Participation was encouraged throughout the training.
24 responses

- a. strongly agree
- b. agree
- c. neutral
- d. disagree

58.3%
37.5%
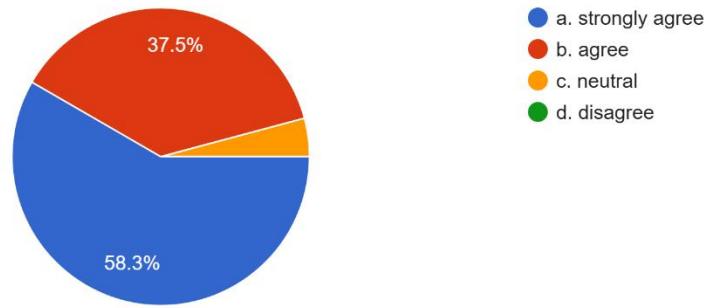
3. The materials and content were well chosen and helpful.
24 responses

- a. strongly agree
- b. agree
- c. neutral
- d. disagree

75%
25%
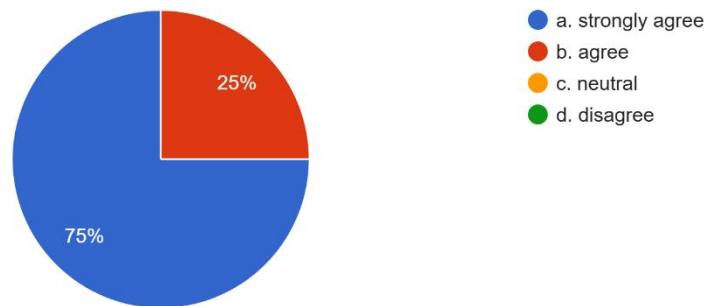
4. The trainer was well prepared and thorough.

24 responses

- ● a. strongly agree
- ● b. agree
- ● c. neutral
- ● d. disagree

25%

8.3%

66.7%
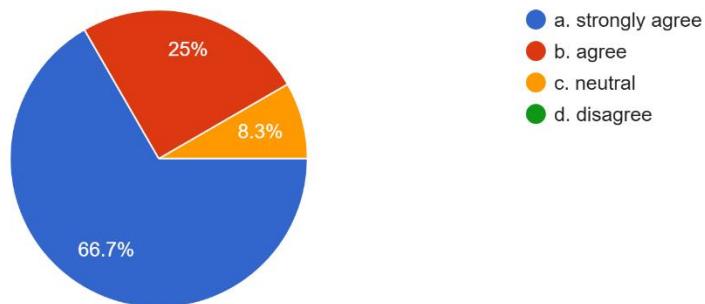
5. Was the material presented in a manner that was easy to grasp?

24 responses

- ● a.Yes
- ● b.No.

100%
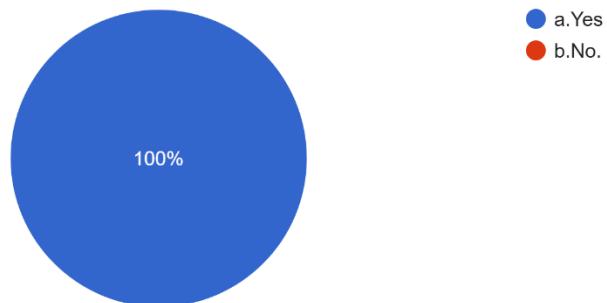
What were the key takeaways from the day's training ?

24 responses

Response spectrum analysis, wind load

Etabs traning

Design of High Rise building

Learning load combination

Understood wind load application as per IS code.Defined and assigned load patterns (DL, LL, WL, EQ), Created load cases and combinations, Applied response spectrum analysis and performed scaling, Analyzed the model and reviewed structural behavior.

Load application and different method to calculate EQ force

How can you relate the concepts learnt in class to the training ?

24 responses

Modeling, load application, analysis and design

Perfectly

Response spectrum analysis, base shear were as per Is 1893 part1 2016, wind load as per is 875 part 2

Modling

Ver

Structural Design

Structural concepts learned in class like load types, load combination's, wind load , k1, k2, k3 factors from IS code, design wind speed are applied directly in the software in today's training.

Load assignment on multi storey building

Very nicely