

Seismic Performance Comparison of Buildings with and without Shear Walls Using ETABS

Sneha Nandu Jadhav¹, Shravani Hemant Mankar², Aditi Changdev Kakad³,
Dhanashree G. Gangurde⁴, Prof. Ashwini Kadam⁵, Prof. Chetan Pagar⁶, Prof. P. G. Chavan⁷

Student, Civil Engineering^{1,2,3,4}

Lecturer, Civil Engineering^{5,6}

Heads Of Department, Civil Engineering⁷

Guru Gobind Singh Polytechnic, Nashik, India

Abstract: *The interaction between shear walls and frame systems plays a very important role in resisting seismic forces, especially in mid-rise buildings. In high-rise buildings, most of the lateral forces are mainly resisted by shear walls along with columns. In this study, an attempt has been made to understand different aspects related to the analysis and design of shear walls. Relevant Indian Standards such as IS 456:2000, IS 1893:2016, and IS 13920:2016 have been studied, and important clauses related to shear walls are discussed. This study also focuses on understanding how these code provisions are applied in practical construction. A manual calculation example is included to explain the shear wall design procedure in a clear manner. Additionally, important aspects of reinforcement detailing, including wall and boundary element detailing, are studied from an execution point of view*

Keywords: Shear wall, structural design, shear wall detailing, IS codes

I. INTRODUCTION

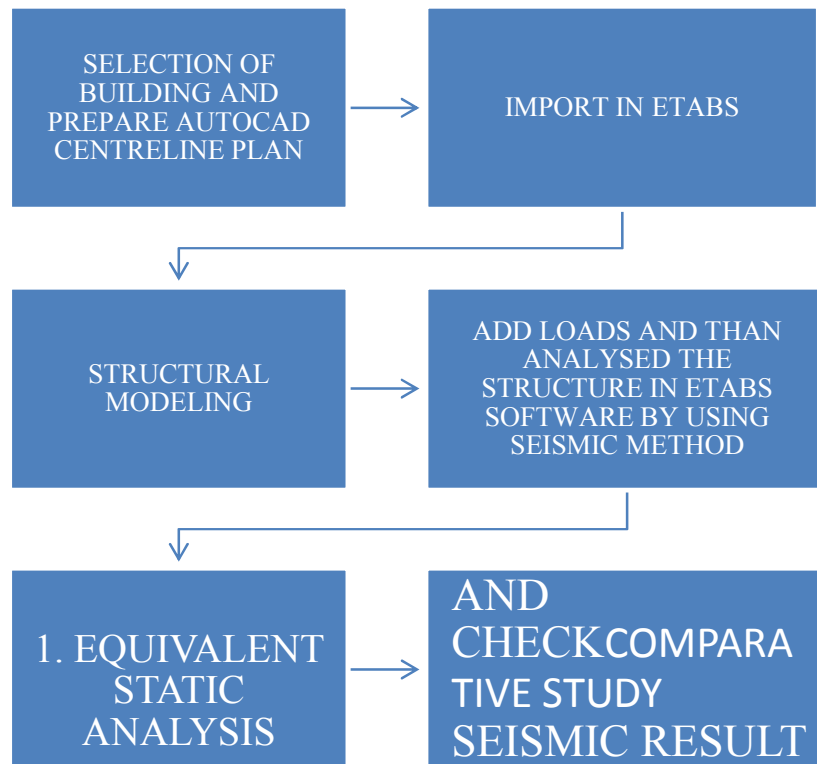
Earthquakes are one of the most dangerous natural disasters, causing serious damage to buildings and human life. Buildings that are not designed to resist seismic forces may suffer structural failure due to lateral loads, leading to excessive displacement and instability. Therefore, improving the seismic performance of structures is very important. To resist these forces, shear walls are widely used as they provide additional stiffness and strength to buildings. They help in reducing lateral displacement and storey drift, improving overall stability. Proper placement of shear walls plays a key role in better performance during earthquakes. In this study, the seismic performance of buildings with and without shear walls is compared using ETABS software. Parameters like storey displacement, storey drift, and base shear are analyzed to evaluate structural behavior. The results highlight the importance of shear walls in improving safety, stability, and earthquake resistance of buildings.

II. OBJECTIVES OF THE STUDY

- To model and analyze a multi-storey building without shear walls using ETABS and study its behavior under seismic loading.
- To model and analyze the same building with shear walls incorporated in the structural system.
- To compare the seismic performance of buildings with and without shear walls.



III. METHODOLOGY



IV. TYPES OF SEISMIC ANALYSIS

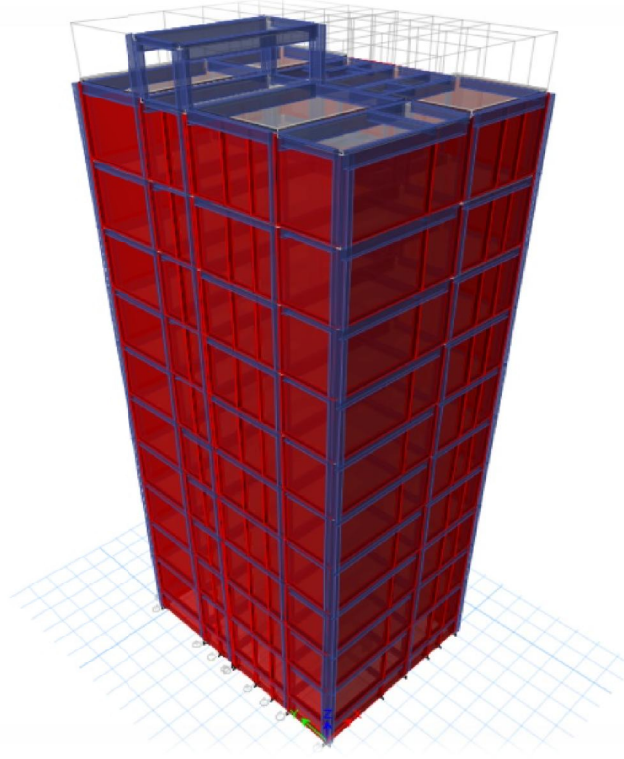
- Equivalent Static Analysis
- Response Spectrum Analysis
- Nonlinear Static Analysis
- Time History Analysis

V. CONCLUSION

COMPARISON OF STRUCTURE WITH AND WITHOUT SHEAR WALL

The seismic performance of buildings can vary significantly depending on the structural system used to resist lateral loads. In this study, two building models are analyzed using ETABS: one model without shear walls and another model with shear walls incorporated into the structural system. The comparison helps in understanding the influence of shear walls on the behavior of buildings during earthquake loading.





VI. ACKNOWLEDGMENT

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