Seismic Analysis of Tall Structure with Shear Walls at different Location

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Abstract **- Shear wall systems is one of the leading usually lateral load resisting systems equipped in high-rise buildings. Shear walls included in building to resist lateral Forces and support the gravity masses. RCC shear walls are having high plane stiffness, which may be habituated at the same time to resist massive horizontal masses and support gravity masses, creating them quite beneficial in several structural engineering applications. There square measure several literatures offered to style and analyze the shear wall. However, the choice concerning the placement of shear wall enclose multi-storey building isn't a lot of mentioned in any literatures. Positioning of shear wall has influence on the general performance of the building. For efficient and economic presentation of building it's important to position shear enclose a perfect location**

Index Terms **- shear wall, RC structure, and seismic analysis. In this work total four models have been designed and analyzed for seismic performance.**

I.INTRODUCTION

A shear wall structure is measured to be one whose confrontation to horizontal load is provided wholly by shear walls. They may act as a vertical cantilever in the form of separate planner walls and as non-planner assembles of coupled walls around elevator, stair, and service shaft. Shear walls have been the most common structural essentials used for stabilizing the building structures against lateral forces. Their very high in-plane stiffness and strength makes them preferably suited for bracing tall buildings. The convenience of shear walls in framing of buildings has long been recognized. Walls situated in beneficial positions in a building can form an efficient lateral-force-resisting system, simultaneously fulfilling other functional requirements. When an enduring and similar subdivision of floor areas in all stories is required as in the case of hotels or apartment buildings, numerous shear walls can be utilized not only for lateral force resistance but also to carry gravity loads.

II. OBJECTVE

1. To conduct seismic analysis of the G+25 storey structure and obtain performance of the same.
2. To conduct seismic analysis of structure with shear wall as a means to improve the performance of building.

III. PROBLEM DEFINATION and ANALYSIS

In this work total four models have been designed and analyzed for seismic performance. Initially a bare frame of G+25 storey structure is analyzed for seismic force. After obtaining results of a bare frame, three different frames with shear walls at different locations is modeled and analyzed. Lastly a comparative study of performance of structure with shear walls at three different locations is determined.

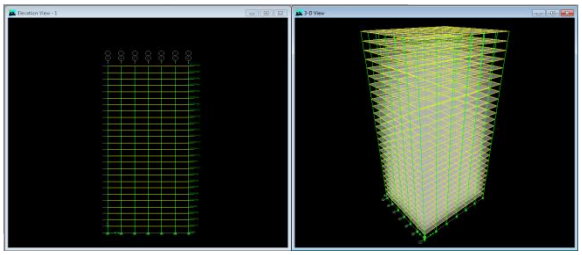

Fig.1 Bare frame structure

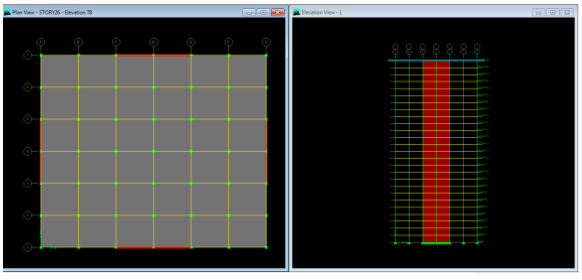

Fig.2 Model 1-shear wall at mid of outer walls

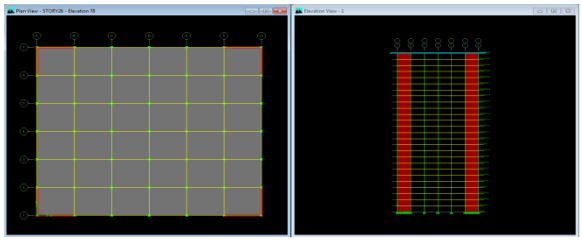

Fig.3 Model 2- shear wall at two corners of each wall

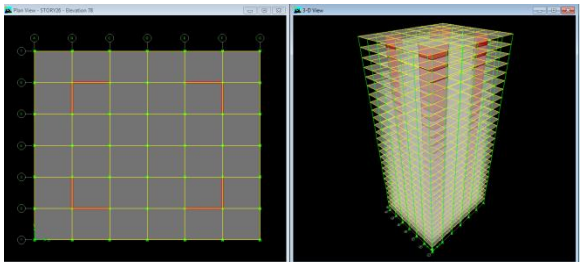

Fig.4- shear wall at interior of structure

IV. METHOD OF SEISMIC ANALYSIS

Linear static analysis, also known as equivalent static analysis is preferred for moderate height buildings and dynamic analysis is performed for multistorey building. Since, the models analyzed in this work are both of moderate height and of high-rise buildings, both linear static analysis and linear dynamic analysis is performed so as to put convenience in studying response. In this method, seismic response of structures is carried out on the principle of horizontal force assumed to be corresponding to the actual earthquake loading. The structures are assumed to be located in zone IV. The direction of earthquake excitation considered is X. Program calculated time period is assigned. Importance factor and response reduction factors are 1 and 5 respectively.

V. RESULTS

Max. Displacement by Equivalent Static Method:

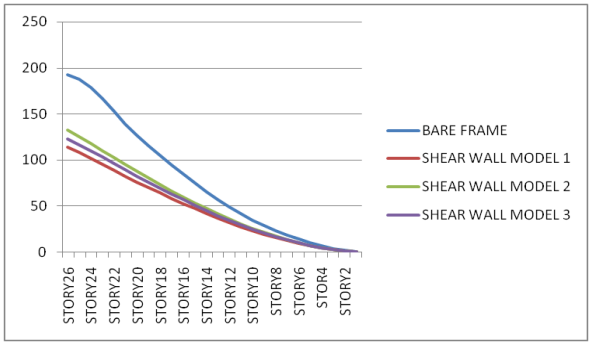

Fig.1: Maximum Displacement of structure

Storey Drift:

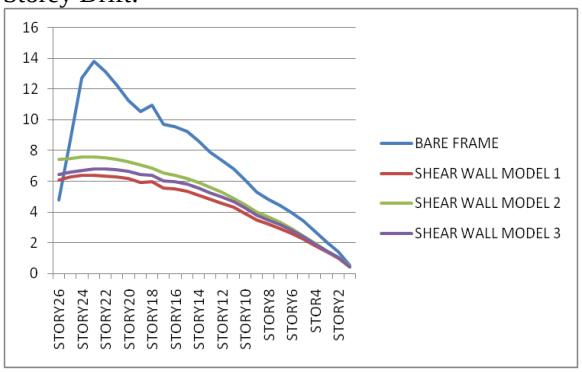

Fig.2: Maximum Drift of structure

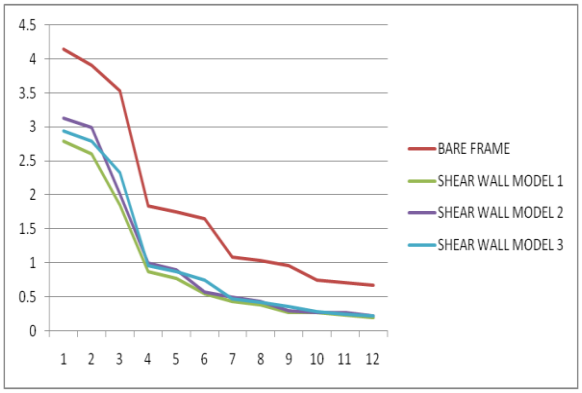

Fig.3 Time Period

VII. CONCLUSION

The results obtained for G+25 storey RC structure after seismic analysis is concluded as follows:

1 G+25 storey bare frame after subjected to seismic loading undergoes high value of displacement. Even though it is within permissible limit, but it is almost on the verge of failure.

2. The provision of shear wall to the G+25 storey structure improves the performance of structure to great extent. Especially the exceeding values of storey drift are brought within permissible limit.

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