"SEISMIC ANALYSIS OF G+10 MULTI-STOREY BUILDING USING SHEAR WALL ON ETABS"

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Abstract: *Shear wall systems are one of the most cost-effective and widely utilised lateral load-resisting mechanisms in high-rise building. They feature great plane stiffness and strength, allowing them to resist enormous horizontal loads while also supporting gravity load .Shear walls are increasingly required in multi-story buildings to counteract lateral stresses such as seismic and wind loads. As a result, determining the most effective position for shear walls is critical. Shear wall placement must be exact, or else it will have a negative effect When the mass centre and hardness centre are aligned, the distance between the shear wall and the mass centre influences the shear contribution of the shear wall.*

Key Words: *: Shear Wall, Optimization, Seismic Forces , critical, aligned.*

1. INTRODUCTION

A research was carried out in this project to identify the best structural arrangement for a multistory structure by drastically altering the shear wall positions. . The computer application programme ETABS was used to evaluate and develop a frame system for four alternative shear wall positions for a G+10 storey structure while maintaining zero eccentricity between the mass centre and the hardness centre. The framed structure is tested to lateral and gravity loads in line with IS requirements, and the results are evaluated to identify the best placement of the shear wall.

2. LITERATURE REVIEW

ETABS software become used to do a dynamic examine of a G+15 storey RC body constructing having L, C, and square form in plan. Narrative flow, storey shear, assist responses, constructing mode, and segment reduce pressure have all been blanketed withinside the comparison. The L-form format become proven to have the best fee of storey shear as compared to square and C-form homes. In all 3 situations, the values of the stories flow withinside the X and Y instructions as they development from pinnacle to bottom. It become determined that once an earthquake pressure is implemented withinside the Y direction, abnormal plan systems might also additionally face up to extra base shear than square plan systems. In each way, normal systems and L-formed homes outperform C-formed ones.

3.SHEAR WALL

SHEAR WALLS are the walls provided in a structure that withstand horizontal forces such as those caused by wind or earthquakes.

SHEAR WALLS are structural walls that are provided parallel to the direction of horizontal force and are exposed to bending moments and shear (in-plane) forces.

- Types of shear wall
    - Core type shear wall
    - C shaped shear wall
    - L shaped shear wall at corners
    - Parallel shear wall along the outskirts
    - Non-Parallel shear wall along the outskirts
    - + Shaped shear wall at center
    - E Shaped shear wall
- II Shear Wall Position
    - At corners of building
    - At centre (core) of structure
    - At periphery of building

4. OBJECTIVE OF STUDY :

- To compare the performance of shear walls in different parts of the construction.
- Shear walls and grid slabs will be studied.
- The link between a shear wall and a grid slab will be reviewed.
- The purpose of this study was to examine the efficiency of buildings with and without shear walls.
- In high-intensity earthquakes, evaluate the seismic reactions of comparable conventional and (G+ 10) storied with shear wall structures, and identify the optimal shear wall location in a structure.

5. METHODOLOGY

The aim of this study is to see how grid slab and shear wall interacts under earthquake loads. This takes into account multi-story buildings. This study examines the structural behaviour of the structural composition proportionate to the interaction of grid slab and shear wall. Shear walls are provided at particular locations in a multi-story building to mitigate storey-drift and column-shear.

5.1. There are three sections of all structural analysis software:

- Pre-Processing: Creates the model, as well as gathers and organises all of the data used for the study.
- Processing: Calculates member forces, stresses, displacements, reactions, etc.
- Post Processing: the results are displayed.

5.1.2 Seismic Methods of Analysis:

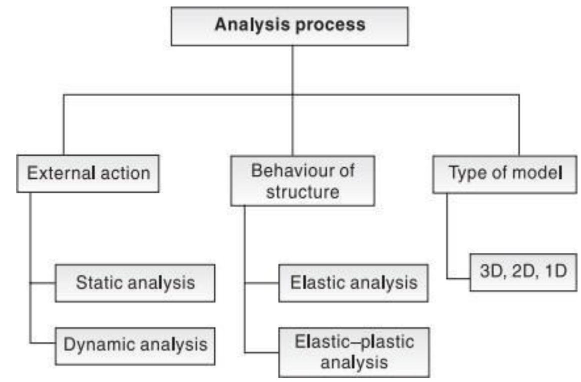

Fig 1- ANALYSIS PROCESS

5.I.3 In this attempt, following main cases will be analysed :

1-Conventional R.C.C. structure having no grid slab and no shear wall.

2-Conventional R.C.C. structure having grids lab

3-Core type shear wall having grid slab.

4-L type shear wall at the edges having grids lab.

5-Parallel type shear wall along the outskirts.

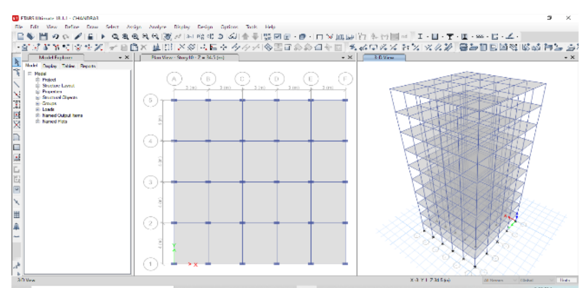

Fig 2- no grid slab and no shear wall.

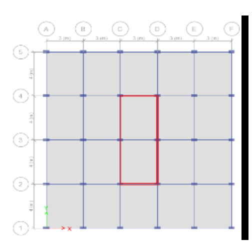

Fig 3- SW at Centre

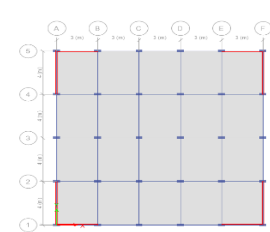

Fig 4- SW at Corners

6. Response spectrum Method:

This approach can be used on structures in which all modes except the basic one has a major impact on the structure's response.it is also called **Dynamic method**.

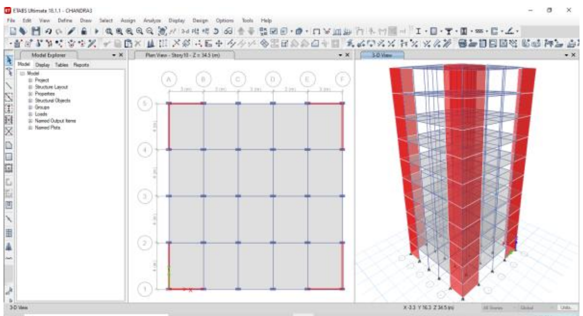

Fig 5- SW at coners with grid slab

7. RESULTS AND CONCLUSION

•The storey drift in all systems is within the permitted limits of IS:1893(Part-1) -2002. However, when compared to other models, grid slabs produced superior outcomes.

•Grid Slabs are the most effective at resisting lateral loads. As a result, this frame design will have the longest service life.

•As the zone collapses, the earthquake hazard will rise as well. Grid slabs with shear walls can be used in these situations.

•The Response Reduction Factor plays an important role on the variation of cost.

•Earthquake-resistant measures such as shear walls and base isolation can be utilised to improve the structure's efficacy even further.

•The frame with grid slabs clearly provides more safety to the designers and it proves to be extremely cost effective.

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