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Seismic Analysis of Irregular (G+9) building with Shear Wall at Different Location: A Review

Vedang Shukla[1], Abhishek Jhanjhot[2]
[1]M Tech Civil, Department of Civil Engineering, Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore, India
[2]Professor, Department of Civil Engineering, Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore, India

ABSTRACT: -Earthquake prone areas throughout the globe may cause intensive damage to the varied structures that lead to harmful damage of social life and massive financial harms. However, the loss can be recognized to the improper design of the structures. In this paper a building with mass irregularityis selected with placement of external shear walls at different locations.Reinforced walls are one of the lateral loading systems commonly used in elevated buildings up to 30 stories. Position of Reinforced walls in unsymmetrical structures has been given due consideration. It is prominent to determine the efficient and complete location of the shaving walls in uneven structures. In this study , we can determine the high elevation of a 10-story structure (unusual RCC structure) in different areas of the shaving walls facing the spectrum by staad-pro response and the excellent shear wall condition found a few parameters base i.e. frequency, top shop trim, timing, storey drift on both sides and the effect of the joint shift on both sides

Keywords: Shear walls, lateral loading, Etabs, Time period, storey drift, linear dynamic analysis, response spectrum.

INTRODUCTION

Continuous throughout the length of the building. Their thickness can be obtained to 150mm, or up to 400mm in high-rise buildings. Shaving walls are usually structures of reinforced concrete (RC) usually with straight plates such as RC walls called shear walls above slabs, beams and other structural elements. These walls usually start at the foundation level and are provided with the length and width of the buildings. The shaving walls are like wide, vertical poles that carry tremendous vibrations down to the base. Shave walls are straight features of the horizontal resistance system. Shaving walls are designed to withstand the effects of side load applied to the building. In housing construction, barbecue walls are straight exterior walls that usually form a box that provides all the horizontal support in the building. In constructing a building a solid straight diaphragm that is able to transfer side effects from the outer walls, floor, and roof to the base of the floor in a manner consistent with their planes.

1.2 Functions of RC wall

The following conditions are required for a building to be classified as a normal building

- RC walls withstand lateral loads and reduce lateral sway.
- Another function of shaving walls is that they provide the stiffness and durability of the structures facing them.
- Shaving walls have another advantage that the solid diaphragm transfers load directly to the Foundations.

1.3 Location of Shear wall.

The shape of the shear wall in a building affects the behavior of the structure. Usually, they form the central part of the elevator or are used as shear walls with gaps in it. For effective operation of the structure, it is prominent to place the shaving walls

in the correct position to minimize the torsion influences on the structure.

- The location of the shaving wall that will result in reduction in rowing capacity and the erosion of the floor will be taken as an ideal location.
- If the area not only shows reduced migration but produces greater torsion, that would not be considered a suitable location.
- Possibly, a certain configuration of the shaving walls may result in a significant reduction in lateral displacement, but may also result in a greater degree of eccentricity resulting in flexibility in the structure.
- Therefore, the balance should be adjusted to the shaft wall configuration so that the horizontal forces and torsion are completely removed.

1.3 Modeling of Building

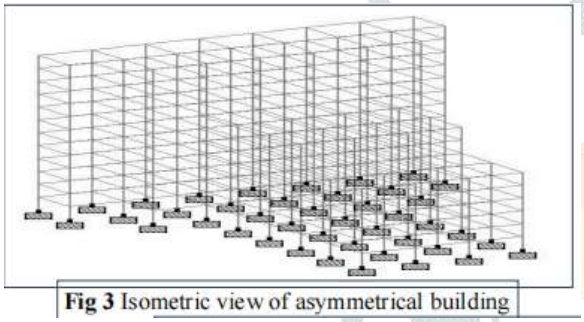

Fig 3 Isometric view of asymmetrical building

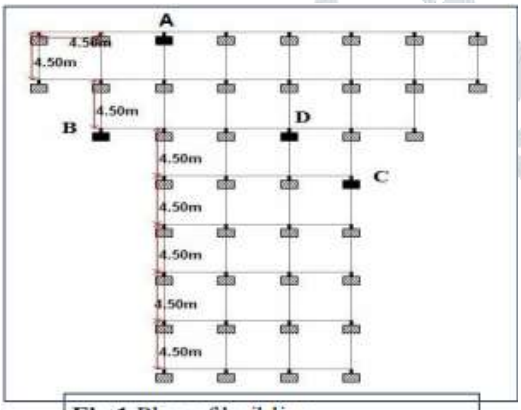

Fig 1 Plan of building

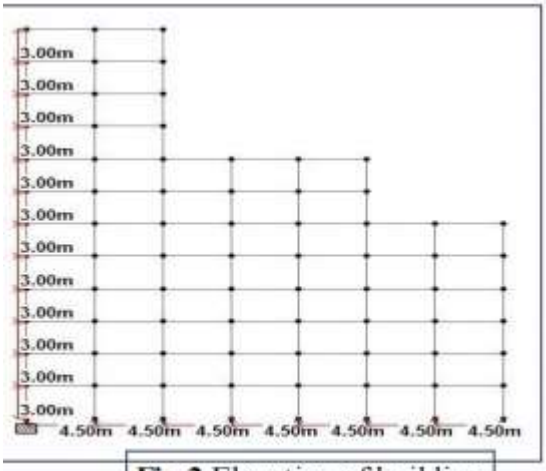

Fig 2 Elevation of building

OBJECTIVE: Objectives of this study are as follows:-

- Study the earthquake response of an asymmetrical cantilever structure with a shear wall in a separate area under gravity and earthquake loading using computer-assisted software.
- Study the different shear wall area to minimize vibration in the building due to seismic forces.
- Study the earthquake activity of an asymmetrical cantilever structure under variatives such as storey drift, base shear and shift joints.

Literature Review: -

2.1Gaikwad Ujwala Vithal

The Impact of Shear Wall on the Seismic Behavior of
Unequal reinforced concrete structure (Oct-2017)
In this study the Response Spectrum method was used to analyze the horizontal structure. The purpose of this study was to reduce torsion using a shear wall in the structure. ETABS is computer software used to prove a point. Five different design analysis cases namely four vertical-facing barrage, X-axis X-shaped wall, X-axis-shaped barbecue, exterior corner-shaped barbecue and double X-axis wall and and three corresponding Y-axis. Different thickness of the clip wall namely 150mm, 200mm, 300mm, and 400mmare used in all these cases. It has been observed that torsion, erosion and displacement of the structure decreased through a shear wall centered on the corners. This study will be useful during the erection of a barbershop in the building.

2.2 -Prakhar Jain & Ankit Gaurav:
Learn about the structure of a high structure in different parts of the shear wall under the seismic load (July.2017).
Subsequent studies indicate that earthquakes occur more frequently now in the day. Earthquake analysis and structural design traditionally focus on reducing the health risk in the most anticipated earthquake. In order to minimize the effects of earthquakes and wind loads, side-by-side load systems are introduced into buildings. Shaving walls are one of the most common side load systems commonly used in high-rise buildings up to 30 floors. The shape of the shaving walls in uneven structures is reasonably considered. It is very important to determine the efficient and complete location of the shaving walls in uneven structures. In the present study, we can determine the behavior of 15 high-rise media (RCC square building) in different areas of the severest-facing walls in the form of a staad-pro reaction spectrum and high shear wall position found the basis of several parameters i.e. frequency , high-end shop, time, stores drift on both sides and integrated shifts on both sides

2.3Dipika N. Khandelwal1, Monica S. Mhetre2
Revision of High Height and Shear Walls in Higher Buildings
(July.2017).
In this paper various aspects of high ceilings and the location of barbers on high-rise buildings have been discussed based on studies conducted by various researchers. The following conclusions can be drawn from studies, Shear walls placed in the center have a significant impact on the performance of the structure such as 95% removal of the structure can be reduced by providing a shear wall up to 20% of the total length of the sides. Although 70% to 85% of the temporary effects of bending are reduced if there are internal columns and a perimeter on the ground floor when shearing walls are provided in the central area of the building. Considering the base shear in the lower columns, the results are reduced by 86% due to the contribution of shear walls to very high structures.

2.4 Gagandeep1 and Aditya Kumar Tiwary
Analysis of a Non-Asymmetrical Structure with a Shear Wall under Seismic Loading. The current study is concerned with the behavior of the G + 8 residential building with a shaving wall and not in various locations. Shear wall is located at the edge of the building. Modeling and analysis of the RCC component structure is done by STAAD.pro. This study included calculating High Release, Combined Stress and Base Shear and compared with all analyzed cases. In this study we considered zone-III, zone-IV, zone-V. The middle ground is considered.

2.5 Zain-Ul-Abdin Butt, Nitish Kumar Sharma, Nirbhay Thakur: Comparison between Symmetrical and Unbalanced Structure under Seismic Load using Bracing and Shear Wall (May.2019).
In this study, emphasis was on the analysis of standard and unusual frames using the Response Spectrum Response Method. Building A (G + 9) is the model for this study. Different construction frames are made that include shaving walls and reinforcement of different shapes in different areas to have their own effective location to reduce the basic shear and to provide resistance towards earthquake. The parameters for the comparison study are: Base Shear, Time, Story drift and Node Removal.

2.6Vishal N, Ramesh Kannan M, Keerthika L: Earthquake Analysis of Multi-Floor Multi-Floor Building (March 2020).
: Most multi-storey buildings are analyzed based on the assumption that the building is under total load after modeling the entire building. But in reality, each floor is subject to certain loads that are thought to be functional during the construction itself as it is built in phases as a floor structure. Consecutive analyzes in a building are ignored by many building engineers when analyzing a building. As a result of this uncertainty, there may be differences in the members of the ground floor structure in relation to the upper floor as construction continues which leads to improper distribution of power to the member. Therefore, the analysis should only be done with the consistent use of loads on each floor to avoid cost overruns and cost effectiveness. To study the behavior of a 20-story structure with precision decomposition model and analyzed in the form of a reaction spectrum was considered both outside and outside Construction Sequence Analysis (CSA) using different building systems in CSI ETABS V16 according to BIS 1893: 2016 (Part 1). Finally, effects such as axial strength, shear strength, bending time are drawn by building members and reactions such as floor movement, floor cutting and floor overflow are plotted and compared to each

structural plan. Keywords: Building Sequence Analysis, Multi-storey Structure, Response Wide Range, Seismic Analysis, Direct Reverse Disruption.

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2.7DivyaVishnoiIn et, al2018: Analysis and design of a horizontal and horizontal structure under a gravitational structure It was analyzed and found that most of the buildings are usually constructed in an abstract way such as a sloping floor, uneven structure, Torsion deflection of filling walls, vertical and horizontal structure, etc. Previous earthquakes studies have shown that most RC buildings with such barriers were severely damaged under the earthquake. In this study modeling and analysis activities were performed based on software called "Staad Pro" and "SAP: 2000". The analysis was performed on the G + 5 symmetric and Unsymmetric framework illustrated in SAP to study the behavior of bending times, shear strength and axial strength.

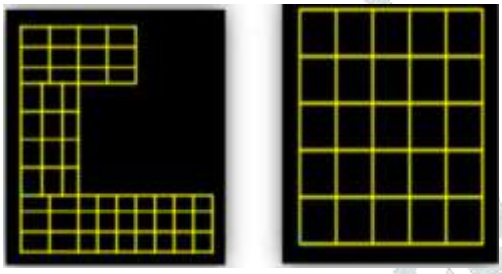

Figure 1: Unsymmetrical plan

Figure 2: Symmetrical plan

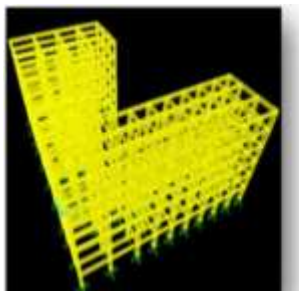

Figure3: Isometric Unsymmetrical Building

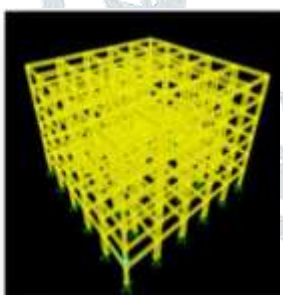

Figure 4: Isometric view of viewof Symmetrical Building

The Symmetric model provides an additional Gross Leasable Area (GLA) compared to the unequal model. Therefore, Land Use will be more.

• The Load Distribution Model in the Symmetric model is very similar compared to the unbalanced model.

• The need for reinforcement is higher on the Unbalanced frame than the symmetric frame.

• Symmetric Model Expensive with respect to the Unbalanced model as the volume of the material is higher than the Unbalanced model.

CONCLUSION

- The literature review provided in this report provides information on the movement of the sides due to earthquakes in equal structures compared to similar buildings, as asymmetrical structures are not naturally natural and are at risk of major fluctuations.
- Different earthquake reactions are completed in the modeling process namely storytelling, storytelling, storytelling moment, storytelling ability, storytelling strength as these parameters are prominent features in any analysis.
- The literature review provided in this report provides information on the ideal location for a barbershop where there is a reduction in drilling capacity and floor movement will be considered a good location.
- It is therefore necessary to analyze the structure of the asymmetrical cantilever with a shear wall in a different area under different loads to determine the ideal location for the shear wall.
- It has also been found that large spanner cantilevers are more prone to earthquake damage due to lateral forces, torsion effects, uneven settlement, and structural weight.

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