A REVIEW OF SEISMIC ANALYSIS OF SHEAR WALL OPTIMIZATION FOR MULTI-STOREY BUILDING

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Abstract - *In this review paper we studied the some paper related to the different position of the shear wall in the RC framed structure which is subjected by the seismic force and other external force. An earthquake force is a very strange force and behaves quite differently than Gravity and Wind loads, striking the weakest spot in the whole three dimensional structure. Masonry Infill are frequently used to fill the gap between the vertical (column) and horizontal (beam) resisting elements of the structure frames with the assumption that these infills will not take part in resisting any kind of load either axial or horizontal. Hence, its significance in the analysis is generally neglected by the designer. In fact, infill wall and shear wall considerably enhance the rigidity and strength of the frame structure. Various researches suggest that the bare frame has comparatively lesser stiffness and strength than the infill frame and frame with shear wall, therefore their ignorance cause failure of many multistory structures when subjected to seismic loads and other external load. In the present study, the finite element analysis of RC frame models viz. a bare frame; a frame with shear wall considering infill; a bare frame with shear wall has been carried out at the same height structure but the location of the shear wall is different and checking the which one position of the shear wall is performed better to other.*

***Key Words*: Seismic analysis, Time history, RC frame, Etabs, Shear wall, Different position of shear wall.**

1. INTRODUCTION

RC structure can adequately resist both horizontal and vertical load. Whenever there is requirement for a multistory structure to resist higher value of seismic forces, horizontal load resisting system such as shear wall should be introduced in a structure. Vertical plate like Reinforced Concrete wall introduced in structure in addition to beam, column and slab are called shear wall. Shear wall can be provided both along the length and width of the structure. Properly designed structure with shear wall has shown good performance in past earthquake. Mark Finlet, a noted consulting engineer in USA stated that "We cannot afford to build concrete structures meant to resist severe earthquakes without shear walls." Different positioning of shear wall in structure produces varying response in the structure during application of horizontal force. Properly designed structures with shear walls have shown very good performance in past earthquakes however they require special detailing in high seismic risk zones. Shear wall is a popular choice in many earthquake-prone countries like Chile, New Zealand and USA because they are easy to construct and reinforcement detailing is relatively straight-forward and therefore can easily be implemented at site. Moreover these walls are efficient, both in terms of construction cost and in minimizing earthquake damage in structural and non-structural elements (like glass windows and structure contents). But in order to get maximum advantage, it must be symmetrically located in plan to reduce ill-effects of twist in structures. It should be placed symmetrically along one or both directions in plan and prove more effective when located along exterior perimeter of the structure because such a layout increases resistance of the structure to twisting. There are figure of some different position of shear wall which is given below:-

1.1. Structure with shear wall on each side on Middle:-

In this position of the shear wall, the shear wall is placed at the middle of the wall.

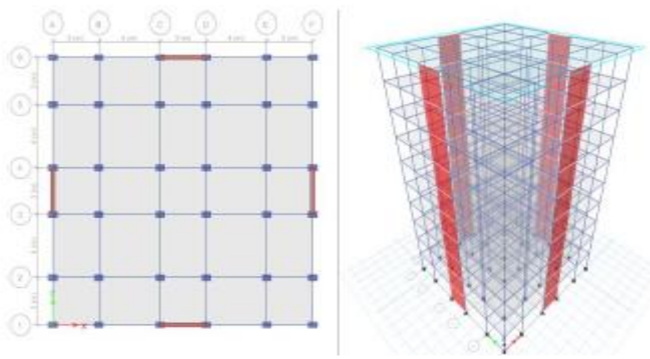

Fig -1-Structure with shear wall on each side on Middle.

1.2. Structure with Corner Shear wall extending 3m on each side.

In this position shear wall is placed at the corner of the building.

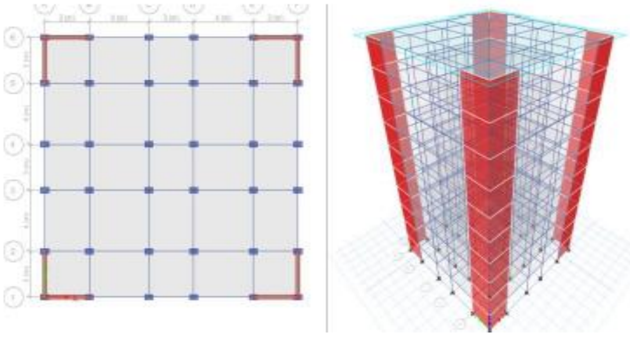

Fig-2-Structure with Corner Shear wall

1.3. Structure with shear wall in centre.

In this position shear wall is placed at the centre of the buildings.

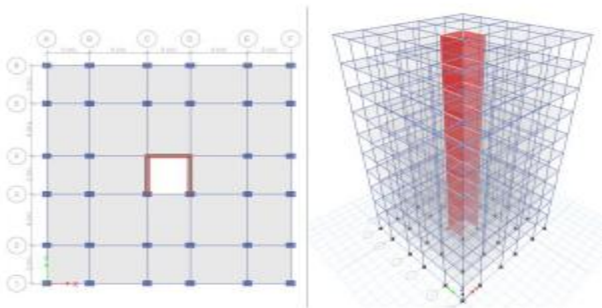

Fig-3-Structure with shear wall in centre.

2. LITERATURE REVIEW

After study various paper related to the seismic analysis of the RC framed structure with different position of the shear wall, and all conclusion is given below:-

[1]Wen-I Liao[1] (2004)

This study show that, Past RC panel tests performed at the University of Houston show that reinforced concrete membrane elements under reversed cyclic loading have much greater ductility when steel bars are provided in the direction of principal tensile stress. This paper presents the test results of four large-scale shear walls, including two shear walls under shake table tests and two shear walls under reversed cyclic loading. The height, length, and width of the designed shear walls for the shake table tests are 0.7 m, 1.4 m and 0.085 m, respectively. The height, length, and width of the designed shear walls for the reversed cyclic tests are 1.4 m, 2.8 m and 0.12 m, respectively. Based on the experimental results, the tested high performance shear walls have greater ductility than that of conventional shear walls.

[2]O. Esmaili[2] (2008)

In this study that, In recent decades, shear walls and tube structures are the most appropriate structural forms, which have caused the height of concrete structures to be soared. Finally, having some technical information about the structural behavior of the case would be very fascinating and useful for designers.

[3]Er. Raman Kumar[3] (2014)

This study that, It is well recognized that the incorporation of horizontal load resisting systems in the form of shear walls, bracing systems etc. improve the structural performance of structures subjected to horizontal forces due to earthquake excitation Therefore 10-storeyed and 15-storeyed structures were taken with four different locations of shear-walls i.e. at central frame, external frame, internal frame, and combined external and internal frames.

[4]Ahmad hosseini[4] (2014)

Shear walls are a type of structural system that provides horizontal resistance to a structure or structure. They resist in-plane loads that are applied along its height.. The importance of the shear wall in resist the wind and earthquake load are study, the effect of the shear walls on the conventional frame system. The improvement in the structural performance of the structure with frame system by using shear wall is study.

[5]Prasad Ramesh Vaidya[5] (2015)

This study investigates the seismic performance of shear wall structure on sloping ground. Response spectrum analysis is carried out by using finite element software SAP2000. The performance of structure with respect to displacement, story drift and maximum forces in columns has been presented in this paper.

3. CONCLUSIONS

After study the above research paper related to the seismic analysis of the RC framed structure in which the shear wall are provided at the different position and conclusion is given below:-

a) Shear wall highly influence the forces acting in the Structural member. Higher values of Bending moment and
b) Shear force will be at the RC framed structure in which shear wall provide at the corner of the structure. Storey drift is minimum in the RC framed structure in which the shear wall is provided at the corner of the structure because its provide more reliability.
c) The value of the base shear as well as time periods are maximum in the RC framed structure in which

shear wall is provided at the centre of the structures.

d) The value of the overturning moment in the structure in which shear wall at the middle of wall is exist between the shear wall at the centre and shear wall at the corner of the structure.

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