

Effect of Positions and Orientations of Shear Wall in Structure

D. S. Desale¹, C. S. Kankariya², Dr. V. N. Kanthe³,

Assistant Professor, Department of Civil Engineering^{1,2,3}

Guru Gobind Singh College of Engineering & Research Centre, Nashik, Maharashtra, India

Abstract: Shear wall systems are one of the most feasible and hence commonly used lateral loads resisting mechanism in high rise buildings. The position & orientation of these walls has effect on the stiffness of each floor in the structure, the diaphragm, centre of mass displacement, and the drift of floor. Stiffness and strength parameters can be utilized to resist large horizontal loads and support gravity loads simultaneously. Incorporation of shear walls has now become inevitable in multi-storey buildings so as to resist the lateral forces. Hence it is very necessary to determine the most effective location of shear walls. Structural engineers preferred to distribute the walls in buildings to make the centre of mass almost close enough to the centre of rigidity, but to make this condition satisfied, they have many choices construct the walls on the perimeter, or use intermediate walls, side wall, corner wall etc. Effectiveness of shear wall has been studied with the help of four different models. Model one is RCC frame structural system and other four models are shear wall orientation & positions structural system. Analysis is carried out by using ETAB. The comparison of these models for different parameters like Displacement, Storey Drift and Story Shear has been presented by adding shear wall with column. Shear walls possess adequate lateral stiffness to reduce inter-storey distortions due to earthquake-induced motions. In this chapter, analysis of shear walls with a moment resisting frame using the Khan and S barounis method is discussed. When two or more shear walls are connected by a system of beams or slabs total stiffness exceeds the summation of individual stiffness. Openings normally occur in vertical rows throughout the height of the wall and the connection between wall cross-sections is provided by connecting beams. Such shear walls are called coupled shear walls. The analysis of coupled shear walls by Rosman's continuous medium method is also discussed.

Keywords: Progressive collapse, SAP2000, Alternate load path method, Through Type Bridge

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