

Analysis of Shear Wall on the basis of Joint Displacement and Opening by using Etabs

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ABSTRACT:

The reinforced concrete shear wall is one of the most commonly used lateral load resisting in high rise building. Shear walls are the structural elements of the horizontal force resisting system, shear walls have high influence strength and stiffness and provided to resist not only gravity loads but also lateral loads caused by seismic and wind. So many literatures are available to analyse and design of shear wall. An earthquake load is calculated as per IS 1893 (PART-1)-2016 and applied to (G+14) storey R.C building in zone-IV. The analysis is performed using ETAB v.2017 Software package. The scope of the present work was to study seismic responses of the multi storey RC shear wall building opening and joint displacement for resisting lateral forces acting on structure.

KEYWORDS:

Shear Wall, Etabs, IS code Design, Joint Displacement, Horizontal Opening of Shear wall, Vertical Opening of shear wall, Storey Drift

1. INTRODUCTION

In contrast to the worldwide rapid growth of high-rise buildings, no probabilistic assessment procedures have been developed for different risk like seismic evaluation of this special type of building group. Reinforced concrete buildings often have a vertical plate-like RC walls called as Shear Walls in addition to beams, slabs and columns. These shear wall usually start at foundation level and are continuous throughout the building height. Their thickness can be as minimum as 150mm or as maximum as 400mm in high rise buildings. Shear walls are mostly provided along both width and length of buildings. Shear walls as like as vertically-oriented wide beams that carry earthquake loads downwards to the foundation.

1.1 Classification of shear walls based on shape:

- Simple rectangular types and flanged walls
- Coupled shear walls
- Rigid frame shear wall
- Framed walls with infilled frames
- Column Supported Shear Wall
- Core type shear wall

1.2 Classification based on behaviour :

- Shear walls – Deflection and the strength are controlled by shear. They are usually low-rise shear walls.
- Ordinary- moment shear walls – Deflection and strength are controlled by flexure. They are usually high rise shear walls used to resist cyclones and high winds.
- Ductile – Moment shear walls: shear wall have good energy dissipation characteristic under reversed cyclic loads and special walls meant for seismic regions.

1.3 Problem Statement:

- G + 14 Storey R.C Public building (Hospital building)
- Zone factor, Zone - IV, $Z=0.24$
- Building frame system is Special Moment Resisting Frame (SMRF)
- Reduction factor, $R=0.5$
- Importance factor - $I=1.5$ (Hospital building)
- Floor to floor height = 3.1m
- Roof and floor slab thickness = 200mm
- Beams dimension = 500 x 500mm
- Column size = 700 x 700mm
- Grade of concrete = M25 and steel Fe-415