

The Influence of Shear Wall Position on Seismic Performance in Buildings

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Abstract : Reinforced concrete shear walls are essential components in protecting buildings from seismic forces by providing both strength and stiffness. This study focuses on optimizing the placement of shear walls in a high seismic zone. Through nonlinear analyses conducted on an eight-story building, various scenarios of shear wall positions are investigated to evaluate their impact on seismic performance. Employing a performance-based seismic design (PBSD) approach, the study aims to meet acceptance criteria related to inter-story drift ratio and damage levels. The findings emphasize the importance of concentrating shear walls in the central area of the building during the design phase. This strategic placement proves more effective compared to peripheral distributions, resulting in reduced inter-story drift and mitigated potential damage during seismic events. Additionally, the research explores the use of shear walls that completely infill the frame, forming compound shapes like Box configurations. It is discovered that incorporating such complete shear walls significantly enhances the structure's reliability concerning inter-story drift. Conversely, the absence of complete shear walls within the frame leads to reduced stiffness and the potential deterioration of short beams.

Keywords : performance level, pushover analysis, shear wall, plastic hinge, nonlinear analyses

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