



Seismic Design of Periphery RC Beams in Buildings With Large Plan Aspect Ratio

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Abstract

Seismic behavior of buildings with large plan aspect ratio is affected by the in-plane flexibility of the floor diaphragms. Generally, reinforced concrete (RC) monolithic slab-beam system with plan aspect ratio less than or equal to 3 is considered to provide rigid diaphragm action. This helps in distribution of lateral load to the individual lateral load resisting systems in proportion to their stiffness. According to Indian Standard, a diaphragm is considered to be flexible if it deforms such that the maximum in-plane displacement is more than 1.2 times the average displacement of its ends. This study presents quantitatively additional reinforcement requirement in the periphery beams of buildings, arising due to in-plane flexibility of floor diaphragms with large plan aspect ratios. For the purpose, buildings with various plan aspect ratios are studied including the influence of different configuration of RC structural walls and URM brick infill. It is observed that 5% to about 240% more longitudinal reinforcement is required in the periphery beams to resist the additional tensile forces induced in them due to in-plane flexibility of the floor diaphragms.

Keywords: In-plane bending, Diaphragm, Axial tension, P-M interaction, Shear design