

Seismic Behaviour of 12-Storey RC Buildings with Optimized Shear Wall Locations: A Review

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Abstract: *As cities keep growing into earthquake-prone areas, making sure mid-rise reinforced concrete buildings can handle seismic forces has become a big deal. Shear walls, out of all the options for handling sideways loads, really stand out—they boost stiffness, help keep everything stable, and control how much a building sways, especially in those 10 to 20-storey towers you see everywhere.*

Here, I've pulled together the main insights from both classic and recent research on how these buildings behave during earthquakes. I focus on 12-storey buildings, since that's a pretty common height, and dive into how things like where you put the shear walls, the kind of soil you're building on, and how the earthquake forces are spread out all affect performance. The data come straight from analyses using STAAD.Pro, ETABS, and SAP2000—tools the industry trusts—running through everything from simple static tests to full-on nonlinear time-history simulations. Altogether, this review brings in findings from 21 well-established studies, plus seven newer ones from the last few years.

Some trends pop up again and again: putting shear walls at the core or on the corners tends to cut down on displacement, shift the base shear, stiffen the structure, and make the whole building more ductile. I've included figures showing how drift changes, how base shear depends on soil type, and how the building's time period drops with different setups.

But there's still work to do. There are gaps in nonlinear modeling, understanding soil-structure interaction, dealing with torsional imbalances, and figuring out the best way to place shear walls using optimization algorithms. This review pulls all of that together to give engineers and researchers a solid, up-to-date foundation for designing better, more earthquake-resistant 12-storey RC buildings.

Keywords: 12-storey RC buildings, shear wall location, seismic analysis, storey drift, STAAD.Pro, response spectrum, nonlinear dynamics.

