



## Site Specific Response Spectrum Analysis of Various Wall-frame Composite Tall Buildings

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### Abstract

Consideration of site-specific response spectrum for seismic analysis helps in creating efficient structures. The present study examines the influence of site-specific response spectra and time histories derived based on the Bhuj earthquake on the composite tall buildings with a wall-frame lateral load resisting system. The research considered 24, 44, and 64-story composite tall buildings with plan dimensions of 48 m × 48 m and located at three distinct sites in Ahmedabad. ProSHAKE software is used to develop site-specific response spectra and time histories. The software ETABS is utilised to perform site-specific response spectrum and acceleration time history analysis, in addition to conventional response spectrum analysis of wall-frame buildings in accordance with IS 1893 (Part 1): 2016. Various shear wall locations are explored to meet the criteria of relevant Indian standards. This paper compares the analysis and design outcomes for tall buildings' strength and serviceability criteria such as the time period, base shear, story displacement, inter-story drift ratio, and design forces, as determined by site-specific response spectrum and time history, in addition to response spectrum analysis as specified in IS 1893 (Part 1): 2016. The results of these analyses indicate that site-specific response spectra influence both the serviceability requirements for tall buildings and the design of structural elements in 24- and 44-story tall buildings. Additionally, it is established that buildings with shear walls at the centre of core faces performed better in terms of meeting the strength and serviceability criteria for tall buildings.

**Keywords:** Site-specific response spectrum, Time history analysis, Tall building, Composite Structure