



## Estimation of Site Amplification Factor and Predominant Frequency in and Around Panchkula City, Haryana, India

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### Abstract

In this study, we used the Horizontal to Vertical Spectral Ratio (HVSr) technique to estimate the site amplification factor and the fundamental/predominant frequency at some of the sites in the Panchkula city of Haryana state of India. This technique gained popularity when Nakamura (1989) estimated the site amplification factor by considering the Horizontal to Vertical spectral ratio of microtremor noise data. This method helps in the seismic microzonation of an area with very less seismicity. It has been found that the site amplification factor and the fundamental frequencies at 19 sites in the city vary in the range of 1.9-3.1 and 0.4-1.0 Hz, respectively depending upon the local geological conditions. The sites associated with the riverside show more site amplifications ( $>2.8$ ), while sites away from the river show lesser amplifications ( $<2.1$ ). Similarly, we observed that some sites show higher predominant frequencies ( $>0.85$ ), while some sites show less predominant frequencies ( $<0.5$ ). It has been also observed that some sites show clear H/V peaks, while some sites show broad peaks suggesting poor impedance contrast between bedrock and soil. The variation of site amplification factor and predominant frequency in the study region exhibits variable geological conditions and site characteristics. This study is highly useful for civil engineers in designing and constructing high-rise buildings in this region.

**Keywords:** Site amplification, Predominant frequency, Microzonation, Horizontal to vertical spectral ratio