

CHOICE OF GROUND MOTION DATA FOR ASEISMIC DESIGN

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In a large number of problems of design in seismic zones, structural engineers have to take the important decision regarding the ground motion data to be used for a site in the analysis of various structures. This vital decision of selecting ground motion data depends upon the seismotectonic features of the site, and occurrence of events in that region. On the basis of expected magnitude and focal depth of shock and epicentral distance of the site, expected peak ground acceleration is determined using empirical relationships. It is emphasised that consideration of peak ground acceleration as the only parameter for deciding the ground motion at a site is not adequate. Spectral intensity together with peak ground acceleration has been considered to represent seismic potential of a site in a better way. A method has been suggested for selecting design spectra in various situations and depending upon the soil characteristics of the site.

Based on available data of strong motion shocks recorded in various parts of the world, a relationship between spectral intensity (SI_n - normalised with respect to peak ground acceleration and epicentral distance) has been obtained for different types of site conditions. Also, curves have been drawn to show variation of SI_n with respect to time base modification factor (τ). On the basis of expected magnitude, focal depth and epicentral distance expected peak ground acceleration is found out using empirical relationship for the type of soil conditions similar to those at the site. Then, using relationship between SI_n and epicentral distance, obtained for similar soil conditions, spectral intensity is worked out at the site. From this, the time base modification factor, τ , for any recorded accelerograms can be worked out to suit this spectral intensity. For alluvial soils, El-Centro May 18, 1940 accelerograms may be chosen as the basic accelerograms. Similarly for rock sites Koyna Dec.11, 1967 type ground motion can form this basic data. The time axis of the chosen accelerogram and the acceleration ordinates are then modified corresponding to the value of τ and the peak acceleration respectively. Such modified accelerogram is recommended for use in seismic analysis at the site.

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