

DESIGN SPECTRA FOR MAJOR PROJECTS
BASED ON EXTRAPOLATION OF REPRESENTATIVE RESPONSE SPECTRA

by

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The determination of design spectra is based on response spectra representative of the design level of shaking throughout the period range of interest rather than on peak acceleration or other peak ground motion parameters. The method accounts empirically for the effects that the characteristics of the source mechanism, travel path, and the local geology have on the ground motion. A detailed description of the approach as well as discussion of the basic features, examples, and test cases can be found in the references listed below. The method is applicable to major projects such as nuclear power plants, dams, offshore drilling platforms, and other important facilities for which comprehensive investigations are needed in order to achieve a high degree of confidence in the plant safety.

The basic consideration of the approach is that the severity of ground motion during an earthquake is more completely represented by response spectra than by simplified variables such as maximum ground acceleration. The representative accelerograms are identified by comparing the geologic and seismologic conditions under which they were recorded with those of the design earthquakes (Magnitude, distance, dimensions of fault break, source mechanism, travel path, and regional and local geology), and selecting those that have been obtained under circumstances closest to the design conditions. In order to obtain response spectra at the level representative of the design earthquake, it is usually necessary to scale the selected accelerograms for Magnitude and distance; one advantage of the approach is that the amount of such scaling is minimized. The scaling factors used are based on observed attenuation of response spectra; this spectral approach to scaling is considered more appropriate than the use of attenuation relations based on peak parameters of ground motion. When the response spectra, scaled to a level representative of the design earthquake, have been calculated and plotted, suitable design spectra are fitted to achieve a level of conservatism appropriate to the project.

REFERENCES

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