SITE SPECIFIC SPECTRA CONSIDERATIONS FOR HIGH-RISE BUILDINGS

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Optimization of design criteria for structures against earthquake is one of the main concerns of seismic codes all over the world. Hence, in most of the world's seismic codes, there are some requirements in order to utilize site specific design spectra for high rise buildings that site effects are needed to be investigated in specific points.

In investigating of site effects in specific points, ground level seismic parameters such as peak ground acceleration and the normalized design spectra are estimated during the earthquakes in the scope of the project. In order to estimate the value of peak ground acceleration for each point of sediment, firstly, appropriate accelerograms are selected for seismic bedrock based on results of site Seismicity studies. Secondly, earthquake geotechnical model of basement layers of the site is provided in accordance with results of engineering geology, geotechnical and geophysical studies. Then seismic bedrock accelerograms are applied to seismic geotechnical profile of the site. Finally, the results are analyzed and the maximum acceleration are estimated.

Generally, the normalized design spectra are extracted based on statistical analysis of acceleration response spectra which is resulted from sediment dynamic analysis. In this research, considerations associated with aforementioned process in extracting the site specific spectra for high rise buildings are investigated and according to a case study some recommendations are presented.

The results of dynamic analysis of sediment in Mashhad city site show the following:

1. Value of maximum acceleration in depth of 24m from the surface is 0.3g (gravity acceleration); and
2. Value of maximum acceleration at the surface is 0.46g (gravity acceleration)
3. Proposed non-scaled design specific spectra of the site for corresponding maximum acceleration (0.3g) with average curve plus standard deviation of non-scaled response spectra related to accelerograms that resulted from dynamic analysis of sediment of near and average zone earthquakes using different softwares (SHAKE and DEEPSOIL) and average curve plus standard deviation of non-scaled response spectra related to accelerograms that resulted from far zone earthquakes (FAR AVE+STD) with 2800 and UBC97 code (with consideration of near zone effects) are compared and the related curves are shown in Figure 2.

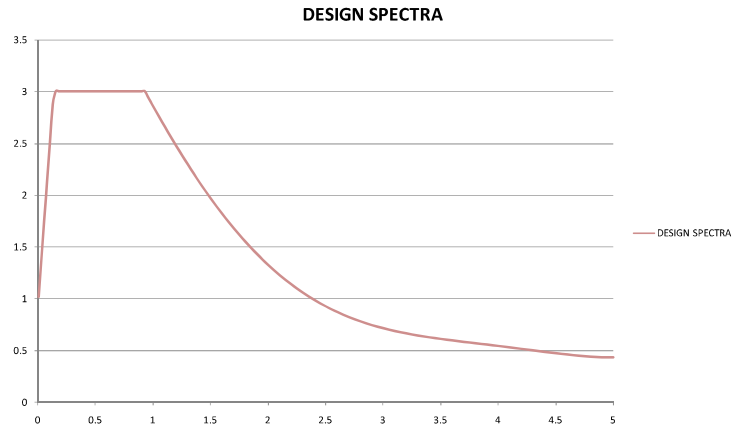

Figure 1. Proposed site design spectra

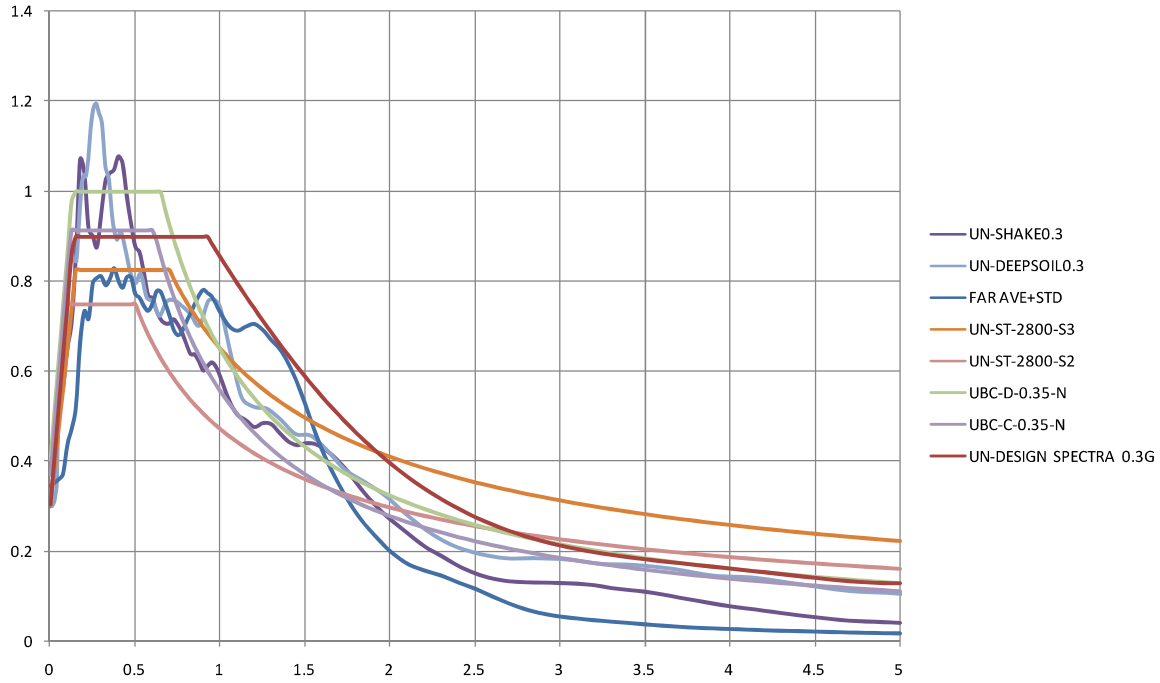

Figure 2. Proposed non-scaled design specific spectra of the site for corresponding maximum acceleration (0.3g) with presented curves in comparison with 2800 and UBC97 codes (with consideration of near zone effects)

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