

INVESTIGATION OF NEAR FIELD AND FAR FIELD EARTHQUAKES EFFECTS ON SITE SPECIFIC SPECTRA

S. O. HOSSEINIAN

*M.Sc. Student, Department of Civil Engineering, Branch of Broujerd, Islamic Azad University, Broujerd, Iran
ohosseinian@yahoo.com*

Mojtaba MOOSAVI

*Assistant Professor, IIEES, Tehran, Iran
m.moosavi@iiees.ac.ir*

Keywords: Near Field Earthquakes, Site Specific Spectra

Ground motions in near fault area can be significantly different from those observed further away from the seismic source. It is well known that near-fault earthquake may contain distinct forward directivity pulse. These pulses like ground motions may occur at near fault sites when the fault rupture propagates toward the site and the rupture velocity is similar to the shear wave velocity, leading to constructive interference of the wave front and the arrival of the seismic energy from the rupture in a large amplitude pulse (Somerville, 1997). It was observed that the near field earthquake effects may play an important role in the site specific response spectrum.

In this study two different sets of earthquakes records including far field records and near field records were scaled to 0.15g, 0.2g, 0.25g, 0.3g, and 0.4g used as input motions to seismic bedrock of a hypothetical soil profile. Details of the Soil profile are shown in the Figure 1.

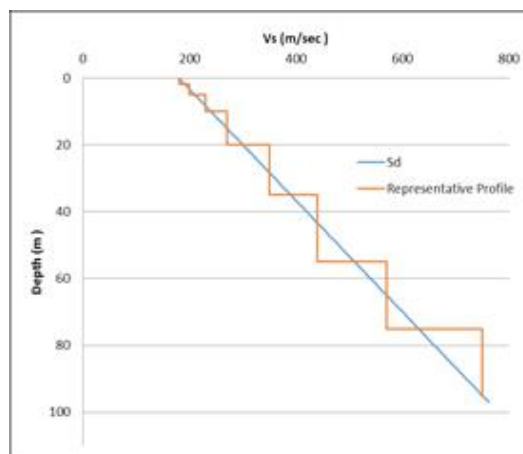


Figure 1. Soil profile

Then by using Deep soil 5.1 site specific response spectra of the soil profile were obtained and compared to UBC97 spectra. Deep soil 5.1 is a one dimensional site response analysis program with graphical user-interface that can perform both nonlinear analysis and equivalent.

As shown in Figure 2 the results indicate that for period above 0.5 Second site specific spectra of near field earthquake records is higher than of site specific spectra of far field earthquake records. Also UBC97 spectra is lower than other spectra in some period . The results showed that UBC97 code does not give generally enough assurance that future earthquakes would threaten structures.

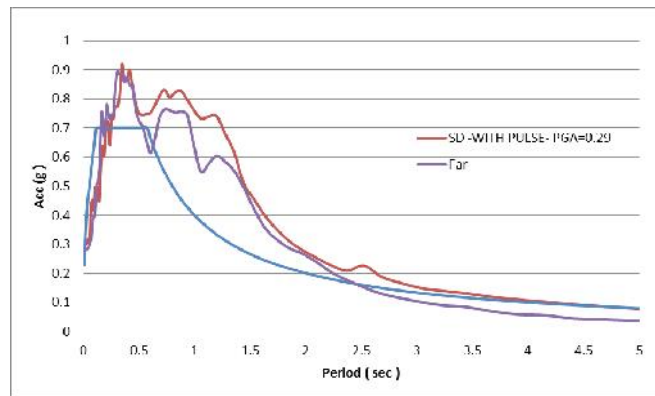


Figure 2. A comparison of Site Specific spectra with UBC97 spectrum

REFERENCES

Hashash YMA, Groholski DR, Phillips CA, Park D and Musgrove, M (2011) DEEPSOIL 5.1, User Manual and Tutorial, 107 pages

Somerville P (1997) The Characteristics and Quantification of Near Fault Ground Motion, *Proceedings of the FHWA/NCEER Workshop on the National Representation of Seismic Ground Motion for New and Existing Highway Facilities*. Burlingame, California, 293-318, 3

Uniform Building Code (1997) International Council of Building Officials

