

Equivalent linear earthquake site characterization of layered soil deposits at Shakardarra and Muzaffarabad

MonaLisa and Sarfraz Khan

Department of Earth Sciences, Quaid-i-Azam University, Islamabad

The present work deals with the test of the adequacy of site response analyses (e.g., strain-dependent normalized shear modulus and equivalent linear damping curves) to predict the effects of soil deposits on site responses during earthquakes. The selected sites are Shakardarra (in Kohat) and Muzaffarabad (Azad Kashmir). For this, the site responses at the vertical strong motion arrays at the Shakardarra and Muzaffarabad were analyzed prior to occurrence of any earthquake. The site response analysis program, which is based on the Equivalent linear hysteretic soil model (EERA), has been used for the purpose. The site response models were constructed using different borehole profiles, shear and compression wave velocity profiles, and the available geotechnical data of CPT and SPT. Two site-response analyses were carried out for two input ground accelerations 0.07 g and 0.1. Based on the EERA analysis results, the Muzaffarabad site was found to have comparable responses over a wide range of earthquake motions while at Shakardarra there is relative small range of earthquake motion results. At Shakardarra site, EERA predicts site amplification of 3.83 (clay), 3.84 (Dry sand), and 3.89 (wet sand) for acceleration up to 0.07 g, and attenuation of surface acceleration for higher levels of accelerations. While at Muzaffarabad EERA predicts site amplification of 9.35 (sandy gravel) and 10.51 (clay) for acceleration up to 0.1 g. The results are beneficial for both the researchers and engineers alike.