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Geophysical in-situ investigations for analyze soil-structure interaction: case study of TRNC-Nicosia (DEU-EBAMER, NEU, AFAD Common Project)

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ABSTRACT

Cyprus is situated in the Mediterranean-Himalayan seismic belt. This seismic belt extends from the Strait of Gibraltar to the Indonesian island generation. In the past century, earthquakes did not cause any major damage. It is observed that there is a significant increase in the seismic activity in the part of the Helenic Cyprus Spread between Antalya Bay and Cape of Albian through the Aksu Thrust Fault. The average S-Wave velocity values change between 350-450 m/sec for the 30 meters depth in the general of Lefkosia where the workplace of this research is. This means that the place defined as bedrock is deeper than the 30 meters in the general Lefkosia. That is why the design spectrums defined in the regulations cannot be used for this research area and soil-bedrock models must be prepared in-situ. For that purpose, at first, in the 49 different locations the microtremor measurements were done for the Lefkosia and surroundings. By this way, the observational soil transfer functions were obtained. With the Soil Transfer Functions, the pre-estimation studies were done for the possible changes in the amplitude and frequency contents of the earthquake waves and acoustic impedance difference depth. In addition, the period sensitivity regions (acceleration, velocity, migration), which is obtained from the soil transfer functions and also describing the soil-structure joint behaviour, is defined. According to the obtained results, the acceleration and velocity sensitivity regions are dominant in the general area. Furthermore, in the pre-research, for the Intense Soil Movement station places managed by AFAD, the pre estimation studies were done for the period sensitivity regions by studying with the noise data in the general KKTC. Generally, it is observed that the bedrock is deeper than 30 meters long.

Key words: Acoustic impedance; microtremor; soil-engineering bedrock model.

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