

Estimation of possible structural damage: the case study of Balçova, Izmir

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ABSTRACT

Earthquakes which most important natural disaster, bear upon our life and property security directly and we cannot prevent to exist earthquakes. It is possible to non-damage form earthquake can be possible earthquake resistant buildings. For earthquake resistant building design, horizontal deformations/ displacements must be calculated before earthquakes occur by using theoretical processing. There are three main cause structural damage during the earthquakes which are local soil conditions, earthquake parameters and structural specialities. Earthquake source parameters and local soil conditions will play an active role in determining the damage. Soil transfer functions (Quasi Transfer Functions-QTS) can be determining such that; the changes will occur on frequency and amplitude of earthquake waves which travels between the seismic bedrock to soil surface. Hence, Acceleration, Velocity or Displacement parameters which Structure will be affected can determine by using soil transfer functions. In this topic, microtremor data were processed depends on Nakamura's horizontal/vertical ratio technic and found that the Quasi Transfer Spectrums can be affected on earthquakes displacement and velocity component by using Geopsy software which generated by Sesame project. Also vulnerability indexes were calculated and mapped from Quasi Transfer Spectrums. Multi Channel Analysis of Surface Waves (MASW) method was applied at study area and Vs changes were mapped. According to the obtained results vulnerability indexes higher than 25, soil resonance frequency values higher than 1 second and Vs30 values lower than 760 m/sec. Also microgravity method was applied at study area for obtaining soil-bedrock models. This results which determined microtremor, vulnerability indexes, MASW and microgravity methods has been interpreted together.

Key words: Vulnerability index; QTS; MASW; microgravity.

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