



Investigation of the bedrock depth by using MASW, microtremor and microgravity methods at Guzelbahce-Izmir (Turkey)

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Whole population of Izmir city is under control of active tectonic structures. On the otherhand there are high buildings, skyscrapers which have very high predominant periods. Therefore prediction of soil behavior under dynamic conditions are very important issue. For this reason, the Izmir-Guzelbahce (Turkey) region where there is intersection of two major faults called Izmir fault and Seferihisar fault, was selected to study. To identify the shear wave velocity, bedrock depth and soil dynamic properties, multi-channel analyses of surface waves (MASW), microtremor and microgravity methods were carried out along a profile. Shearing strength, elasticity modulus, incompressibility modulus, natural vibration frequency, seismic amplification coefficient, Poisson's ratio etc. are directly related to the V_s . The V_s is utilized in the determination of dynamic soil behavior together with soil amplification and fundamental period. Also microtremor measurements are used in the determination of soil types, fundamental period and empirical transfer function. Nowadays, the microgravity method is used in the exploration of shallow structures particularly in places where settlements have accumulated. The gravity data obtained from the application of this method are evaluated together with the results obtained from MASW and microtremor measurements. The results of these methods were interpreted together. The Bouguer gravity values could be related to the transitions between the N-S trending alluvial fans and delta coast sediments. These transitions observed in the soil structure are monitored in the H/V dominant frequency values. The V_s -depth changes, V_s values of the soil show sudden changes both laterally and vertically. These changes were classified at four different V_s values along the N-S profile. Within this classification, unit I was defined in the velocity range 0–350 m/s, unit II as 351–550 m/sec, unit III as 551–950 m/sec and unit IV as 951–1150 m/sec. Finally, the results were indicated that the soil generally contains sudden variations in the V_s values, the depth of engineering bedrock and geotechnical parameters from north to south in Izmir-Guzelbahce.

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