



Investigation of Buildings Strength Using Microtremor Method: A case from the North of Izmir Bay (Turkey)

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Seismic risk investigations has great importance in City of İzmir which exists within the first degree earthquake hazardous zone and also surrounded by active tectonic systems. Microtremor measurements have been used to determine building's period and strength characteristics, as a non-destructive way of exploring bearing frame structure of the buildings. It is possible to measure dominant periods and amplifications at each floor, and also to calculate vulnerability indexes and floor spectral ratios (FSR) using these two parameters. In this study, microtremor data were collected at each floor of 5 buildings in Karşıyaka, in the North of İzmir Bay. The buildings were selected along the shoreline and the construction ages as well as the heights were chosen to be similar, in order to make a consistent comparison between the results. The data were recorded at each floor of the buildings and outside the buildings simultaneously for 40 minutes and HVSR curves were obtained by using GEOPSY software. The validation of periods were determined using FSR in order to calculate damping ratios accurately. The variation range and tendency between damping ratio and period of each floor with damping ratios and vulnerability indices, along with the preliminary influence factor, were presented and discussed. In addition, a fitting curve was plotted indicating the relation between the damping ratio and dominant natural frequencies of the floors of each building. Furthermore, evaluation of strength, damping ratio, natural dominant period and vulnerability index of the buildings were estimated by interpreting microtremor data. As a result, it was determined that 3 of the 5 buildings were seismically risky.