



Geotechnical and Seismological Considerations on Earthquake Damage in Yalova (Turkey) City

Ferhat Ozcep (1), Savas Karabulut (1), Oguz Ozel (1), Ceren Cicen (2), Dilek Kepekci (3), Tazegul Ozcep (1), and Halil Zarif (4)

(1) Istanbul University, Geophysics, Istanbul, Turkey (ferozcep@istanbul.edu.tr), (2) Istanbul Technical University, Civil Engineering, Istanbul, Turkey, (3) Bogazici University Kandilli Observatory and Earthquake Research Institute, National Earthquake Monitoring Center, Istanbul, Turkey, (4) Istanbul University, Faculty of Engineering, Department of Geological Engineering, 34320 Istanbul, Turkey

Yalova is located on a geodynamic position (especially, affected the Northern Branch of North Anatolian Fault Zone). By using design earthquake parameters, cyclic stress analysis of liquefaction were applied to the field data (both SPT (N) data), obtained from over 200 borehole sites in the Yalova region. By using FS, liquefaction potential index (PL) was estimated. In the last phase of the liquefaction analysis, by using Isihara and Yoshimine (1992) approach, the liquefaction induced soil settlements for several design earthquakes were estimated. The validity of the estimation of seismic site response characteristics from ambient noise measurements was investigated in the city of Yalova (Southern Part of Marmara Sea), which was affected latest by the March 12, 2008 (MI: 4.8) in Yalova-Cinarcik Earthquake. After the August 17, 1999 earthquake and November 12, 1999, a continuously recording network of 8 stations was installed from October 9, 1999 to March 6, 2000. During the second step (2009) of this study, for the purpose of evaluation of site effect problem 37 'single site' ambient noise measurements were performed in a dense grid of points covering the center of the Yalova city (300 m in direction of E-W and 750 m in direction of N-S). A comparison between fundamental periods obtained from strong ground motion records and obtained from microtremor measurements shows similarities, which is in the range 0.1-5 Hz. All results (liquefaction or site effects) are evaluated in integrated form with earthquake damage caused by 1999 Golcuk earthquake.