



Estimation of the Liquefaction-Induced Ground Settlements and its Relation to the Earthquake Damages: Yalova (Turkey) Case

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In this study, estimated liquefaction-induced ground settlements and its relation to the real earthquake damages in Yalova has been investigated. Liquefaction, as it is known, is defined as the transformation of a granular material from a solid to a liquefied state as a consequence of increased pore water pressure and reduced effective stress due to the earthquake. Safety against earthquake hazards has two aspects: firstly, structural safety against potentially destructive dynamic forces and secondly safety of a site itself. To reduce the hazards due to the earthquakes and to obtain the structural safety against earthquake forces, determination of the liquefaction behavior of sandy soils is one of the important goals in seismic soil behavior studies. The design magnitudes and acceleration values of the earthquakes in hazard analysis were respectively chosen as 6.5, 7.0 and 7.5 (magnitudes), and as 0.25, 0.30, 0.35, 0.40, 0.45 and 0.50 g (accelerations). In the second phase of the study, earthquake induced settlements were estimated by Ishihara and Yoshimine (1992) approach for study area. In the third phase of the study, obtained liquefaction-induced ground settlements is compared by the real earthquake damages of the 17 August 1999 Izmit earthquake ($M_w=7.4$) that ruptured a 140 km segment of the North Anatolian Fault.