



Geophysical and Geotechnical Studies for Electric Power Plants Project At the Sakarya River Zone, Turkey

Cengiz Kurtulus (1), Ali Bozkurt (2), and Hasan Endes (1)

(1) Kocaeli University, Dept. of Geophysics , İzmit, Kocaeli, Turkey (cengizk@kocaeli.edu.tr, endes@kocaeli.edu.tr), (2)
ABM Engineering Co., İzmit, Kocaeli, Turkey (alibozkurt@abmjeo.com)

Geophysical and geotechnical studies were conducted at a proposed hydroelectric power plants facility at a site in the north of Sakarya river D100(E-5) bridge in Adapazarı town of Sakarya city in Turkey. The study is aimed at evaluating the competence of the near surface formation as foundation materials. Geophysical and geotechnical methods of investigation were adopted. The geophysical investigation involved the Vertical Electrical Sounding (VES) technique using the Schlumberger configuration, seismic refraction method and geotechnical investigative methods comprised of boreholes to 40 m depth with Standard Penetrating Testing (SPT) and undisturbed Shelby tube, disturbed Split Spoon soil sampling, triaxial compression and consolidation tests.

A total of five Vertical Electrical Sounding (VES) and five seismic refraction profiles from different location within the study area were used for the study. Water content, plasticity, and grain size distribution characteristics are obtained from laboratory testing leading to a classification of elastic silts and elastic silts with sand using the Unified Classification System.

The geophysical results revealed three distinct geoelectric sequences which comprises of topsoil, weathered layer and consistent silty clay. The topsoils composed of sandy clay/ clayey sand while the weathered layer composed of silty clay. The geotechnical results show that the soil has relatively high clay content. Based on the consistency limits of the soils within the area, the soil generally indicate firm plasticity, hence, the soils are expected to exhibit medium swelling potential. There is no evident of geological feature such as fracture/fault within the subsoil in the area.