

08-9**GEOPHYSICAL SURVEY ALONG ENERGY TUNNEL AND PEN-STOCK ROUTE OF CINE DAM****HAKKI KIREMITCIOGLU**

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A geophysical survey has been carried out on the surface trace of energy tunnel and pen-stock route of Cine Dam by employing electrical methods in February 1998.

Cine Dam is situated on Cine Stream, a tributary of Menderes River in western Turkey. The height of dam is 118 m. and it has been planned for irrigation, flood control and hydropower.

Dam site, valley sides, energy tunnel route and pen stock route are composed of metamorphic rocks such as gneiss, flaser gneiss, granite gneiss and migmatites. To the higher altitudes of dam site, gneiss underlies various schists. The gneiss in the above mentioned areas have cracks with intervals of 1-4 m and space of 5-20 cm.

To determine the locations of the would be collapses and to make difference of fresh rock mass from soft rock mass or weathered rock mass were the aims of energy tunnel survey and pen stock route survey respectively. The pen stock route would be parallel to topography in case of existence of thin talus with lower cost otherwise a horizontal route with a vertical part of 50 m. would be considered.

Geophysical survey consist in 47 probes, measured by Schlumberger electrode configuration and placed with intervals of 10-30 m.

Those of VES curves which represent laterally homogenous and parallel stratified media were interpreted by computer modelling method after the layer parameters had been attained by conventional curve matching whereas, distorted VES curves were interpreted considering the complicated geological conditions as had been tackled by Zohdy, 1969 and Alfano, 1961.

Four resistivity ranges, representing four structural conditions of gneiss have been determined by parametric measurements according to which geological interpretation of VES curves has been achieved. It has been observed that increase in the number of cracks and degree of disintegration caused a decline of resistivity of the rock mass or vice versa.

Geoelectric sections on which the structural conditions of gneiss have been designated have presented the results of geophysical survey.

During the excavation of the energy tunnel it has been observed that the gneiss zones that had been identified by the resistivity values of lower than 500 ohm-m indicated heavily damaged gneiss or feldspar or groundwater saturated zones seven of which have collapsed.

On the pen stock route too, drilling results confirmed the structural conditions of gneiss that have been predicted by geophysical survey. On the cores, belonging to high resistivity zones cracks were scarce. Thickness of weathering zone that was about 12-15 m has been determined precisely enough to produce the project.

Consequently, the geophysical survey of energy tunnel and pen-stock route of Cine Dam have yielded valuable data which helped to overcome some of the difficulties that the contractor have encountered during the excavation of tunnel and to save time and to diminish the soundings on the pen-stock route.