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The characteristics of the engineering geology of Uromieh Lake soft sediments

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Abstract

[en] Uromieh Lake, which forms a closed, inter mon tane basin, located in northwest of Iran and is the biggest lake in the country. The lake has 5000 square kilometers area, with 140 km length and 15 to 50 km widths. Based on interpretations upon tectonic evolution of the region, Uormieh Lake is considered as a remnant portion of Tethys Ocean. The present situation of the lake shows that, it is surrounded by a few faults and forms a tectonic depression. Saturated clay and silt deposits overlying on bed rocks show evidence of marine fossils and demonstrate that earlier deposited environment of the lake was not so much salty. The source of soft sediments in the lake which were transported through north and south runoffs and floods are mainly comes from playa deposits of Maragheh Formation, Ceertaceous and Neogene shale and sandstone, limestone of Qum Formation, and granitic intrusive s. Besides these silt and clay sediments, detrital sediments in form of small sandy grains and in situ chemical deposits in lesser amounts are also seen in the sediments. These detrital deposits which are colored and composed of quartz, mica, and calcite are more frequent. Clay minerals are illite, kaolinite, and chlorite. Aragonite composes most parts of chemical deposits. The amount of organic material in sediment of the lake is almost 5 % but in salty lagoons of the lake this amount increase to 15 %. The mean content of salt is 250 g/lit. Due to this salt content in water of the lake, except at the conjunction of rivers to the lake it takes time for suspended sediments to deposit. Based on direct observation and through core log ing form boreholes which were drilled along Shah id Kalantary freeway, The soft sediments of the lake have fine bedding. In samples collected from core logging along the lake coast in Tabriz and Uormieh region, fine sandy layers with up to 2 millimeters in thickness can be seen. The existences of these layers can considerably effect engineering characteristics of the deposits. Grains smaller than 75 micron, can be seen down to 150 - meter depth and constitute 95 % of the deposits, obviously show their fine - grained nature. Sediments in the middle parts of the lake mainly consist of fine clay (Cl) to silt (Ml). Their activities decrease form surface to depth. By increase in activity of sediments, the amounts of internal friction, permeability coefficient (k), and consolidation index (C v) decrease, but compaction index (Cc) increase. In general, sensitivity of top layer sediments is more than but tom one. Detail analysis on results of vane shear experiments, Spt, and uniaxial compressive strength demonstrate that shear strength of the sediments considerably increase with depth and that their sensitivity decrease in 40-45 meters depth

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