

# The study on Geotechnical Characteristics of Copper Mine Tailings

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Waste management issue in mining industry has become increasingly important. In this regard, construction of tailings dams plays a major role. Most of the tailings dams require some kinds of remedial actions during their operational lifetime, among which heightening is the most common. In the first stage of the remedial provisions for Sarcheshmeh Copper Complex tailings dam in Iran, it has been decided to use hydrocyclone method to provide suitable construction material due to the high cost associated with using borrow materials for heightening of the dam. To undertake this project a series of laboratory experiments was performed to determine the copper 'original tailings' and 'cycloned materials' geotechnical characteristics to evaluate the applicability of the cycloned materials for construction purposes. Different laboratory experiments were conducted to determine the grain-size distribution, Atterberg limits, specific gravity, maximum density, shear strength parameters, consolidation coefficient, and hydraulic conductivity. The results were compared with those of similar mines to check whether

they follow the trends observed in other copper tailing materials elsewhere. Variation of the cohesion and internal friction angle versus different compaction ratios were studied in order to determine realistic shear strength parameters for tailing dam stability analysis. In this study, using oedometer test, a mild linear relation between void ratio and the consolidation coefficient has been found for tailings materials. By considering the effects of void ratio and weight of passing sieve #200 materials, a new relationship is proposed that can be used for estimating the copper slimes hydraulic conductivity in seepage analysis of tailings dams.

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