

The Effect of Foundation on the Earth Fill Dam Settlement

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Abstract : Careful monitoring in the earth dams to measure deformation caused by settlement and movement has always been a concern for engineers in the field. In order to measure settlement and deformation of earth dams, usually, the precision instruments of settlement set and combined Inclinator that is commonly referred to IS instrument will be used. In some dams, because the thickness of alluvium is high and there is no possibility of alluvium removal (technically and economically and in terms of performance), there is no possibility of placing the end of IS instrument (precision instruments of Inclinator-settlement set) in the rock foundation. Inevitably, have to accept installing pipes in the weak and deformable alluvial foundation that leads to errors in the calculation of the actual settlement (absolute settlement) in different parts of the dam body. The purpose of this paper is to present new and refine criteria for predicting settlement and deformation in earth dams. The study is based on conditions in three dams with a deformation quite alluvial (Agh Chai, Narmashir and Gilan-e Gharb) to provide settlement criteria affected by the alluvial foundation. To achieve this goal, the settlement of dams was simulated by using the finite difference method with FLAC3D software, and then the modeling results were compared with the reading IS instrument. In the end, the caliber of the model and validate the results, by using regression analysis techniques and scrutinized modeling parameters with real situations and then by using MATLAB software and CURVE FITTING toolbox, new criteria for the settlement based on elasticity modulus, cohesion, friction angle, the density of earth dam and the alluvial foundation was obtained. The results of these studies show that, by using the new criteria measures, the amount of settlement and deformation for the dams with alluvial foundation can be corrected after instrument readings, and the error rate in reading IS instrument can be greatly reduced.

Keywords : earth-fill dam, foundation, settlement, finite difference, MATLAB, curve fitting

Conference Title : ICGGE 2022 : International Conference on Geomechanics and Geomechanical Engineering

Conference Location : Montreal, Canada

Conference Dates : August 08-09, 2022