

Investigation of arching phenomenon in earth dams using Geo-Studio model (Case study: Safarood dam)

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ABSTRACT:

Leakage is an important issue in earth dams which by exceeding a certain amount, there is possibility of malfunction and the failure of the dam. In this scope there are many soft-wares developed in order to forecast and evaluate leak rate. To calculate the amount of dam leaking, a model of the dam with material properties and real Geotechnics in SEEP/W and SIGMA/W which are based on the finite element and are respectively for flow analysis, seepage and stress-strain analysis are delineated and calculation of stress and deformation analysis are done. One of the important issues in earth dam is water flow in core of earth dam. Another phenomena is arching which results in the horizontal and vertical stresses in the lower part of the core and creates the possibility of cracks in the dam. Increase in water pressure causes cracks opening and lead to hydraulic fracturing. Results of modelling showed that by comparing hydraulic pressure of vessel and total stress in the core probability of hydraulic fracturing in dam is predictable.

Keywords:

Analysis of seepage, earth dam, stress-strain analysis, arching, hydraulic fracturing, SEEP/W and SIGMA/W