An investigation on the accuracy of numerical model utilizing a combination of linear behavioral model with a nonlinear on in the Taham Dam

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Abstract

Studies over determining the behavior and modeling the rock fill dams have always been of great importance, because shows the behavior of a real dam and evaluating the behavior of such dams for organizing the principles of designing and introducing new experiences.

The data of different monitoring instrumentations include of electric piezometers and pressure cells in different levels of the dam will be comparing. The recorded results of the monitoring system of the dam will evaluate.

Based on the dominant facts over the project and by applying the technical features of the design and engineering interpretations, technical judgments and filtration will be doing over fine and possibly damaged (of no right function)instruments. Then based on mechanical parameters of the materials (according to the report of the design stage) and using code the behavior of the dam will be modeling. Numerical analysis is done by using different material models.

Numerical analysis is done by using three material models: linear-elastic model, cam-clay model (combined with linear elastic model) and elastic-plastic model in two loading modes of: 1-whole loading process and 2-step- loading process.

The body of the dam is considered in two forms of homogeneous and inhomogeneous. Comparing the results of the all models with observation data (summaries of instrumentations) shows that the use of elastic-plastic behavioral model is known to be as the best alternative, if done step-loading and considered as inhomogeneous material.

Keywords: rock-fill dams, monitoring, numerical modeling

1. INTRODUCTION

Tendency for monitoring the rock fill dam bodies for organizing the designing principles and introducing new experiments had been always, and is still, focused by dam building staff.

In Iran, too, several case studies on some dams have been carried out and their resulted data have been broadcasted in the few past years, and the aim of the present research was the possibility to provide an acceptable database on organizing the designing principles of soil dams. Such researches have been led by Dr. Mirqasemi and his coworkers during 2003 to 2004, within which the instrumentation systems of "Lar" and "panzdah-e-khordad" dams have been evaluated. A study over "Taham dam" had also been done by Farzin Karimi and Abbas sorush from Amir-Kabir University, they have used "Flac" software, but in their method of modeling; making of the layers and applying the inhomogeneity in the shoulders and in the core

2. DAM FEATURES AND METHODOLOGY

This dam is a rock fill dam with a watertight clay core with the height of 124 meters, crest length of 458 meters, heel width of 535 meters, body volume of 128 million square meters, the maximum unload capacity of 1000 square meters per second, and is located 15 kilometers far from north of Zanjan.

The materials which make the body of the dam are as follows: