

عنوان مقاله:

three and two-dimensional seepage analysis for zoned earth dam located in narrow valley

محل انتشار:

سمپوزیوم برآورد عدم قطعیت در مهندسی سد (سال: 1384)

تعداد صفحات اصل مقاله: 10

نویسندگان:

,F. JAFARZADEH - *Department of Civil Engineering, Sharif University of Technology, Tehran, Iran*

M. ASADNIA - *Department of Civil Engineering, Sharif University of Technology, Tehran, Iran*

خلاصه مقاله:

Seepage analysis is one of the most important analysis in design of embankment dams and can influence the project from safety points of view, as it determines saturated region and hydraulic gradient which are the most critical part dam body. In engineering practice, in order to design an earth dam, seepage analysis is carried out in a section with maximum water height or in a general cross section of the dam. Observations have shown that there are significant differences between the data measured in site and data obtained from those two-dimension analyses in dams constructed in narrow valleys and in such cases a three-dimensional seepage analysis is crucial. In this study, seepage from bodies and foundations of hypothetical dams constructed in different valley shapes was studied. Also, two-dimensional seepage models of these dams were analyzed in accordance with current methods in two-dimensional seepage analyses of earth dams. The dams were modeled and constructed in two geometrical shapes: triangular valleys and trapezoidal valleys; in each certain shape factor were variable. In triangular valley the slope of the valley and intrapezoid valley both slope of the valley and the smaller trapezoid base were variable. Results compared to each other and some conclusions are drawn on the amount of errors which may occur because of simplification of problem's dimensions from three to two. The model dams are inhomogeneous earth dam with central clay core. The analyses were carried out by finite element method (FEM), considering unsaturated flow and steady state of water in normal level. The SEEP-3D software was used for two and three dimensional analyses. In order to study the effects of third dimension, some representative parameters such as seepage flow rate, hydraulic gradients at exit point and at maximum places as well as the location of phreatic surface which determines the amount of pore pressure were investigated. For instance the amount of three-dimensional discharge comparing to two-dimensional case is increased as the valley slope is increased. It was shown that the flow rate in three-dimensional models is with good approximation three times of two-dimensional ones. The location of phreatic surface in threedimensional models is higher than that of two-dimensional models.

کلمات کلیدی:

Seepage, Unsaturated flow, Finite elements, Earth dam, Narrow valley

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/126545>



