THESIS

STUDY OF CREEP THEORY BY USING TWO-DIMENSIONAL FINITE DIFFERENCE COMPUTER MODEL AND ITS VERIFICATION BY ELECTRICAL ANALOGUE MODEL

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ABSTRACT

STUDY OF CREEP THEORY BY USING TWO-DIMENSIONAL FINITE DIFFERENCE COMPUTER MODEL AND ITS VERIFICATION BY ELECTRICAL ANALOGUE MODEL

A number of structures were built on the basis of Bligh's creep theory. Some of them were successful while others failed. Therefore further investigation were required to find out sound and scientific techniques for the design of low head structures. The present study is carried out for the verification of analytic creep theory, which is overdue, for the future designing of hydraulic structures.

The main objective of the study is to study seepage under hydraulic structures using the numerical models. The results obtained by an Electrical Analogue Model and Finite Difference Computer Model are compared with the results of analytical theory. To initiate and to understand the methodology of a electrical analogue model and numerical technique a simple seepage problem was studied. This experience was used to modify Rushton (1979) model to solve seepage problems. Analysis of numerical model results show seepage under hydraulic structure is a complex problem which can only be properly solved using a numerical model.

Comparison of numerical model results with Bligh's Creep theory show that Bligh's theory considers linear distribution of potential along the creep length whereas actual distribution is non-linear. Bligh's theory is a conservative yet simple approach but it is not applicable to complex field situations where the soil properties vary widely below the hydraulic structures. The effect of different positions of sheet piles can not be properly considered using Bligh's theory.

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