THESIS

INFLUENCE OF SEEPAGE ON DAM STABILITY AND HYDROPOWER PRODUCTION FOR SATPARA DAM HYDROPOWER PROJECT

By

Zaheer Muhammad Malik
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University of Engineering and Technology, Lahore, Pakistan.

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Abstract

Satpara Dam Hydro Power Project (13.2 MW) was the chosen case study. It is a zoned earthen embankment with an upstream impervious blanket and a relatively pervious foundation conditions.

The study aims at quantifying the seepage through the dam body, with emphasis on its influences on the dam slope stability and the hydropower production.

Geoslope office packages, SEEP/W and SLOPE/W were utilized for the Quantification of seepage and the slope stability analysis respectively. The results were assessed against the conventional Terzaghi's Equation for seepage and relative FOS standards for the stability analysis.

A correlation coefficient of 0.941 and an R^2 value of 0.88 indicated reliable confidence of the seepage results.

A similar trend was obtained for three different stability analysis approaches, with the FOS values well above the established standards for different loading conditions.

Seepage was concluded to be influential on the slope stability, the average FOS values from the three methods of analysis were discussed in the light of phreatic line estimations for the analysis and the acceptability was confirmed over relative possible hazard criteria.

At the end, a 2.07 % increase was indicated through the incremental involvement of seepage in the mean monthly discharges for the power and energy computations. It was thus concluded that the influence of seepage on Mega projects may as well be neglected but projects such as the case study taken might undergo an appreciable economic appraisal.