

## Seepage Analysis through Earth Dam Embankment: Case Study of Batu Dam

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**Abstract :** In recent years, the demands for raw water are increasing along with the growth of the economy and population. Hence, the need for the construction and operation of dams is one of the solutions for the management of water resources problems. The stability of the embankment should be taken into consideration to evaluate the safety of retaining water. The safety of the dam is mostly based on numerous measurable components, for instance, seepage flowrate, pore water pressure and deformation of the embankment. Seepage and slope stability is the primary and most important reason to ascertain the overall safety behavior of the dams. This research study was conducted to evaluate static condition seepage and slope stability performances of Batu dam which is located in Kuala Lumpur capital city. The numerical solution Geostudio-2012 software was employed to analyse the seepage using finite element method, SEEP/W and slope stability using limit equilibrium method, SLOPE/W for three different cases of reservoir level operations; normal and flooded condition. Results of seepage analysis using SEEP/W were utilized as parental input for the analysis of SLOPE/W. Sensitivity analysis on hydraulic conductivity of material was done and calibrated to minimize the relative error of simulation SEEP/W, where the comparison observed field data and predicted value were also carried out. In seepage analysis, such as leakage flow rate, pore water distribution and location of a phreatic line are determined using the SEEP/W. The result of seepage analysis shows the clay core effectively lowered the phreatic surface and no piping failure is shown in the result. Hence, the total seepage flux was acceptable and within the permissible limit.

**Keywords :** earth dam, dam safety, seepage, slope stability, pore water pressure

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