

# Investigation of permeability effects on seepage of earth-filled dams

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## Abstract

Earth-filled dams have long been widely as means of saving water for agricultural and rural exploitation. However, a number of defects such as seepage, slope instability, etc. are natural features of these dams. Therefore, since water resources limitations are severe due to the recent drought, there is a developing need for accurate analysis and subsequently seeking solutions to these glitches. Seepage in earth-filled dams is one of the most hazardous phenomena, having profound implications for dam stability and ultimately, can potentially trigger piping and precipitate structural failure. So controlling seepage is of crucial significance in long-term. 2D and 3D seepage analysis using computer programs are scientifically and practically proven methods for accurately estimating seepage volume and therefore determining the effectiveness of seepage restrictive methods. 3D seepage analysis is proven to have a higher accuracy in comparison with two-dimensional modeling but it requires excessive amounts of time and resources. In addition, possible influential factors on differences between models and reported measurements are elaborated. Effects of permeability on seepage in various parts of the dam is investigated and methods for mitigation is suggested thereafter.

**Key words:** Seepage, Analysis, SEEP3D, Permeability, Dam, Earth-filled