

عنوان مقاله:

Seepage Analysis of Rock-Fill Dam Subjected to Water Level Fluctuation: A case study on Gotvand-Olya Dam

محل انتشار:

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خلاصه مقاله:

The Gotvand-Olya Dam is a rock-fill dam, located at Khuzestan province in southwest of Iran. Since the dam is subjected to the daily water level fluctuation, such as rapid drawdown and refill, thus induce a structural impact on the behavior of dam body, it draws many soil engineering concerns. In this paper, seepage analysis of the rock-fill dam was primarily conducted to evaluate the dam safety against the leakage through the dam body. Traditionally, steady-state analysis was employed to investigate the seepage in the dam body, summing that water level is fixed at two cases: high and low water levels. Consequently, it was not able to properly reflect the time-dependent characteristics of seepage phenomena. In this study, seepage analysis was numerically performed using 2-D FEM transient analysis. As a particular boundary condition for an analysis, the water level fluctuation was incorporated to simulate the daily changes. As a result, various seepage phenomena were quantified such as hydraulic gradient, seepage vector and pore water pressure distribution at the corresponding time of interest as the water level rises and recedes. At steady state analysis, the seepage flux at high water level in downstream area was predicted to be 78 l/s. In addition, the seepage flux measured and estimated were both acceptable considering design criteria. The result of this study proves that there is no sign of hazardous sources contributing to the possibility of piping, internal erosion and excess leakage through the dam body.

کلمات کلیدی:

Seepage/ Hydraulic structures/ Net flow/ Finite elements/ Gotvand-Olya Dam

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