



Effect of Valley Slope on Static and Dynamic Response of Earth Dams Supported on Rock Foundation

Mehran Javanmard¹, Isa Alamiparvin² and Farhang Farrokhi³

1Assistant Professor, Department of Civil Engineering, University of Zanjan, Zanjan, Iran

2PhD. Student, Department of Civil Engineering, University of Zanjan, Zanjan, Iran

3Assistant Professor, Department of Civil Engineering, University of Zanjan, Zanjan, Iran

Original Article:

Received 15 Dec. 2017 Accepted 10 Jan. 2018 Published 30 March. 2018

ABSTRACT

In earth dams with a simple geometry, especially when the valley width is large, various analyses are performed in two-dimensional plain strain condition. In contrast, when the valley width is small or dam foundation is not uniform, the dam structure would be three dimensional and requires 3D analysis. Furthermore, valley slope of and dam sides may influence the dam behavior. The main objective of this study is to investigate valley slope on the behavior of earth dams at end of construction, first impounding, steady seepage stages, and under dynamic loading. Therefore, three similar earth dam with the different valley slopes (30° , 45° and 60°) were analyzed. Results of analysis show that the valley slope has no significant impact on arching phenomenon and maximum pore water pressure and minimum settlement at the end of construction are associated with the dam with valley slope of 30° . Results of the study indicate that the pore water pressure induced by dynamic loading is independent from valley slope and response acceleration of dam crest increases by an increase in the slope of valley.

Keyword:

Earth Dam; Arching;
Valley slope;
Amplification factor;
Pore water pressure

* Corresponding author: Mehran Javanmard

Peer review under responsibility of UCT Journal of Research in Science, Engineering and Technology