

Behavior of Khassa Chai Earth Dam under Earthquake Excitation

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ABSTRAT:

An earth dam is built of suitable available soils obtained from borrow areas or required excavation which are then distributed and compacted in layers using mechanical means. Earth dams can be constructed of one material to be homogeneous or multiple materials to be zoned dams. Zoned dams are usually advised since zoning allows the use of several different types of material in the embankment which may be available from areas of borrow or required excavations.

This paper presents a dynamic analysis on a zoned earth dam subjected to earthquake motion in which pore water pressure, effective stresses and displacements are calculated. The finite element method is used and the computer program Geo-Studio is adopted in the analysis through its sub-programs SEEP/W and QUAKE/W. As a case study Khassa Chai dam is selected, it is located on Khassa Chai river and constructed of zoned embankment, it has a total length of 3.34 km. The selected earthquake for the analysis is El-Centro earthquake with a period of (10 sec) and different amplitudes of acceleration. The time of the analysis is taken as (600 sec.) with a time step ($\Delta t = 0.05$ sec.) to investigate the behavior of the soil for a period of time after the earthquake has stopped, a free vibration period is included in the analysis. It was concluded that, the value of pore water pressure generated at the base of the core is greater than that in the upper parts of dam, the horizontal and vertical effective stress continue to decrease during the period of analysis (600 sec) which indicates that the soil continues to weaken during this period, the horizontal displacement increases with depth of the point from the crest and the largest horizontal displacement will be at the base of the dam at time 60 sec and There is attenuation of the acceleration to some degree depending on the amplitude of the input horizontal acceleration.

Keywords: Earth dam, earthquake, finite elements, liquefaction.