Geophysical Research Abstracts,
Vol. 11, EGU2009-2176-3, 2009
EGU General Assembly 2009

Seismic performance analysis of Tendaho earth fill dam, Ethiopia.

T. Berhe (1) and W. Wu (2)

(1) Geotechnical Engineering, BOKU, Vienna, Austria (tensay@engineer.com/Fax : +43 1 47654 5567), (2) Geotechnical Engineering, BOKU, Vienna, Austria (wei.wu@boku.ac.at/Fax : +43 1 47654 5567)

The Tendaho dam is found in the Afar regional state, North Eastern part of Ethiopia. It is located within an area known as the 'Tendaho Graben' ,which forms the center of Afar triangle, a low lying area of land where East African, Red sea and the Gulf of Eden Rift systems converge. The dam is an earthfill dam with a volume of about 4 Million cubic meters and with mixed clay core. The geological setting associated with the site of the dam, the geotechnical properties of the dam materials and seismicity of the region are reviewed. Based on this review, the foundation materials and dam body include some liquefiable granular soils. Moreover, the active East African Rift Valley fault, which can generate an earthquake of magnitude greater than 6, passes through the dam body. This valley is the primary seismic source contributing to the hazard at the Tendaho dam site. The availability of liquefiable materials beneath and within the dam body and the presence of the active fault crossing the dam site demand a thorough seismic analysis of the dam. The peak ground acceleration (PGA) is selected as a measure of ground motion severity. The PGA was selected according to the guidelines of the International Commission on Large Dams, ICOLD. Based on the criteria set by the ICOLD, the dam is analyzed for two different earthquake magnitudes, the Maximum Credible Earthquake (MCE) and the Operating Basis Earthquake (OBE). Numerical codes are useful tools to investigate the safety of dams in seismic prone areas. In this paper, FLAC3D numerical tool is used to investigate the performance of the dam under dynamic loading. Based on the numerical analysis, the seismic performance of the dam is investigated.