Geophysical Research Abstracts
Vol. 17, EGU2015-14840-2, 2015
EGU General Assembly 2015

Evaluation of creep properties of sliding zone soil in a slow moving landslide

Shun Wang (1), Dong Sheng Xia (2), Jing e Wang (3), Wei Wu (1), and Wei Xiang (3)

(1) Institute of Geotechnical Engineering, University of Natural Resources and Life Sciences, Vienna, Austria (shun.wang@boku.ac.at), (2) Faculty of Engineering , China University of Geoscience , Wuhan (dongshengxia@163.com), (3) Three Gorges Research Center for Geo-hazard, Ministry of Education .Wuhan ,China (wangjinge@cug.edu.cn)

Slow-moving landslides make up a great part of geohazards in the Three Gorges reservoir (TGR) in China. Most of them move at speed of several centimeters per year (or even less) and show evidence of episodic accelerations, which corresponds to seasonal rainfall and 30 m of reservoir water level fluctuation (145 m to 175 m on elevation). Various methods are applied to study the structure and kinematic features of these landslides, in particular, a 908m-long in-situ tunnel beneath the Huangtupo landslide, which is volumetrically the largest and most complex landslide in TGR region, was constructed in 2012 and became the world-first 3d, multi-filed landslide monitoring system. In-situ monitoring devices on the landslide and extensometers within the landslide were installed. The structure and kinematic characteristics were analyzed according to the geological logging of the tunnel excavation and monitor data. The central part of the landslide is creeping at a slow, relatively stable rate of about 20mm/year, the deep displacement, however, presented different stages of movements. To clarify the mechanism of this kind of movement, several intact samples were collected from the rupture zone for creep test, and a residual state ring shear creep test with various shear force was conducted. The results of tests at different shear forces show that the displacement rate is positively dependent on the shear force, and a threshold value for creep was obtained. The displacement rate was dramatically increased at the threshold value which is a little larger than the residual shear strength. In addition, the displacement rate at the threshold value is decreased with increasing the consolidation duration after the shearing ceased. The long-term displacement presents acceleration stage and deceleration stage, which showed a similar tendency to the extensometer results. This means this creep test can partially simulate the creep movement of the landslide and help for the prediction of the slow-moving landslide.