Geophysical Research Abstracts, Vol. 8, 04172, 2006
SRef-ID: 1607-7962/gra/EGU06-A-04172

Debris flow induced head-cutting process of landslide dams

H. Chou (1), W.M. Liao (1)

(1)Department of Civil Engineering, National Central University, Chung-Li, Taiwan 32054 (htchou@cc.ncu.edu.tw)

The head-cutting process of the seepage-induced collapse of landslide dams and the associated debris flow is explored in this paper by inclined-flume experiments with the slope range of $12°$to$24°$. The range of discharge for debris flows induced by seepage failure, being a function of particle size, permeability, dam length and slope, is determined by experimental data and a theoretical consideration. During the seepage failure, the mass of grains above the seepage line slide down either in the arc shape or in the stepwise shape, then fully mixed with seepage water to form the debris flow. The key time parameters controlling the receding profile is the mobilization of the slumped blocks. The head-cutting process and the duration of the dam failure are analyzed in terms of dimensionless parameters, which are important for the design of the warning system and hazard mitigations for downstream communities. According to the experimental data, the sediment concentration of the debris flows from the seepage failure decreases with the increasing channel slope or the increasing seepage discharge.