A kinematic model of the Suao landslide calibrated to the morphology of the landslide deposit

L.W Wei (1), C.M. Lo (1), C.F. Lee (2), H.T. Chou (2), and M.L. Lin (3)

(1) Disaster Prevention Technology Research Center, Sinotech Engineering Consultants, INC., Taipei, Taiwan, ROC. (cmlo@sinotech.org.tw), (2) Department of Civil Engineering, National Central University, Chung-Li 320, Taiwan, ROC., (3) Department of Civil Engineering, National Taiwan University, Taipei, Taiwan, ROC.

This study presents results of a case study on the Suao catastrophic landslide, including its kinematic process and the deposition geometry. A 3D discrete element method (program), PFC3D was used to model the kinematic process that led to the landslide and destruction of 115.9k Suhua highway. The landslide advanced from debris slide to debris avalanche during the kinematic process. Assuming a friction coefficient of each particle of 0.05, the predicted maximum velocity was about 50 m/s, the material in the source area collapsed and moved out in about 30 seconds, part of particles deposit downstream, and the whole process finished in the period of about 132.5 seconds. The simulation mimics the process of landslide and alluvial fan in very detail, and the final form is close to real situation. However, it should be reminded that the entrainment from banks and channel bed is neglected by employing PFC3D.

Key word: Suao catastrophic landslide, kinematic process, deposition geometry, discrete element method