

Simulations of seismic signals induced by landslides by numerical coupling of PFC and FLAC

Zheng-yi Feng^{1*}, Cyun-Fu Lin¹, Pei-hsun Tsai²

¹Department of Soil and Water Conservation, National Chung Hsing University, Taichung 402, Taiwan, ²Department of Construction Engineering, Chaoyang University of Technology, Taichung 413, Taiwan

We developed a two-dimensional numerical coupling approach using the Particle Flow Code (PFC) and Fast Lagrangian Analysis of Continua (FLAC) code to simulate the flow process of landslides and rock avalanches. We used the Xiaolin rock avalanche as a case study. The sliding of the rock fragments was simulated by PFC. When the rock fragments impact on the top boundary of FLAC, forces and displacements of the boundary grids will be transmitted between the two codes. We assigned monitoring locations in the coupled numerical model to record the seismic signals induced by the simulated rock avalanche. The time-frequency spectrograms of the seismic signals were analyzed using Hilbert-Huang transform (HHT) for examining the seismic characteristics. The simulated results were compared with the seismic signals recorded during the landslide from a broadband seismic station, SGSB, which is 11.4 km away from the Xiaolin landslide site.

Keywords: PFC, FLAC, HHT, Xiaolin, landslide