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Talus Deposition Pattern of Rockfall through Mechanical Model and Remote Sensing technology

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Rockfall disasters occurred frequently in Taiwan mountain areas during the earthquake and storm events. The differences between the size and amount of rockfall make various types of disasters. In particular, as rockfall consists of simultaneous movements of numerous rock fragments, it might cause serious disasters, which has occurred in Sishou Hills, Central Cross-island Expressway, Hungtsaiping, and the landslide-blocked lake of the Long-Quan River. Such disasters have threatened the safety of life and need to be concerned.

This paper focuses on the study of rockfall talus deposition. Numerical DEM program (PFC3D 3.0) calibrated with small-scale physical experiments are used to simulate the movement process and talus deposition pattern of rockfall. The valid numerical modeling method is subsequently applied to the full-scale research. The application of remote sensing technology also provides the feasible tool for the analysis of slope ground covering and the evolution of rockfall.

The small-scale experimental results show that the talus deposition pattern of rockfall is significantly affected by its amount and fall height, as well as the geometry of slope and the evolution of rockfall. The full-scale case study coupled with numerical modeling not only confirms the experimental results, but also indicates the influences of the contact damping ratio and the contact stiffness of rockfall material. The obtained results are helpful for developing reasonable and scientifically sound guidelines while giving further research of related rockfall talus deposit issues.

Keywords: Rockfall disaster, talus deposition, distinct element method (DEM), phys-

ical experiment, remote sensing technology.