

A flexural toppling failure in the northern Central Range, Taiwan

*Ching-Ying Tsou¹, Hsi-Hung Lin², Masahiro Chigira³

1. Faculty of Agriculture and Life Science, Hirosaki University, 2. Central Geological Survey, MOEA, Taiwan, 3. Disaster Prevention Research Institute, Kyoto University

On December 19, 2016, a rockfall occurred on the right bank of the Baishi Valley at the downslope of the Taigang village, in Taiwan. The rockfall continued lasting more than two weeks, opened a number of new tension cracks in the head area and the rock masses did not travel far, but formed a steep cone at the foot of the slope. However, no trigger for the collapse is evident. Geologic and geomorphic investigations indicate the rockfall occurred in a old landslide scar within a gravitational deformed slope at its lower part. The strata is mostly composed of argillite and alternating beds of sandstone and mudstone at the foot of the slope. The argillite strata has well developed slaty cleavage, which strikes NE-SW and generally dips at 80° along the riverbed to the north of this slope, but was observed to have flexurally toppled downslope in the landslide scar and in the deformed slope. In addition, the alternating beds are also bent downslope. Toppled beds had open fractures, which had been created during toppling deformation, and had also resulted in small scarplets of about 1 m high beyond the landslide crown. Moreover, morphological phenomena on the upper slope such as a ridge-top depression and a juxtaposing convex slope indicate that the slope deformation have already taken place long before and this deformation provides a basic cause for the occurrence of rockfall event.

Keywords: flexural toppling, rockfall, gravitational slope deformation, Taiwan