Post Deformation Characteristics of a Large-scale Slope in the Reservoir Area

*Yao Jiang[1], Shenghua Cui[2]

1. Institute of Mountain Hazards and Environment, Chinese Academy of Sciences, 2. State Key Laboratory of Geohazard Prevention and Geoenvironment Protection, Chengdu University of Technology, China

Landslides are geological process that potentially presents significant hazards to human safety and the built environment. The study of landslides generally focuses on three aspects: pre-failure deformation, the failure itself and post-failure movement. Normally, the pre-failure deformation of large-scale landslides is rarely documented because of the limited availability of early detection and monitoring data, whereas the short- and long-term characteristics of post-failure processes are commonly studied. On 29 November 2016, a colluvial slope located on the right bank of the Lancang River, Yunnan, southwestern China, experienced sudden failure with a large displacement, directly damaging two highways. After this movement, engineering geology investigations, field monitoring and laboratory tests were immediately carried out to reveal the possible failure mechanism and post deformation characteristics. Based on the in-situ survey, 6 scarps were identified on this slope, and their detailed characteristics were determined. The potential sliding zone was determined to be between the colluvium and the bedrock based on drilling and inclinometer readings. By examining the shear strength of the colluvial soils in the sliding zone under different water contents in the laboratory, the rise of the reservoir water level may have been the key factor triggering this large movement. The monitoring GPS data further showed that the horizontal and vertical displacement ratios decreased following the power function, and these findings provide more information for slope stability analyses and potential disaster mitigation for deforming slopes.

Keywords: reservoir area, deforming slope, inclinometer monitoring, sliding zone, water content, deformation ratio

