

Theme Lecture 7

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Theme Lecture Title

Cause and Mechanism of Fatal Zhenxiong
Landslide of January 11, 2013

Professor Yue obtained his BSc and MSc degrees' education in earthquake and geology at Peking University in Beijing from 1979 to 1986. He obtained his Ph.D. degree's education in geotechnical engineering at Carleton University in Ottawa from 1988 to 1992. He joined HKU in 1999. Prior to joining HKU, he had a total of ten years professional working experience in Hong Kong, Ottawa and Beijing. He chartered as an engineer in Ontario in 1995 and in Hong Kong in 1998, and has been a registered professional engineer (geotechnical) in Hong Kong since 1999.

His research interests include ground investigation, soil and rock mechanics, tunnel and cavern, engineering geology, geohazards, oil/gas fields, and the earth system. He has made more than 400 publications including 2 USA/China patents. He has given more than 480 invited lectures/seminars at conferences and institutions worldwide. He is an active council/committee member of Chinese Society for Rock Mechanics and Engineering, Chinese Institution of Soil Mechanics and Geotechnical Engineering, Engineering Geology Commission and Geohazards Research Division of China Geology Society. He serves the editorial boards of many journals including Chinese Journal of Geotechnical Engineering, Journal of Earthquakes in South China, and Journal of Rock Mechanics and Geotechnical Engineering. He received the Outstanding Graduate Award of Peking University in 1983, the Canadian Government Laboratory Fellowship in 1992, the Mao Yi-Sheng Soil Mechanics and Geotechnical Engineering Youth Award in 2006, the Outstanding Young Researcher Award from China National Natural Science Foundation in 2007, the Excellent Contribution Award from the International Association for Computer Methods and Advances in Geomechanics in 2008, Excellent Paper Award from the 2011 Annual Conference of the Geological Society of China, and Outstanding Award from the Journal of Rock Mechanics and Geotechnical Engineering in 2012.

Cause and Mechanism of Fatal Zhenxiong Landslide of January 11, 2013

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The fatal Zhaojiagou landslide suddenly occurred in a dry season in the early morning of January 11, 2013 in Zhenxiong County, Yunnan Province, southwestern China. The failed colluvium slope had an overall dip angle 20° and occupied a volume 2.1×10⁵ m³ of about 16 m thick, 110 m long and 100 m wide. The soil and rock mixture debris was rapidly deposited over the front gentle slope area of 650 m long and 250 m wide. The overall slope angle from the back scarp crest to the debris deposition toe was about 19°. The Zhaojiagou village of 16 houses was located over a plane area of 10,000 m² at 500 m to 650 m horizontal distances to the failed slope toe. A large amount of the debris rapidly arrived and instantly buried 14 village houses with 46 people, 59 pigs and 5 cattles. The thickness of the debris deposition over the village was up to 13 m thick. This paper presents an independent investigation result of the landslide and found its cause possibly due to a sudden eruption of highly pressurized natural gas accumulated and stored in the deep ground of the failed slope. A literature review has shown that this gas cause of fatal landslides was not yet reported in open literature available in English and Chinese. The finding would be useful to landslide hazard reduction and prediction in the region and around the world.

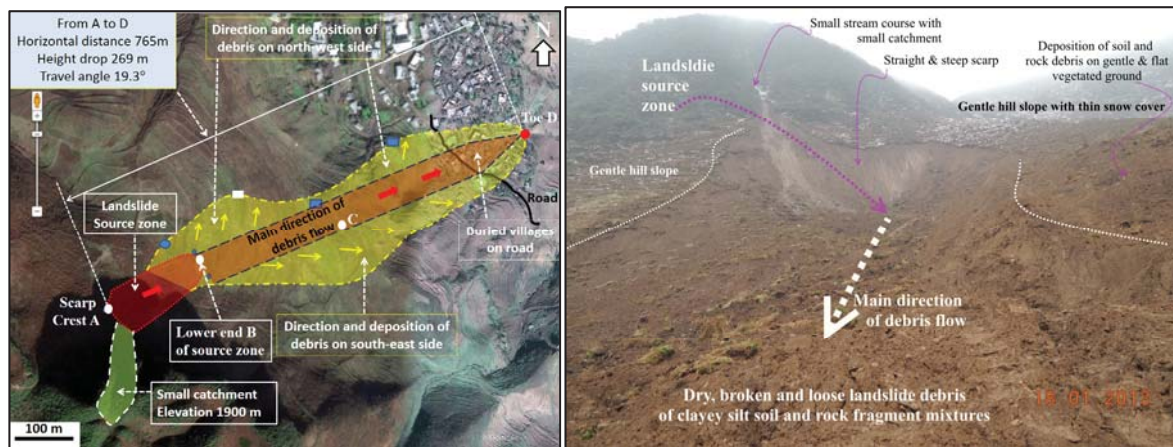


Figure 1. Plan view (a) and source zone of Fatal Zhenxiong Landslide of January 11, 2013.

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