

The reconstruction of the short-lived landslide dam geometry at Siaolin Village, Taiwan

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Typhoon Morakot 2009, brought intensive torrential rain to southern Taiwan and caused a catastrophic landslide at a hill in the back of Siaolin village, Taiwan. The landslide occurred about in 6 o'clock of August 9th, 2009. The huge landslide buried the village and entered Chishanxi where a natural dammed pond was formed. Within about an hour, this short-lived dam collapsed. Overflowing floodwater washed away the buried village.

Dam geometry is important for simulating the landslide dam breaching. This study aims to reconstructing the geometry of the Siaolin landslide dam before it breached. Aerial-photographs and digital terrain models (DTMs) with 5-meters precision taken before and after Typhoon Morakot, as well as the extensively field investigation results, were used to reconstruct the dam geometry. The volume of the landslide was about 23.87 million m³ which mainly comprises shale and colluvium. Based on the aerial-photographs and DTMs, the total volume of the natural landslide dam is estimated as 15.36 million m³. The volume of washed away debris after the dam breaching are estimated to be 10.83 million m³. Discrete- and continue-mechanics-based numerical simulations were utilized to model the debris deposition and the results are used to adjust the inferred dam geometry. In summary, the highest and the lowest elevation of the dam is 475 m (right bank) and 420 m (left bank), respectively, with a mean height of 70 m. The cross-river length and the alone-river width of the dam are 450 m and 750 m, respectively. Regarding to the hydrological characteristics related to the landslide dam, the catchment area on the upstream of the landslide dam is 353 km² and the maximum volume of pounding water is 20 million m³ before the dam breaching. Based on the reconstructed landslide dam geometry, the dam break hydrograph and the mud flow could be simulated which will presented in a accompany paper in this conference.

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