



## **A Simulation on River Blocking Induced by Landslide Derived from the Overburden of Reservoir Bank**

Mo Xu (1), Zilong Li (1), Jian Guo (1), Yong Zhao (2), and Zizhong Wang (2)

(1) Chengdu University of Technology, Chengdu, China (xm@cdu.edu.cn), (2) Sichuan Water Resources and Hydroelectric Investigation & Design Institute, Chengdu, China

River blocking by reservoir-impoundment induced landslide is one of the most serious disasters in water conservation and hydropower projects. The storage-capacity of the reservoir would be reduced or even be totally deprived by river blocking, once the reservoir loses its water storage function, series of environmental problems would be arisen. Most of the scholars who study river blocking by landslide are using UDEC simulation to analyze the mechanisms of the slope failure. However, the blocks of UDEC cannot crack, and is not applicable for soil landslides simulation. Based on the PFC2D particle flow method, we established the ideal model of reservoir bank overburden, and set various condition of the reservoir elevation. Then, we simulated the failure process of the overburden and predicted the height of the landslide dam and analyzed the relationship between the water levels and the heights of the landslide dam. Overall, the conclusion is that the higher the reservoir elevation is, the higher the landslide dam could be. However, when the saturated portion is 1/3 of the overburden soil, the total volume of the sliding soils reaches its maximum. That means, there is an extremely dangerous range of reservoir elevation related to the landslide event, we can refer it as the riskiest range. When the reservoir level is lower than the lowest elevation of the riskiest range, the slope failure is characterized by collapse; when reservoir level is within the riskiest range, the runoff of the saturated soil would produce dragging force to the unsaturated soil, and finally result in a total failure; when the water level is higher than the highest elevation of the riskiest range, landslide would only be happened in the saturated soil. This method has certain reference significance to the prediction of the river blocking by reservoir-impoundment induced landslide. This method is not suitable for the simulation of the dynamic process of reservoir level fluctuation related landslide, however, it is reasonable when the static water level is being simulated.