

Experimental Study on the Initiation Mechanism of Landslide on Granitoid Residual Soil Slope in the Southern Area of Anhui, China

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Landslides on granitoid residual soil slope make up a great part of geohazards in the southern area of Anhui, China. Most of them often occurred after a heavy rain or rainstorm event, which brought huge property losses and sometimes human casualties. The rainfall infiltration in granitoid residual soil slope can result in seepage and rising of groundwater level and also increases the velocity of groundwater flow, which can cause the underground erosion and temporary discharge. In this process, transportation of the eroded particles will occur and the voids of soils will increase, which promote the increasing of pore-water pressure. The above process illustrated in Fig. 1 generates the decreasing or deterioration of shear strength of soils in the slope, which results in the occurring of landslide.

To clarify the initiation mechanism of this kind of landslide, we took soil samples from the sliding surface of Fanzhangzu landslide, which occurred on August, 2012 on the granitoid residual soil slope ($\eta\sigma_5^{3-1}$, medium grained quartz monzonite) in the southern area of Anhui, China, and examined the effect of underground erosion on shear strength and decrease of shear strength caused by increasing of pore-water pressure by means of ring shear tests. The test results on the soil samples with different gradations of grain show that the shear strength is related to gradation of grain. Specifically, the shear resistance reduces with the decreasing in content of fine particles. In other words, deterioration of shear strength of soils was caused by underground erosion in the process of rainfall infiltration. By increasing the

pore-water pressure from the upper layer of the sample, we examined the initiation of shearing which can simulate the landsliding due to the rise of groundwater level caused by rainfall infiltration. Additionally, in consideration of a road at the toe of the landslide, we also performed the ring shear test with seismic loading, to examine the effect of traffic vibration on the initiation of landslide. The results show that the single traffic vibration cannot induce the failure of slope, whereas promotes the occurring of landslide through increasing pore-water pressure in the process of rainfall infiltration.

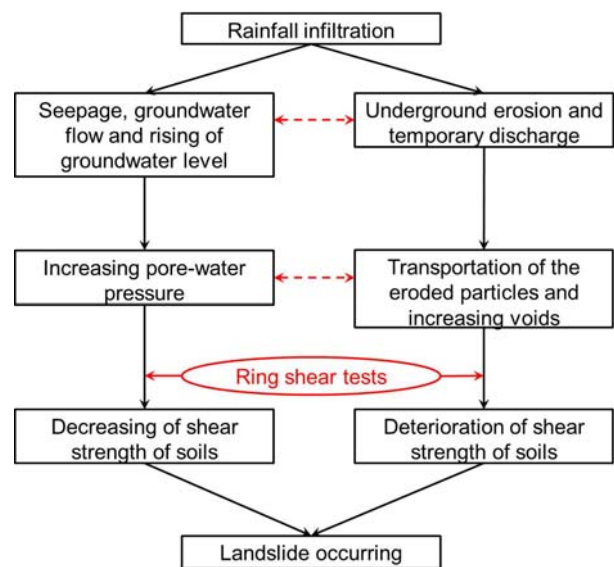


Fig. 1 Chain of the interrelationship in process of landslide initiation on granitoid residual soil slope