D07

Water migration on the shear zone of loess in large shear displacement

〇Fanyu ZHANG, Gonghui WANG, Toshitaka KAMAI

1 Introduction

Landslides present a considerable hazard in Chinese Loess Plateau, causing serious casualties and huge economic losses. The potential of this kind of hazards has been elevated by the climate change and urbanization. To better understanding of mechanisms of loess landslide for the geohzard mitigation, we investigated some landslides in Lanzhou, China, and took samples from the fields and examined their shear behaviors at large displacement.

This study aims at examining the water migration within the loess sample suffered large displacement of shearing.

2 Materials and methods

We took the loess sample from the source areas of some loess landslides, and performed ring shear tests on them by using a ring shear apparatus that was developed in DPRI, Kyoto University. The samples were prepared to reach different initial water content and were placed into shear box using moist damped method. The samples were sheared by using multistage testing procedure under drained conditions. Note that single-stage testing was conducted only for the saturated sample under untrained condition.

3 Results and Conclusions

We found that there was a shear zone formed in each of the tests, and water content changed within different soil layers (below the shear zone (L), shear zone (SZ), and above the shear zone (U)). Fig. 1 shows the water content of samples at different soils layers before and after testing. There is a critical water content near the plastic limit (17.68%) of samples, at which the water content of the shear zone shift from increase to reduction after shearing.

Fig. 2 shows the variation of void ratio against water content at different normal stresses. Void ratio also showed an over-turn behavior at the water content of 18.5%.

Fig. 3 shows the variations of cohesion and friction angle of samples with water content. Also, it is found that this is a bifurcation point at the water content of around 18.5%, after which both of them showed differing changing tendency.

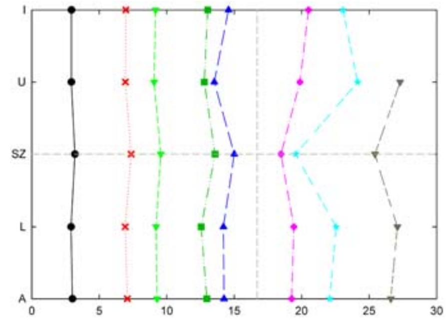

Fig. 1 Water content of samples at different soil layers before and after testing (I: initial water content; A: average value)

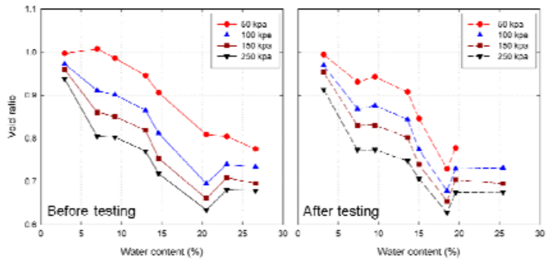

Fig. 2 water content against void ratio. (Left: average value after consolidation, Right: water content of shear zone after shearing)

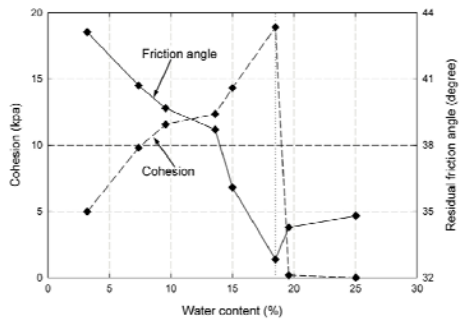

Fig. 3 Cohesion and residual friction angle at different water contents