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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Influence of shearing rate on the residual strength characteristic of three landslides soils in loess area" *by* Baoqin Lian et al.

Anonymous Referee #1

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Residual strength of soils is important for the evaluation of the reactivation potential of ancient landslides. Determination of residual strength of soils is challenging in geotechnical engineering, because, as well known, the residual strength is related to many factors, such as soil type, clay contents, plastic limit, moisture, slaking property, dynamic loading and rate of shear. This study performs ring shear tests on sliding surface soils collected from three landslides in loess area. Two rates of shear are considered to investigate the influence of rate of shear on the residual strength. This study matches the scope of the journal. The following comments should be carefully addressed and revision is required.

1) To the best of my knowledge, the influence of rate of shear on the soil residual strength has been widely reported in previous. My question is: what is the difference between the findings revealed in this study and those reported in previous? Where is the innovation of this study?

2) In Line 128, distilled water is added to the soil until the desired water content is achieved. but in Line 166, distilled water is added to soil until the saturated moisture is obtained. Which one is correct? Please check.

3) In Section 3.1, two rates of shear are selected to investigate the influence of the rate. Why are the two rates preferred? Please explain it.

4) As is known, shear behavior of soils is closely related to moisture. But in Section 3.3, samples only with saturated moisture are used. Please explain it.

5) Previous literature has revealed the shear stress fluctuates as shear displacement increases, making it difficult to determine exact value of residual shear strength. In this study, how to determine this value?

6) In Section 4.3, the Coulomb law is adopted to determine the residual frictions. This study states that, the law assumes that residual cohesion is zero. However, most previous works seem not require the assumption.

7) Errors are found in writing. 7a) The "a series" in Line 20 should be "a series of ". 7b) The "0.2"in Line 57 should be "0.2 mm/s". 7c) The "0.05" in Line 59 should be "0.05mm/min". 7d) The "a 5%"in Line 59 should be "5%". 7e) The "ring-shear tests" in Line 63 should be "ring shear tests". 7f) The "0.02" in Line 65 should be "0.02 mm/min". 7g) The "mud stone" in Line 66 should be "mudstone". 7h) The "range from" in Line 70 should be "ranging from". 7i) The "4.5" in Line 104 should be "4.5m". 7j) The "0.001" in Line 159 should be "0.001 degree". 7k) The "drain" in Line 177 should be "drained". 7l) The "Figure 3b, 4b, and 5b" in Line 192 should be "Figures 3b, 4b, and 5b". 7m) The "asτr/σn (0.1)" and "andτr/σn (1)" in Line 251 should be "as τr/σn (0.1)" and "and τr/σn

(1)". 7n) The "ÑĎr(1) - ÑĎr(0.1)" throughout the manuscript should be italic.

8) Errors are found in figures. In Figures 3, 4 and 5, the unit of normal stress should be "kN/m2". For example, in the Figure 4a, the unit of σ should be "kN/m2" to keep consistent with the text body.

9) Apart from rate of shear, additional factors, such as slaking property and dynamic loading, also affect the residual strength of sliding surface of landslides, and in turn governs the stability of colluvial landslides. The following literature may be related to the additional factors and colluvial landsides, and may be cited, if applicable.

Li C, Yan J, Wu J, et al. Determination of the embedded length of stabilizing piles in colluvial landslides with upper hard and lower weak bedrock based on the deformation control principle. Bulletin of Engineering Geology and the Environment, 2017: 1-20.

Yan C, Xu X, & Huang L. Identifying the impact factors of the dynamic strength of mudded intercalations during cyclic loading. Advances in Civil Engineering, 2018.

Shen P, Tang H, Huang L, & Wang D. Experimental study of slaking properties of red-bed mudstones from the Three Gorges Reservoir area. Marine Georesources & Geotechnology (in the press).

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