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Discussions

Interactive comment on "Analysis of instability conditions and failure mode of a special type of translational landslide using a long-period monitoring data: a case study of the Wobaoshi landslide (Bazhong city, China)" *by* Yimin Liu et al.

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Dear professor DarveïijŽ We are very grateful to receive your discussion and comments about this paperïijŇand your comments and suggestions are important for improving the next research work. The research idea of this paper is to verify the theoretical deformation failure mode of the plate-shaped translational landslides based on the measured data of the key physical parameters of the landslide. As your express in your comments, we want to obtain the correlation between rainfall intensity and block motion. Next we discuss several issues in your comments. Firstly, the research target of

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Discussion paper

this paper - the Wobaoshi landslide, according to the landslide investigation and investigation report, is a typical sandstone and mudstone interbed rock landslide whose soil cover layer is very thin, and its thickness is not more than 5m from the sectional graph, as shown in Figure below(Chen et al., 2015). Therefore, when the geomechanical model is established, the cover layer is neglected, and the static geomechanical model of the plate-shaped rock sliding body is established based on limit equilibrium method. The basic characteristic of the limit equilibrium method is that the Mohr-Coulomb failure criterion of the soil in static equilibrium conditions is considered, that is, the problem's solution is solved by analyzing the destruction of the soil's balance, and this method considers soli elastic-perfectly plastic model which obey the Mohr-Coulomb failure criterion and associated flow rules. Secondly, regarding the internal friction angle of the clay, its value is measured by the geochemical experiment. On the other hand, the clay layer is severely weathered, so its internal friction angle is small. The internal friction angle θ is obtained by triaxial compression tests of the core, which is taken from the sand-mudstone contact surface in sliding surface, and the internal friction angle θ = 11.2°(Chen et al., 2015). In general, the dilatancy effect obtained by the associated flow law is much larger than the actual observation, especially in the case of laternal infinite(Tschuchnigg et al., 2015a). However, for slope stability analysis, laternal infinite is not considered in most cases, and the dilatancy effect is not significant (Griffiths & Lane, 1999). Therefore, it is reasonable to set the dilatancy angle to be equal to the internal friction angle in my paper. Additionally, the detail description finite element modeling is that, we choose MIDAS GTS NX to perform numerical simulations and calculations, and the linear elastic model finite element method is used in this paper, the elastic modulus and Poisson's ratio are shown in Table 4 in the paper. The right boundary of the model selects the position of the right side of the landslide about 30m from the foot of the slope; the lower boundary selects the elevation of 0 m; the left boundary is located inside the mountain, about 30m away from the plate girder I. The element type adopts a plane strain quadrilateral-triangle mixing element, and the whole model divides 13775 elements and 14026 nodes. The bottom boundary of the calculation model constrains the vertical and horizontal displacement, and the left and right boundaries constrain the horizontal displacement. The model uses steady-state seepage calculation, and the water levels at the left and right boundaries were set to 342 and 275 m, respectively. The water level in the Crack I and Crack II is selected for a typical change period, as shown in the table below. The deformation mechanism of the plate-shaped landslide is studied by simulating the deformation of the plate girders caused by the change of the seepage stress field in a water level change period. The geomechanical model in this paper is relatively simple, which is a purely static method, and it ignores the influence of strain history. Moreover, in the numerical simulation calculation, the boundary conditions are set relatively simple, and the working conditions considered are also less. These shortcomings are improved in the next research. Since the interactive discussion of this paper is coming to an end, our response is in a hurry, so we are looking forward to further communication with you by Email. Thank you very much for your suggestion and consideration, and we look forward to hearing from you. Best regards, Yimin Liu, Guiyun Gao and Chenghu Wang.

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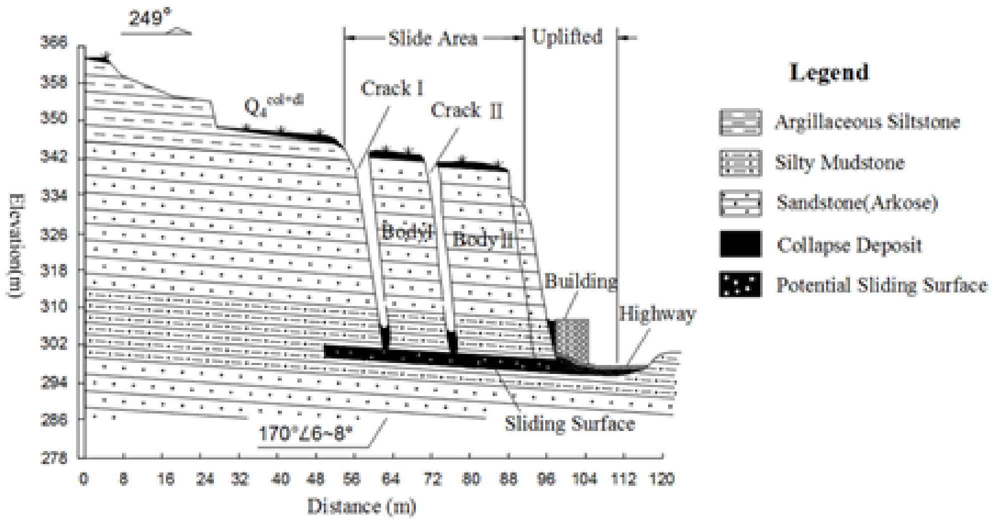

Fig. I-I' sectional graph of the Wobaoshi landslide

Fig. 1.

Loading Steps	Crack I	Crack II
0	314.50 m	311.00 m
1	316.00 m	313.00 m
2	317.50 m	315.00 m
3	316.00 m	313.00 m
4	314.50 m	311.00 m

Tab. loading step of the water level in Crack I and II

Fig. 2.

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