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Portable Ring Shear Apparatus and its Application on Croatian Landslides

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Introduction

New, transportable undrained ring shear apparatus was designed to be used in different counterpart organizations in Croatia-Japan Joint Research Project. The paper presents the concept, design and construction of new ring shear apparatus, ICL-1. and its application on samples from two landslides in Croatia.

Portable Ring Shear Apparatus, ICL-1

The current undrained ring-shear apparatus geotechnically simulates the formation of the landslide shear surface and the following post-failure motion and observes the consequence of mobilized shear resistance, as well as the post-failure shear displacement and generated pore-water pressure. It can keep undrained condition up to 1 MPa of pore water pressure and load normal stress up to 1 MPa. This makes it suitable for investigation of large- scale and deep seated landslides (Kostanjek landslide).

Ring Shear Test on Samples from Kostanjek and Grohovo landslide

We obtained samples for ring shear testing from two landslides in Croatia, Kostanjek and Grohovo. The samples are taken from locations with outcrops of material where sliding surfaces are assumed to be formed in the past.

In this study, we performed undrained speed control tests on marl sample from Kostanjek landslide and clayey sample from Grohovo landslide. After consolidation of the sample (by applying normal stress of 1000 kPa for Kostanjek landslide and 200 kPa for Grohovo landslide in drained conditions), undrained speed control test was performed on a fully saturated samples (Bd **>** 0.95 was obtained). Speed control test was conducted under constant shear speed of 0.002 cm/ sec and until shear displacement reached 2 m, in order to obtain steady state condition. From speed control test results, peak friction angle and mobilized friction angle for both materials were determined.

Summary and Conclusions

The paper presents the results obtained by performing basic tests (undrained speed control tests) on marl and clay samples, taken from two Croatian landslides. Related experimental procedures are described in detail. Typical test results are presented to show the efficiency of this ring shear apparatus. These results can be considered as preliminary, since they will be used for planning of tests on borehole samples.

References

Sassa K, Fukuoka H, Wang G, Ishikawa N (2004a) Undrained dynamic-loading ring-shear apparatus and its application to landslide dynamics. Landslides 1(1):7–19

Sassa K, Nagai, O, Solidum, R, Yamazaki, Y, Ohta, H (2010) An integrated model simulating the initiation and motion of earthquake and rain induced rapid landslides and its application to the 2006 Leyte landslide. Landslides 7:219–236.