

Evaluation of appropriate tensile load in maintenance of ground anchor

Toshinori Sakai*

Mie University, Tsu 514-8507, Japan

* Corresponding author. Tel: +81-59-231-9580; E-mail: sakai@bio.mie-u.ac.jp

Abstract

Ground anchors are widely used to maintain the stability of cutting slopes and to prevent landslides. They are constructed in natural ground and can have complicated structures involving various materials. Anchors are used to introduce the initial tensile load during fixation, but the tensile load does not remain constant over time. The load can gradually decrease due to ground creep or relaxation of the tendon. The tensile load may also increase when a slope become unstable due to landslides or slope failures. Therefore, it is important to estimate the appropriate tensile load when performing anchor maintenance. The tensile load can be measured using a lift-off test or a load-cell.

The anchor has a sensor function, similar to that for a borehole inclinometer or a pipe strain meter. In the present study, a method was developed for determining the tensile load distribution for a slope where anchors were installed, and the relationship between the tensile load and the load-cell temperature. Fig. 1 shows the distribution of tensile load. The area with a tensile load of over $0.9T_{ys}$ corresponds to an area of landslide activity. Fig. 2 shows the relationship between the tensile load and the temperature of the load-cell. A high correlation is found when the slope is stable, but low when the slope becomes unstable. The results indicate that it is important to evaluate the appropriate

tensile load for ground anchors when performing maintenance.

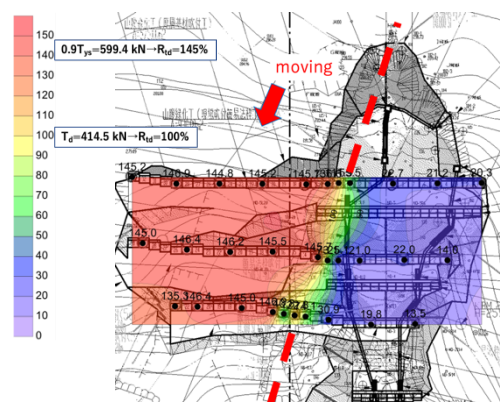


Fig. 1 Distribution of tensile load.

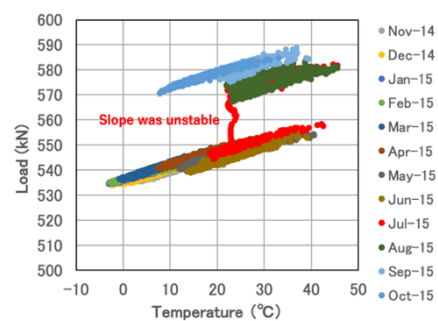


Fig. 2 Relationship between tensile load and load-cell temperature.

Acknowledgments

The author is grateful to the Public Works Research Institute, SAAM Groupe and Dr. Yamazaki for suggesting the topic treated in this study. This work was supported by a Grant-in-Aid for Scientific Research of Japan (No. 19K04595).