Društvo za geotehniku u Bosni i Hercegovini
Друштво за геотехнику у Босни и Херцеговини
Geotechnical Society of Bosnia and Herzegovina
GEO-EXPO 2023
Mostar, 19. oktobar 2023. / October 19, 2023

Hideaki Marui[1]
Wataru Sagara[2]
Takashi Horiuchi[3]

https://doi.org/10.35123/GEO-EXPO_2023_5

COMPREHENSIVE CONTROL MEASURES IN THE VERY LARGE TAKISAKA LANDSLIDE AREA IN JAPAN

Summary:

The purpose of this paper is to highlight the comprehensive control measures in the very large Takisaka landslide area in Japan. The Takisaka landslide area is one of the most representative large landslide areas in Japan. The location of the Takisaka landslide is extremely peculiar and this landslide could pose a great threat to the surrounding area. The landslide area is directly adjacent to the main channel of the Agano River, which has a length of 210 km and a catchment area of 7,710 km^2 and flows from the eastern part of Fukushima Prefecture through Niigata Prefecture to the Sea of Japan. In the worst case, if the Takisaka landslide were to occur on a large scale, the sliding mass of soil could dam up the mainstream of the Agano River. In this case, a large reservoir would be created upstream and many residential areas would be flooded. In addition, if the reservoir were to burst, there would be flooding downstream. In order to avoid such a situation, the Takisaka landslide area must be managed extremely carefully, and comprehensive and drastic countermeasures must be taken. Originally, it is impossible to completely prevent such a large landslide by hard countermeasures using engineering structures alone. Therefore, for such a large landslide, it is necessary to monitor the amount of landslide movement in real-time continuously and to immediately issue an evacuation order to nearby residents when a critical amount of movement is measured. At the same time, however, it is also necessary to install hard measures using engineering structures to prevent the continuous movement of the landslide. This report first describes the characteristics of the Takisaka landslide. Then, comprehensive control measures, both soft measures and hard measures, are reported. The main part of the soft measures is the early warning system based on the comprehensive real-time monitoring system of this landslide. The main components of the hard measures are drainage works to collect and channel dangerous groundwater, such as drainage tunnels, drainage wells, and drainage boreholes. Finally, the effect of the drainage works already installed is illustrated three-dimensionally.

Key words:

Comprehensive control measures, Soft measures, Hard measures, Real-time monitoring, Early warning, Engineering structures, and Drainage works

[1] Em. Prof. Dr. agr., Dr. nat. techn. Hideaki Marui, Niigata University, Research Institute for Natural Hazards and Disaster Recovery, Ikarashi-Ninocho 8050, Nishi-ku, Niigata, 950-2181 JAPAN, 08marui@gmail.com

[2] Dr. Sc. Wataru Sagara, Sabo & Landslide Technical Center, Landslide Engineering Department, Sabo-Kaikan 5F, 2-7-5, Hirakawacho, Chiyoda-ku, Tokyo, 102-0093 JAPAN, sagara@stc.or.jp

[3] Director Takashi Horiuchi, Agano River District Office, 14-28, Minamicho, Akiha-ku, 956-0032 JAPAN, horiuchi-t84kd@mlit.go.jp