Research on assessing the risk of landslide in storms following major seismic disturbances

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1. Introduction

It is said that once a large magnitude earthquake occurs, it losens portions in slopes such as a crack, which makes it more likely to cause landslides compared to before the earthquake (Photo 1). The sediment disaster warning information issued by the prefectural governments and local meteorogical observatories in collaboration is made public when the 60 minutes cumulative rainfall and soil-water index exceeds a certain criterion, but after the large magnitude earthquake, an interim criterion that is 50 to 80 percent of normal is actually applied to issue the information. (Fig. 1 generally only the soil-water index is lowered.) Here, we would like to introduce the results of the research on the adequacy of this interim criterion.

2. Evaluation of the interim criterion of the Sediment disaster warning information after earthquakes

We have calculated the disaster capture rate which is the percentage of the numbers of the issued warning information before sediment disaster occurrence based on the rainfall data and sediment disaster occurrence data in a half year in the Tohoku and Kanto region that have observed earthquakes of the intensity 5 or more due to the Great East Japan Earthquake, 2011 and applied the interim criterion. At that occasion, we have classified three areas such as (1) Disaster capture area by the normal criterion, (2) Capture area by the interim criterion and (3) No capture area (Fig. 1) and classified the numbers of disasters in the respective area and largest earthquake intensity in the Table 1 and Fig. 2. By that result, we have found that introduction of the interim criterion has successfully raised the capture rate by 18.8%, which was 68.8% by the normal criterion just going under the nationwide average value of 75% at normal time, so it can be called an improvement. Therefore the interim criterion was somewhat effective. Further, we have reviewed the required minimum lowering rate based on the consideration that lowering the criterion might increase the warning information issuance frequency and increase the air shot, and obtained the result that there was no change in the capture rate between 70 to 80% and 50 to 80% of the criterion value.

3. To finish

From now, we are to implement a further review through the slope stability analysis to have a quantitative evaluation on loosened ground due to earthquakes.

Photo 1 Example of the slope that has collapsed by the rainfall after to the Great East Japan Earthquake, 2011(provided by Tochigi Pref.)

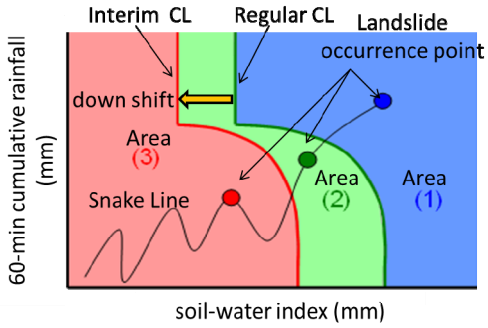

Fig. 1 Provisional reference and disaster capture image after large magnitude earthquake

Table 1 Relation between the disaster capture state and largest earthquake intensity

Area	Number of landslide occurrence				Total	Share
	Level5+	Level6−	Level6+	Level7		
(1)	5	8	9	0	22	68.8%
(2)	1	0	5	0	6	18.8%
(3)	0	0	4	0	4	12.5%
Total	6	8	18	0	32	-

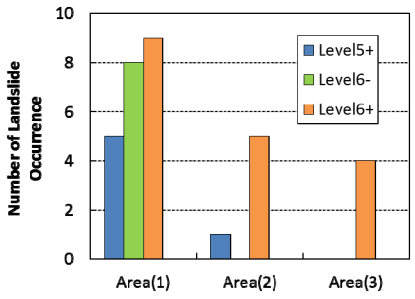

Fig. 2 Relation between the disaster occurrence state and largest earthquake intensity