

The concept of landslide risk assessment by incorporating numerical simulations

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1. Introduction

In the recent years, the risk of natural hazards began to be emphasized, because of the much more serious natural hazards happened and the scale of hazard exceeds the protected standard of the engineering structures. The concept of the risk for natural hazards solves the problem that when the decision-makers considered how to distribute the resources to mitigation.

There is not a unique definition and assessment method for the risk yet. The original concept of the risk is com from the insurance, which has been extended to the potential lost or probable harmful consequence made by a specific hazard and has been used to discuss how to decrease the threaten made from natural hazards. However, because of the different purposes, the definition and methodology of the risk assessment has little different, which could mainly classify to three types in the previous studies.

As the result, the main purpose of the study is to show a distinct model of the risk assessment and the initial result of the hazard mapping. The first part is to classify the three types of the risk assessment from the previous studies and discuss the different of the models, and the second part shows how the landslide was mapping by the statistic method.

2. The risk assessment framework

Generally speaking, risk is considered as the function of the hazard and vulnerability. Regardless of the slight difference on the definition in many studies, the probability of specific natural hazards occurred in a given area and period time is regarded as the part of the hazard in the risk assessment, and which is accepted. However, when mentioned of the

vulnerability, several differences happened. The capacity was considered as one part of the vulnerability in some studies, and some thought that capacity should be considered individually. The part of the difference on capacity has an influenced on the discussion of the mitigation measures, because the part of the capacity would affect the result of the natural hazard. However, it should be discussed more clearly that when the lost of the area decreased, it means that the risk or the vulnerability is decreased.

3. The hazard assessment

To evaluate the risk for landslide, the probability of landslide was considered to represent the part of the hazard. The logistic regression is mainly used by means of the landslide data identified in 2004, after the serious typhoon event happened in the end of July.

Five factors, which are geology, landuse, height, slope, and the distance from the river, were used to evaluate the landslide probability. We used odds to calculate the landslide probability, and the result is shown by a hazard map. From the map, the susceptibility of the landslide is distinguished.