

A Study on Criterion of Slope Failure Considering Geology and Rainfall Pattern

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To avoid human damages by slope failure caused by local short heavy rain, which is increasing by influences of global warming, the information of damage potential of slope failure is published from Japanese Meteorological Agency against each 5km mesh in all around Japan. This information, based on relationship between hourly rainfall and Soil Water Index, is foundation of evacuation instructions or orders from local government. However, the capture or hitting ratio of the information is very low; only 20% against past 10 years, because the SWI cannot express the actual soil water in slopes. Moreover, the 5km mesh is also not enough since its classification is not based on geological features, so the landslide or steep slope failure are depend on geological features deeply.

We have installed the three ground water level recorders developed by Dr. Ueno into different geological slopes in Ishikawa prefecture, Japan. This means that we obtain the actual ground water levels in slopes on damage potential zone, and the relationships between hourly rainfall and the actual water level in slopes are modeled as parallel tank model. Then we calculated new critical line based on Radial Basis Function Networks by using the estimated actual ground waters and past 10 years rainfall data. Finally, we compared the slope damage records and new critical lines for each geological classification.

As the results, the capture ratio is improved over 50%, and the estimation of damage potential of unaffected slopes maybe improved by adoption of geological zoning.

Biography:

Toshiyuki Takahara was born in Aug. 2nd, 1968. In 1997, he received Doctorate of Engineering from Hokkaido University. He worked as a researcher and engineer in OYO Corporation. He worked as an Assistant Professor in Kanazawa University. He is a Vice chairman of council for slope failure and its damages in Ishikawa Pref in 1995. In 2016, he is an Advisor of Hokuriku branch Ministry of Land, Infrastructure and Transport.