A Statistical Analysis to Discriminate Landslide Area in Topographical Maps

[1]IWAO, Y., [1]GUNATILAKE, J. [2]WATANABE T. and [3]YAMASAKI, T. [1]Department of Civil Engineering, Saga University, Saga, Japan; [2]Nippon Koei Co. Ltd., Japan; [3]Japan Conservation Engineers, Japan.

Landslide is the most common natural hazard in the mountainous area of Japan. Therefore, identification and discrimination of landslide prone areas is a prime important task. Statistical analysis can be used as a successful technique to distinguish Landslide areas in topographical maps as described.

It has been able to discriminate the potential landslide hazardous zones using this technique at a high level of accuracy. The authors tried to measure the interval of contours along distances and the slope of the area and plotted in frequency distribution histograms. The histograms of topographical data were found to have two fundamental patterns. Landslide areas distinctly showed some multi-peaks feature while non-landslide areas showed just a single-peak in the respective frequency distribution plots.

Topographical maps were graphically measured and histograms were mathematically analysed. Landslide areas and non-landslide areas were accurately discriminated by this method, within 0.1 to 1% confidence level. Authors applied the proposed method to discriminate landslide areas of western Kyushu district of Japan. Four local regions of the Kyushu Island were studied and six sub-regions were categorised depending on the scale functions and probability parameters. Results were correlated with the actual field information. The analysis independently discovered most of the risky areas and two non-landslide areas clearly verifying and demonstrating the applicability of this method in landslide studies.