

**Talk on Landslide Hazard & Risk Assessment****By Ir. Oh Chin Wah**

Ir. Oh Chin Wah is a committee member of Geotechnical Engineering Technical Division, IEM for session 2010/2011.

The talk on 26 October 2010 was presented by Ir. Dr Low Tian Huat, who is currently the geotechnical manager from Mohd Asbi & Associates. His talk covered the definition and the methodology of landslide risk and hazard assessment and the production of risk and hazard maps for both linear based infra structures and area based hill side development area.

He started the presentation with the definition and terminology of landslide inventory, landslide susceptibility, elements at risk, vulnerability and the difference between landslide risk and hazard. He further elaborated that the Landslide hazard assessment method can be classified as individual slope assessment, linear based assessment (along linear infra structure, i.e. road, expressway, railway and electric transmission lines) and area based assessment (development area such as housing development, town, city and etc).

The methods for Landslide Hazard Assessment can be carried out in three ways, (i) the geotechnical approach (ii) direct methods and (iii) indirect methods. The geotechnical approach involves sampling, logging and testing. Direct methods are based on geomorphological mapping, geological mapping and remote sensing (primarily aerial photography) whereas the simplest indirect methods involve univariate and bivariate analyses to identify single parameter or pairs of parameters that cause or contribute to slope instability.

The steps to carry out Hazard Assessment involve desk study (geological formation, landslide records etc), data collection (spatial and non spatial data) and hazard analysis. During desk study, the landslide records, geological information and rainfall data and distribution are collected for analysis later. The data collection can be based on spatial data or non spatial data. The spatial data can be aerial photographs or LIDAR data as Based map. Light Detection and Ranging (LiDAR) is an instrument that uses an intense laser light transmitted at an object and detecting the laser light reflected by the object. This can be used to produce the base map for the slope hazard and risk assessment. Details of how to carry out the LIDAR and what types of information can be derived out from this survey were also discussed by him. Non spatial data can be collected through ground/geomorphological mapping work. From the mapping work, the factors of effecting slope instability, i.e. tension cracks, water seepage areas, distressed infra-structures (broken or blocked drainage system), adverse geological features and etc can be collected and recorded in the standard Proforma. This data and information will be used to produce Geomorphological map and Hazard map. In hazard analysis, the common model parameters are recorded and compiled, such as slope angle, flow accumulation, failure history, geological formation and lineament, rainfall intensity and distribution and land cover. These model parameter layers shall be overlaid using Spatial Analyst in GIS Environment to produce hazard map. Lastly, he touched on the landslide risk, the derivation of Consequences Modelling for Area based in GIS and also the steps involved in risk management.

During the course of presentation, he shared with the audience the actual experience that he was involved in leading the Area Based Landslide Risk and Hazard Assessment study of Hulu Klang Ampang, Landslide Risk and Hazard Assessment for the Access road of Genting Highland Resort World and producing the risk and hazard map for Penang island and Bukit Kanada, Miri, Sarawak. The talk was ended with questions and answers from the floor and a presentation of token of appreciation from Geotechnical Engineering Technical Division.