Mapping and Monitoring of Landslide Hazards Using LiDAR Technology

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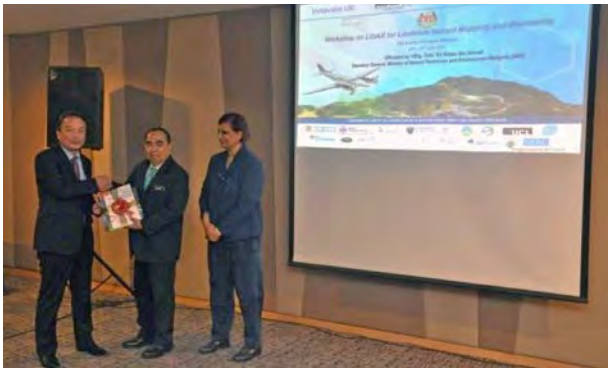
Remote sensing technologies are indispensible for hazards mapping and monitoring and they have advanced over the decades from aerial photography, satellite optical and radar, terrestrial and aerial LiDAR scanning to UAV Photogrammatery. Malaysian geoscientists were provided with an overview of the latest techniques at the Workshop on LiDAR for Landslide Hazard Mapping and Monitoring, which was held on 11-13th of July 2017 in The Everly, Putrajaya. The Workshop was jointly organized by the Department of Minerals and Geoscience (JMG) and project partners of the Newton-Ungku Omar Fund (NUOF) under the administration of Malaysian Industry-Government Group for High Technology (MIGHT) and Innovate-UK.

The Workshop commenced with officiating remarks by YBhg. Dato' Sri Azizan bin Ahmad, Secretary General, Ministry of Natural Resources and Environment Malaysia (NRE). In his speech, YBhg. Dato' emphasized on the reinforcement of disaster risk reduction strategies and improvement of the preparedness before a disaster strike. YBhg. Dato' also mentioned that a project of this kind is essential in the present day where climatic issues are prevalent, apart from being in line with the National Blue Ocean Strategy (NBOS) envisioned by the NRE to encourage the sharing of skills, knowledge and capacity building. A total of 44 participants comprising technical and academic representatives including risk assessors, engineers, geologists and researchers from different states in Malaysia attended the Workshop. A total of 11 papers were presented by the invited speakers including the NUOF Project Members from Malaysia and United Kingdom. The Workshop began on the 11th of July 2017 with the keynote paper presentation on the Role of Geoscience in Disaster Risk Reduction by Dr. Helen Reeves from British Geological Survey (BGS). Her presentation provided an overview of BGS's role in geology in context of the Sustainable Development Goals and the Sendai Framework for Disaster Risk Reduction (DRR) and its' priorities. The Natural Hazards Partnership was also explained. Three elements from the 17 Sustainable Development Goals endorsed by the United Nations were also highlighted in the matter of Disaster Risk Reduction; Sustainable Cities and Communities, Climate Action and Partnerships for the Goals.

The first session shed light on the subject of Light Detection and Ranging (LiDAR) application and its practice both in tropical and cold climate land. The presenters for this session shared their insights on their methods, approaches and challenges when conducting geological risk assessments and mentioned the benefits of utilising remote sensing in landslide hazard mapping. This session also highlighted the various uses and pros of using LiDAR specifically in the field of hazard assessment along with some case studies in Malaysia and UK.

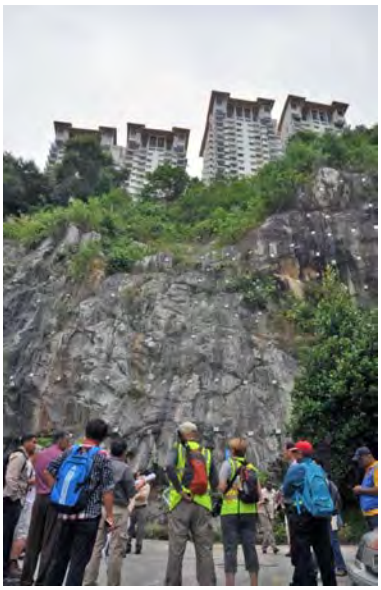
The Workshop continued with the field demonstration of Terrestrial LiDAR Scanning (TLS) on the 12th of July 2017 at Bukit Permai, Cheras. Parts of Bukit Permai are classified as critical slopes and the characteristics of the slopes were explained by the facilitators followed by a fruitful discussion on the effectiveness and life-span of the remedial actions taken on the slopes. Participants got to see how the TLS instrument scans and collects data of a slope and were also exposed on its' processing and analysing using a computer.

The last session of the Workshop on the 13th of July 2017 started off with the demonstration of the SIGMA Mobile/Geovisionary which was proven to be useful for hazard mapping in terms of data acquisition and storing. This session was then followed by a dialogue on the Reflections and Way Forward. Issues were highlighted in this dialogue concerning local universities fresh graduates' preparedness to conduct site investigation and perform basic geological tasks at the field and the short-term remediation plan applied in Malaysia. The importance of LiDAR application and ways to fully optimize its' benefits in many fields was also discussed. A better outlook was obtained on new approaches to apply LiDAR technology for the geoscience industry.

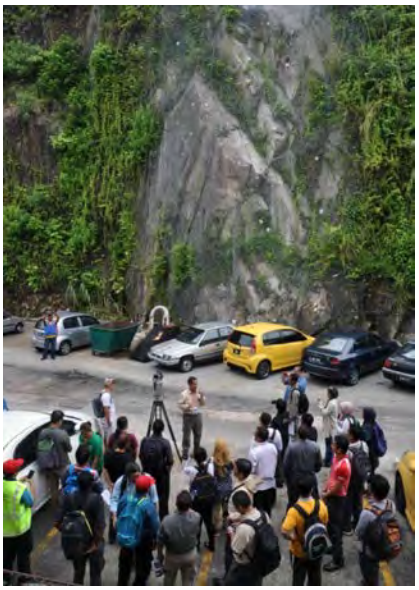


A token of appreciation was presented by Tuan Haji Shahar Effendi bin Abdullah Azizi (**middle**), Director General of JMG to YBhg. Dato' Sri Azizan bin Ahmad (**left**), Secretary General of Ministry of NRE, who delivered the officiating remarks.

Various participants attended the Workshop in The Everly, Putrajaya.



Parts of Bukit Permai, Cheras are classified as critical slopes and ranked as very highly hazardous. It poses a risk to the adjacent residential areas. The mitigation measures adopted along the slope consists mainly of wire mesh, shotcrete and rock bolting.



Guided demonstration of the Terrestrial LiDAR Scanning (TLS) instrument next to a critical slope in Bukit Permai, Cheras.

A group photo of the participants at the Workshop.