



Evening Talk on Unsaturated Soil Behaviour of Tropical Residual Soils by Prof. David G. Toll

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The Malaysian Geotechnical Society (MGS) recently organised an evening talk by Professor David G. Toll of Durham University, UK, on the 17th of January 2018 at the Seminar Room of the Institution of Surveyors Malaysia. After being introduced by MGS's Deputy President, Ir. Liew Shaw Shong, Professor David Toll began his presentation on his talk entitled "Unsaturated Soil Behaviour of Tropical Residual Soils."

He started off by explaining what suction is, the difference between osmotic and matric suctions, and Schofield's suction scale. He also presented electron microscope scans that demonstrate how surface tension and menisci are formed on a particulate level in unsaturated soil matrix. He explained the difference between direct measurement of suction and control measures. He discussed to some detail about conventional tensiometers, their shortcomings, the effect of cavitation and how modified tensiometers can measure higher suction magnitudes. He also explained how filter paper can be used to measure suction. Different approaches of using suction measurements by sensors and probes was also presented.

In the second portion of his presentation Prof. Toll elaborated to some depth about water retention behaviour of soils. He used the water retention curve and explained the wetting and drying cycles of soils, the effect on suction and its applicability. He also discussed how the technology has advanced nowadays and that in a brief time some proprietary appliances can establish soil water retention curves.

The third portion of his presentation was on suction and its effect on the shear behaviour of soils. After explaining on Bishop's approach for considering matric suction in shear strength of soils, he elaborately discussed about the extended Mohr-Coulomb shear strength relationship with due consideration of matric suction. He then proceeded to demonstrate the contribution of suction on the angle of shearing

resistance with varying gravimetric water content of soils from a series of triaxial tests on samples of a weakly cement sand.

In the last portion of the presentation, Prof. Toll called on Mohd Syazwan Md Rahim, co-author of the paper "Fully coupled hydro-mechanical assessment of a failed tropical residual soil slope in Putrajaya, Malaysia." The paper was presented during the tripartite seminar on geotechnical engineering solutions for natural disaster mitigation in December 2017, in Hong Kong. Mohd Syazwan briefly explained how hydrological and mechanical properties of the soil were established and back analyses done for the Putrajaya Presint 9 Landslide of 2007.

The talk ended with a token of appreciation presented by MGS President, Ir. Yee Yew Weng, which was then followed by a group picture.



Photos taken during the talk