

# Technical Talk on the Application of Unsaturated Soil Concept for the Tropical Soil Slope Stability Assessment

(Organised by Geotechnical Engineering, Technical Division, IEM)

Ref Number : IEM18/HQ/419/T BEM Approved CPD/PDP Hours: 2

**Date** : 23<sup>th</sup> October 2018 (Tuesday)  
**Time** : 5.30pm – 7.30pm (*Refreshments will be served at 4.45pm*)  
**Venue** : Tan Sri Prof. Chin Fung Kee Auditorium, Third Floor, Wisma IEM, PJ  
**Speaker** : Dr Mohd. Syazwan Md. Rahim

## SYNOPSIS

Rainfall-induced slope failures are prone to take place in a tropical country like Malaysia especially during rainy seasons. This climate variation has caused the stability of many slopes progressively deteriorate due to the reduction of suctions (or increase of pore water pressures) caused by rainfall infiltration, leading to reduced shear strength. To model this interrelation of hydro-mechanical characteristics of residual soil slope, a proper understanding of the relevant soil parameters (soil water retention curve and the permeability function) is essential. The ability to analyse them properly is worthy of investigation and this can be done by the use of experimental investigation and advanced numerical modelling using both saturated and unsaturated soil properties.

The talk will provide a brief overview of the important aspects of unsaturated soil behaviour that are of relevance for tropical residual soil slopes. A series of advanced saturated and unsaturated laboratory testing for both hydrological and mechanical properties will be presented, as well as the description of the role of suction in determining shear strength. Subsequently, the stability assessment which incorporates unsaturated soil concepts and using finite element approach will be shown. In addition, 3 different case studies will be presented, which in general demonstrate that within a slope the mobilised shear strength drops quickly during a rainfall event but recovers much more slowly during drying. This explains how a series of regular rainstorms with short periods of drying in between can cause a ratcheting effect, with rapid loss of strength during each period of rain that is not recovered during the intermediate drying periods

## SPEAKER'S BIODATA

Dr Mohd Syazwan Md. Rahim holds a BEng Civil Engineering from UPM in 2006. He obtained MSc. in Geotechnics at University of Strathclyde, UK, in 2008. He then continued working as a Geotechnical Engineer, before pursuing his PhD study at Durham University, UK, from 2012 to 2016. His research study encompassed two areas of civil engineering: (i) the engineering behaviour of unsaturated and tropical soils and (ii) the application of numerical modelling in geotechnical engineering. The primary focus for his work on unsaturated soils is to find practical engineering solutions for natural hazards, particularly landslides. His research was supervised by Professor David Toll (Chair of Technical Committee TC106 – ISSMGE). Upon his return, he has worked with AECOM Perunding Sdn. Bhd. as a Senior Geotechnical Engineer for MRT Line 2 project and as a Senior Lecturer in UKM. Currently, he is engaged with Megaconsult Sdn Bhd as a Senior Engineer.

**Ir. Lee Peir Tien**  
**Chairman, Geotechnical Engineering Technical Division, IEM**

## FEE ANNOUNCEMENT (Effective: 1<sup>st</sup> October 2017)

### Members:

- (i) Registration Fee: No Charge
- (ii) Administrative Fee:
  - (a) Online RM15
  - (b) Walk-In RM20

### Non-Members:

- (i) Registration Fee: RM50
- (ii) Administrative Fee: RM20

### CPD Hours Validation:

Name: .....

Membership No.: .....

Signature: .....

### Personal Data Protection Act:

I have read and understood IEM's Personal Data Protection Notice published on IEM's website at [www.myiem.org.my](http://www.myiem.org.my) and I agree to IEM's use and processing of my personal data.