Malaysian Geotechnical Society

PRE-AGM WEBINAR ON "SOME GUIDANCE ON GOOD GEOTECHNICAL FEM ANALYSIS – CASE HISTORY"

By

PROFESSOR DR. HARRY TAN SIEW ANN
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National University of Singapore

29th June 2021 (Tuesday) 3.00 pm – 5.00 pm

BEM Approved CPD Hours: 2 Ref. No.:IEM21/PP/030/T(w)

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MGS / IEM / GeoSS Members**: Free**
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Speaker's Profile

Professor Harry Tan Siew Ann was a Colombo Plan Scholar who graduated from Auckland University with First Class Honors B.Eng. in 1977 as the top engineering graduate of the school. He joined NUS as a Senior Tutor and earned his M.Eng. in 1982. His M.Eng. thesis research topic is in the Geotechnical area on the excess pore pressure behavior of marine clay in reclaimed land. He was awarded the NUS Overseas Graduate Scholarship to pursue his M.Sc. and Ph.D. degrees in geotechnical engineering at the University of California at Berkeley, which he completed 1982 and 1985, respectively. He has been a staff member of the Department of Civil Engineering at the National University of Singapore (NUS) since May 1980. He retired from NUS end of June 2020. He is now an Honorary Fellow of NUS Engineering Faculty.

He is a registered professional engineer, and specialist Geotechnical engineer in Singapore since 1992, and 2008 respectively. He has published over 300 technical papers covering topics such as Numerical Geotechnics for Deep Excavations, Pile Foundations, Geosynthetics, Ground Improvement of Soft Clays, and Land Reclamation challenges. He has been involved in several major consulting jobs in Singapore and the region. He acted as leader of the State "Expert Witness Team" comprising of four international experts in the COI experts in the COI (Committee of Inquiry) for the Nicoll Highway tunnel collapse incident of 20th April 2004. Though retired, Prof. Tan continues to actively teach Geotechnical modules at NUS CEE Department, and acts as an independent Geotechnical Expert in helping industry do advanced design and value engineering with State-of-the-art knowledge and capabilities to meet the exacting demands and challenges of green engineering that minimise resource consumption impact on our fragile environment.

Synopsis

Numerical modelling tools like FEM in Geotechnical Engineering has become a practical reality in many highly complex ground engineering design practices world-wide. Good advanced models are readily available in modern user friendly softwares like Bentley Plaxis suites which are commonly used in Singapore and Malaysia. However, these are used generally for design proposals and submissions with little follow-up to carefully back-analysed how well the FEM predictions matched the actual response of the ground construction. So, the potential of good design optimization is not realized in many projects for lack of use of good advanced analysis that will allow for safe economical design.

In this lecture, Prof Harry will discuss briefly the capabilities of soil constitutive models (particularly the family of Hardening Soil models, HS, HSS and GHS available in Plaxis) and how they can be properly calibrated using both laboratory and insitu tests to obtain site specific parameters relevant to deep excavation and tunnelling projects.

Using these calibration methods, he will discuss the case of a very large 30m deep excavation for the One-North MRT station on the Singapore Circle Line, completed in mid-2000, to show how well the HS model was able to predict accurately the performance of the embedded wall next to the INSEAD building with a dewatering system to reduce the water pressures on the 30m deep walls to be constructed safely. Lessons on good FEM modelling from this project will be discussed in the lecture.

Ir. Liew Shaw Shong
President
Malaysian Geotechnical Society