



PRE-AGM SEMINAR

GEOTECHNICAL ENGINEERING: DESIGN AND CONSTRUCTION IN EXCAVATION BASED ON EUROCODE 7



SPEAKER

Er Dr Ng Tiong Guan



SPEAKER

Prof Harry Tan



SPEAKER

Ir. Loh Yee Eng

PROGRAMME DETAILS

OBJECTIVE

The seminar will outline the construction risks, key design-phase elements from the perspectives of an accredited geotechnical checker, practitioner, and professor, as well as the aspects requiring monitoring during the construction stage.

BENEFITS

The sessions will cover the fundamental theories and design considerations for excavation design and construction using EC7 with knowledge sharing from a team of experienced engineers comprising practitioners, academics and checkers.

BEM Approved CPD Hours: 7

Ref. No.: IEM25/PP /030/S

PDU's by PEB - 7

Ref: COA47777



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WEDNESDAY

25/06/2025



START AT

09:00AM



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HOTEL, PJ**

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DETAILED PROGRAMME CONTENT

8:30 - 9:00	Registration
9:00 - 10:30	Session 1: Fundamental of excavation design based on EC7, considerations and common pitfall in design - Prof Harry Tan S.A.
10:30 - 10:55	TEA BREAK
10:55 - 12:25	Session 2: Fundamental of excavation design based on EC7, considerations and common pitfall in design - Prof Harry Tan S.A.
12:25 - 12:40	Q&A
12:40 - 13:40	LUNCH
13:40 - 15:25	Session 3: Good Practices for Design and Construction of Deep Excavation – What can go wrong? - Ir. Loh Yee Eng
15:25 - 15:45	TEA BREAK
15:45 - 17:30	Session 4: Design and construction of ERSS based on Eurocodes – Case Study from Singapore - Er. Dr Ng Tiong Guan
17:30 - 17:45	Q&A
17:45	CLOSURE

SYNOPSIS AND SPEAKER BIODATA



Dr Tan Siew Ann (Harry) is currently an Associate Professor in the Department of Civil and Environmental Engineering. His research work is mainly in Geotechnical Engineering. He is a registered Professional Engineer in Singapore; and has a PE and AC status in Geotechnical Engineering. He holds a BEng (1st Class Honours) in Civil Engineering from Auckland University, MSc and PhD from University of Berkeley, USA.

He has been involved in over 100 projects in Singapore and in the region and also served as Chairman of “State Expert Witness Team” for COI on Nicoll Highway Tunnel Collapse in 2004-2005.

FUNDAMENTAL OF EXCAVATION DESIGN BASED ON EC7, CONSIDERATIONS AND COMMON PITFALL IN DESIGN

With the vast advancements of powerful Geotechnical FEM as in Plaxis software, engineers face greater challenges in doing correct FEM modelling for analysis and design that is compliant with current codes like EC7 Design Approach 1, with ULS considerations in Combination 1 (Structure bias) and Combination (Soil/Rock bias) partial factors. In this talk, Prof Harry will address some fundamental issues relating to deep excavations analysis and design using Plaxis 2D and 3D. The talk will consider the following topics on limitation & common pitfalls when using Plaxis as follows:

1. Correct use on types of analysis in Plaxis (e.g., Drained and Undrained FEM analyses by Plaxis, and relevance of Consolidation Analysis)
 - a. Test drainage conditions with Consolidation analysis and Monitoring data.
 - b. Effects of Drained, Undrained and Partially Drained conditions on Strengths, Stiffness and FOS of Soil Models used.
 - c. How to compute reliable FOS that combine possibilities of both Structure and Soil failing concurrently at same FOS.
2. Check models are appropriate for geometry and mesh accuracy.
3. Choice of soil models and correct parameters selections with CPTu and PMT calibrations, for good reliable design for EC7 DA1.
4. Case histories of very deep shafts in Singapore DTSS1 and DTSS2 projects.

SYNOPSIS AND SPEAKER BIODATA



Ir. Loh Yee Eng started TRIGEO Consultant in May 2015 after fifteen years working with Specialist Contractors and Geotechnical Consultants. She obtained her degree in Bachelor of Civil Engineering from University of Technology Malaysia (UTM) in year 2000 and Master of Science from National University of Singapore (NUS) in year 2007. She is a registered professional engineer and geotechnical accredited checker with Board of Engineers Malaysia.

Ir. Loh has 25 years of experience in the field of geotechnical works including geotechnical review of KL118 and TNB Monopole Transmission Towers next to Penang Bridge, foundation design of Oxley Towers, deep excavation design for KV-MRT line 1, Daya Bumi Phase 3, Chief Tower and FTB Tower.

GOOD PRACTICES FOR DESIGN AND CONSTRUCTION OF DEEP EXCAVATION – WHAT CAN GO WRONG?

The stability of deep excavation is influenced by many factors, among which are subsurface conditions, method of excavation, construction duration, and pore water pressure distribution. This presentation shares the design approach used in the determination of these factors and what can go wrong when geotechnical engineers do not follow the good practices recommended by various available codes of practice. Two successful cases of deep excavation projects located in Phnom Penh will be presented and discussed, followed by lessons learned from a few compiled failure investigation projects.

Both projects are utilising diaphragm walls as an earth retaining wall system for the basement excavation of 14m to 25m deep. Plaxis 3D analyses were used in both projects to check the impact of trench excavations on surrounding buildings during diaphragm wall installation. The instrumentation monitoring results during trench and basement excavations were checked and compared with the design predictions to ensure no adverse impact to existing buildings during excavations. Challenges associated with the design and execution of deep excavation projects in Phnom Penh will be discussed.

Lessons learned from the CBP wall collapse incident, piling platform failure, and retaining wall failure will be discussed. Many failures could have been avoided if design had been done according to the code of practice's recommendations and monitoring results had been reviewed in a timely manner with action plans being implemented.



Dr Ng Tiong Guan has over 25 years of experience in geotechnical consultancy, specializing in the design and supervision of deep foundations, deep excavations, earth retaining systems, ground improvement and tunnelling projects in Singapore. He has been involved in major infrastructure projects, including LTA Circle Line 1 C821 - Kim Chuan Depot, Kallang Paya Lebar Expressway C421 - Geylang River Crossing, MBS IR - Hotel and Bayfront Avenue works packages, LTA Downtown Line 1 C902 - Promenade Station, LTA Thomson-East Coast Line T310 - Bayfront Station and Tunnel, Ground Improvement works for Changi Airport T5 Land Preparation Package, LTA Cross Island Line CR101 - Changi Depot and PUB Tuas Water Reclamation Plant C2A - Influent Pumping Station. In addition, Dr Ng was also involved in the forensic study of several high-profile failure cases in Singapore such as the foundation failure of a commercial building on Church Street and the

collapse of deep excavation at Nichol Highway Station. Dr Ng served as the President of the Geotechnical Society of Singapore (GeoSS) from 2014 to 2015. He is currently a Co-opted committee member of GeoSS and actively involved in working groups setup by GeoSS, BCA and Technical Committee on Civil and Geotechnical Works under the Singapore Standard Council to draft Singapore Standards, Technical References, Guidelines and Good Practices Manuals.

DESIGN AND CONSTRUCTION OF ERSS BASED ON EUROCODES – CASE STUDY FROM SINGAPORE

The adoption of Eurocodes (SS EN/BS EN) in structural plan submission to the Building and Construction Authority (BCA) of Singapore, and withdrawal of British Standards (BS) from the Approved Document, was officiated on 1 April 2015.

The implementation of Eurocodes, particularly Eurocode 7 (EC7) which governs the geotechnical design, has since significantly influenced the design and construction of Earth Retaining and Stabilizing Structures (ERSS) in Singapore. This seminar will provide a discussion on the key principles of ERSS design based on EC7, highlighting the shift from traditional deterministic approaches to reliability-based design. The session will cover critical aspects such as partial factors, serviceability considerations, forces and structural design considerations and geotechnical risk management in ERSS projects.

The speaker will share an ERSS case history for the design and construction of an underground MRT station on a reclaimed land next to the East Coast Parkway. The types of ERSS schemes adopted include Contiguous Bored Pile (CBP) wall supported by reinforced concrete ring slabs for TBM launching shafts, CBP wall supported by temporary ground anchors for entrances, 20m open cut slope supported by soil nails, with seepage cut-off wall for main station box construction and reinforced concrete soldier pile wall supported by tabular steel struts at the interface between the launching shafts and main station box.

REGISTRATION

REGISTRATION FEES*

Category 1	Members**	RM400.00 per person
Category 2	Non members	RM800.00 per person
Category 3	Group registration (5 and more) members	RM350.00 per person
Category 4	Group registration (5 and more) non members	RM700.00 per person

*Inclusive of 2 tea breaks, 1 lunch and seminar handouts.

** MGS/IEM/GeoSS/CTGS members

The registration fees must be paid in full before the participant is allowed to join the seminar.

PAYMENT METHOD

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- FULL PAYMENT must be settled before commencement of the Seminar, otherwise participants will not be allowed to enter the hall. If a place is reserved and the intended participants fail to attend the Seminar, the fee is to be settled in full.
- The fee paid is not refundable.
- The Organizing Committee reserves the right to cancel, alter, or change the program due to unforeseen circumstances. Every effort will be made to inform the registered participants of any changes. In view of the limited places available, intended participants are advised to send their registrations as early as possible to avoid disappointment.

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