ABOUT THE SEMINAR

Singapore urbanization and geological conditions have been a great challenge to tunneling and deep excavation works. Singapore is a small island state, but is densely urbanized and with highly varied geological conditions. Extensive tunneling and tunneling works over the last 30 years has had to overcome the challenges of that geology and highly developed urban conditions of Singapore. Cautious deep excavation work and operation of TBMs has been a significant factor in reducing the risk associated with the tunneling and deep excavation for development of underground space in Singapore.

Major infrastructure route in Singapore generally run through all major geological formations Various ERSS types were adopted in the cut and cover excavation works depending on the ground condition. Slurry TBMs are chosen typically for tunnelling through rock and mixed face conditions in Bukit Timah Granite whereas EPBM type TBMs are generally adopted for all other ground conditions In this Seminar prestigious speakers from the tunneling and deep excavation field will be presenting on updates of geological conditions of Singapore, guidelines of bored tunneling in Singapore, design of underground structure with complex interfacing and challenges to deal with the interface, and some of the case histories on geotechnical challenges encountered during the constructions together with the appropriate mitigation measures.

TOPICS & SPEAKERS

  By Er. Kiefer Chiam  
  Director of Geological & Underground Projects Department, BCA

  By Er. Michael Goay  
  Senior Engineering Geologist, BCA

- Guideline for Supervision for Bored Tunnelling Works  
  By Dr. Poh Teoh Yaw  
  Director, BCA

- Big Data Analysis on Displacement for Tunnelling in Singapore Soil  
  By Dr. Sun Jianping  
  Design Manager, CCCC-SJ Pte Ltd

- Overcoming Challenges of Development Interfacing with Railway Structures  
  By Er. Dr. Victor Ong  
  Managing Director, One Smart Engineering Consultants Pte Ltd

- Design Challenges of Bored Tunneling for Deep Underground Water Pipe Installation in Downtown Singapore  
  By Er. David Ng  
  Executive Director, One Smart Engineering Consultants Pte Ltd

- Forseeable vs Unforseeable Adverse Ground Conditions - How to better manage ground risk  
  By Mr. Andrew Forsythe  
  Principal Engineering Geologist, Mott Macdonald Group

FOR WHOM

This Seminar is specially prepared for developers, contractors, consultants, engineers and qualified site supervisors (QSS) – RE & RTO. We have invited experienced speakers from the academic and industry to present on relevant topics on ensuring safety, good practice to mitigate risks, and valuable learning points from past incidents and project experience.

CPD PROGRAM

6 STUs (Structural)  
7 PDUs for PEs and Cengs  
7 TUCCS

FEES:

$160.50 (IES Members) / $192.60 CIJC Members) / $214 (Non Members)

Sign up as Group of 5 to enjoy member rate at: $749

(Rates Includes GST, 2 Tea Breaks and Lunch)

FOR MORE INFORMATION, PLS CLICK HERE
SPEAKERS PROFILES AND SYNOPSIS

THE NEW STRATIGRAPHIC FRAMEWORK FOR GEOLOGY OF SINGAPORE AND ITS APPLICATION (2018)

The presentation will provide an overview of the new stratigraphic framework proposed by BCA’s consultant (British Geological Survey) based on the new findings gathered from field mapping works carried out both on land and offshore islands of Singapore, and detailed core logging of BCA’s deep boreholes. The stratigraphy studies also include specialised laboratory testing such as rock petrographic analyses, geochemical testing and radiometric age dating of the rock samples. This presentation will provide an insight into how the sedimentary rock of Jurong Formation are reorganised into different formations and the new naming such as Tuas Formation, Nanyang Member, Pulau Ayer Chawan Formation, Kent Ridge Member, etc and share some examples of its application to engineering works.

Er. Kiefer Chiam is currently the Director of Geological & Underground Projects Department. He is specialist Geotechnical PE registered with Singapore PE Board. His interest and experience spans widely from site investigation works, foundation design, deep excavation to tunnelling and instrumentation works. He plays an active role in promoting the importance of good ground investigation practice when he was working in Land Transport Authority (LTA) prior to joining BCA. At BCA, he leads his team in the review of stratigraphy and structural geology in Singapore, and work together with the British Geological Survey to develop a new Stratigraphy of Singapore and a 3D geological bedrock model for Singapore. which is in compliance with the guidelines of the International Commission on Stratigraphy (ICS).

Mr. Michael Goay is a Senior Engineering Geologist from Building and Construction Authority (BCA). He obtained his BS Geology from Winona State University (Minnesota, USA) and has more than 20 years of experience in engineering geology and geotechnical engineering. He is a member of Institute Geology Malaysia (IGM) and a registered Professional Geologist with Board of Geologist Malaysia (BoG). His commitment to serve the education fraternity started in 2018 with his involvement as part-time lecturer teaching geology under a BCAA joint undergraduate degree course with the University of Newcastle (Australia) and MSc course at NTU. He is currently involved in the implementation of new stratigraphic framework for Singapore proposed by the British Geological Survey.

GUIDELINE FOR SUPERVISION FOR BORED TUNNELING WORKS

BCA-Industry Joint Tunnelling Working Committee has completed a Guideline for Supervision for Bored Tunnelling Works. The supervision guidelines and requirements were compiled based on best practice and industry norm. The guidelines for Supervision for Bored Tunnelling Works included in the Guidebook for Site Supervision Plan was issued via BCA’s circular on Site Supervision Plan for Structural and Geotechnical Works dated 1 September 2019. This presentation highlights some key aspects of the guideline which will help project parties in performing their duties and implementing appropriate measures to mitigate risk of tunnelling works.

Dr Poh Teow Yaw is a Director with Building and Construction Authority which oversees and administers the regulatory framework on building structure safety in Singapore. He is a geotechnical specialist with over 23 years of practical experience. He has authored over 50 publications in geotechnical design and construction including those published in international peer-review journals, conferences and local seminars.
BIG DATA ANALYSIS ON DISPLACEMENT FOR TUNNELING IN SINGAPORE SOIL

Tunnel Bored Machine (TBM) is always used to construct MRT underground tunnel. There is big data pool for TBM operation data, SI borehole data and ground settlement data. The shortcomings of traditional methods for settlement predication due to tunnelling are limited capacities to process and analyse huge volume of data, lack of inter-correlation between TBM performance, ground conditions and settlement, and passive approach to risk management and decision making. Based on the data from Singapore tunnelling project, this presentation will demonstrate how big data analysis technology to make the following improvement: 1) to empower capacity and intelligence in settlement prediction and improve predicative accuracy and to identify the factors governing settlement under different conditions; and 3) to enhance risk management and decision-making for tunnelling.

Dr. Sun Jianping is currently the design manager of CCCC-SJ Pte Ltd. He has over 10 years of experience in rock engineering, project management and deep excavation design for Jurong Rock Cavern Project, Thomson East Coast Line and Changi Airport Project, etc.

Dr Sun obtained PhD degree for slope stability from Chinese Academy of Sciences in 2009 and MSC in Civil Engineering with specialisation in geotechnical engineering from the Nanyang Technological University of Singapore in 2019. He has published more than 30 technical papers in the field of geotechnical engineering. He has received the Best Presentation Award 2018 (first runner-up) from Society for Rock Mechanics & Engineering Geology (Singapore).

OVERCOMING CHALLENGES OF DEVELOPMENT INTERFACING WITH RAILWAY STRUCTURES

In this era of rapid globalisation, the ambitions of mankind have driven surface space to become increasingly scarce, forcing creative solutions in the underground space. With the rapid development of the Mass Rapid Transit, developers are faced with the challenge of interfacing developments with the railway structures, including underground railway tunnels, underground stations, above-ground railway viaducts and piers, and above-ground stations. Protective as we are, disputes arise from such interfaces, drawing out legally binding agreements and engineering assessments. Hence, consulting specialist engineers for the complex interfacing development issues is necessary in ensuring a comprehensive design which fulfils the requirements of the local authority. The speaker will address some tunnelling and underground space design and supervision considerations in order to overcome the challenges of development interfacing with railway structures.

Er. Dr. Victor Ong graduated with PhD in Geotechnical Engineering from the National University of Singapore (NUS). He is currently the President of Singapore Institute of Building (SIBL) and the Managing Director of ONE SMART Engineering (Singapore & Malaysia) Pte Ltd. He is a Specialist Professional Engineer (Geotechnical), registered Qualified Erosion Control Professional (QECP), ABC Water Professional, DFS (Design for Safety) Professional, Chartered Professional Engineer (Australia), ASEAN Chartered Professional Engineer, APEC Engineer and International Professional Engineer and a Professional Engineer (Civil) registered with Professional Engineers Board (PEB), Singapore and Malaysia.

Er. Dr. Ong is a recipient of the Best Contribution Award in Asian Young Geotechnical Engineers Conference and The Hulme’s Prize Award by Tunnelling & Underground Construction Society of Singapore (TUCSS). He was also named Young Consulting Engineer of the Year in 2014 by the Association of Consulting Engineers Singapore (ACES) in year 2017, Dr. Ong has been awarded Singapore’s Top 50 Engineering Achievements by Institution of Engineers Singapore (IES).
SPEAKERS PROFILES AND SYNOPSIS

DESIGN CHALLENGES OF BORED TUNNELING FOR DEEP UNDERGROUND WATER PIPE INSTALLATION IN DOWNTOWN SINGAPORE

Public Utilities Board (PUB) Murnane Water Pipeline Project consist of a stretch of pipe lines to be installed at 45-50m below ground level inside a pre-installed segmental bored tunnel with very tight curvature. Bored tunneling machine is used to construct a segmental bored tunnel with outer diameter of 4.2m at tunnel invert level ranging from 45m from launching shaft to 55m at receiving shaft as a temporary tunneling to install the water pipe lines. The ground condition at the launching shaft location is Bukit Timah Granite Formation with overlying Kallang Formation. There is a transition of geological condition from Bukit Timah Granite Formation to Jurong Formation along the tunnel alignment. The ground condition at the receiving shaft is Jurong Formation. This alignment of bored tunnel is extremely challenging due to the tight corridor available and many constraints along the alignment. The bored tunnel has to undercross the newly constructed Thomson East Coast Line (TEL) Contract T220 bored tunnels and T221 box jacked underpass tunnel, the existing Singapore River, the existing Central Expressway (CTE) underground box tunnels. The bored tunnel alignment is also in close proximity to existing Fort Canning MRT Station and tunnels, and a highrise building with basement. Detail impact assessment have been carried out to ensure the impact due to the bored tunneling is negligible to these infrastructures. This presentation will discuss and present the design challenges of the deep bored tunneling in Bukit Timah Granite Formation and Jurong Formation undercrossing many major structures and buildings.

Er. David Ng graduated in 1999 with a Master’s Degree in Geotechnical Engineering from NUS where he received the Innovation Award and NSTB Gold Award for his outstanding academic results and research work. He is the Executive Director of ONE SMART Engineering Pte Ltd. He is a Specialist Geotechnical PE registered with Singapore PEB. In 2000, he was awarded the First Prize of the prestigious Hulme’s Competition by the Tunnelling & Underground Construction Society of Singapore for his technical paper in tunnelling.

In 2013, he has received the Young Consulting Engineer Award 2013 by the Association of Consulting Engineers of Singapore (ACES). He has published more than 50 technical papers in the field of geotechnical engineering. He has been involved in the design, supervision and project management of major infrastructure projects in Singapore with deep excavation, mined tunnels and bored tunnels in Deep Tunnel Sewerage System, Kallang Paya Lebar Expressway, North East Line, Circle Line, Downtown Line, Thomson East Coast Line and PUB Murnane Water Pipeline Tunnel project during his past 20 years of working experience. Besides Singapore projects, he has also worked on underground metro projects in India Mumbai and Malaysia Kuala Lumpur.

OVERCOMING CHALLENGES OF DEVELOPMENT INTERFACING WITH RAILWAY STRUCTURES

Claims that adverse ground conditions were unforeseeable are common on underground infrastructure projects across the world. In this discussion we consider how these situations are managed both here in Singapore and internationally; and describe what conditions might be considered foreseeable or unforeseeable in Singapore given the vast body of geotechnical evidence from past studies and projects.

Mr. Andrew Forsythe is the Principal Engineering Geologist and team leader for the Geology Team at Mott MacDonald in Singapore. He has extensive experience in underground space development in Singapore and across Asia. He has particularly strong experience in tunnelling and cavern projects for transport and energy projects and his main area of specialisation is ground characterisation and assessment of geotechnical risk. He is a former winner of the Hulme Prize for his paper on the hydrogeology of the Bukit Timah Granite.