



## Supervision of Underground Projects with Deep Excavation & Bored Tunneling And Safe Entry & Work in Confined Spaces Entry & Work(2<sup>nd</sup> Edition)3<sup>rd</sup> Run

By Er. David Ng & Er. Winson Lee

**Date: 6 & 7 June 2024, Thursday & Friday**

**Time: 6 June 2024: 2.00pm to 5.15pm Virtual via Zoom**

**7 June 2024: 9.00am to 5.45pm Physical course at Orchard Hotel Singapore or Similar Class**

**Address of Orchard Hotel Singapore 442 Orchard Road (238879)**

**CPD Programme: 2 STU(Safety), 6 STU(Structural) – To Be Confirmed  
10 PDU(PEB & CENG) – To Be Confirmed**

**Fees: \$381.50 (IES Members)    \$436.00 (Non-Member)**

- *Actual venue (hotel) will be stated in the confirmation email which will be sent to paid participant 2 weeks prior to event date*
- *Please note that attendance for both the courses are compulsory, Certificate of Attendance will be issued to participants with 100% attendance for both courses*
- **This is a blended course comprising 3 hours of zoom session and 7 hours of physical course at hotel.**
- **UTAP – Approved**
- **This course DOES NOT award SDU points**
- **This course is SFC Funded [TGS-2022017485](#)**
- **Course fee to be paid at least 21 days prior to event for individual or Company Sponsored Participants failing which seat will be auto-release without further reminder**

- 2 Coffee Breaks & 1 Buffet Lunch(at Café) at hotel
- Special parking rates at \$10nett (Full Day)

### Supervision of Underground Projects with Deep Excavation & Bored Tunneling (6 Hours)

#### Part 1: Supervision of ERSS and GBW Works for Deep Excavation Projects (2 Hours)

This session will give an introduction to the various types of temporary work for deep excavation projects. These temporary works are either classified as Earth Retaining & Stabilising System (ERSS) or Geotechnical Building Work (GBW) by BCA depending on the excavation depth and retained height. It is important to first understand the key factors affecting the design safety of the various types of ERSS and GBW, in order to be able to carry out the necessary supervision of these ERSS and GBW. Therefore participants will be able to learn the important features of these types of ERSS and GBW design concept and construction sequence in this session. The participants will also learn about the process of deep excavation management including managing the instrumentation & monitoring, and managing the groundwater control and ground settlement. This 2 hour session will prepare the participants to be able to have good understanding of the deep excavation project and thus

## **Course Outline**

- Introduction to the various types of temporary work for deep excavation projects
- Understanding of temporary works classification as Earth Retaining & Stabilising System (ERSS) or Geotechnical Building Work (GBW) by BCA
- Learning the important features of these types of ERSS and GBW design concept and construction sequence
- Learning about the process of deep excavation management including managing the instrumentation & monitoring
- Learning about the process of deep excavation management including managing the groundwater control and ground settlement
- Understanding of the supervision procedures for deep excavation works

## **Part 2: BCA Regulatory Framework for Supervision of Deep Excavation Projects Illustrated with Case Histories (1 Hour)**

There are many current underground projects in Singapore such as Mass Rapid Transit (MRT) Thomson East Coast Line (TEL), North South Corridor (NSC) highway, Deep Tunnel Sewerage System (DTSS), Singapore Power Underground Substation (UGSS), underground drainage, sewerage and water pipelines projects. Hence it is very important to have a comprehensive and clear regulatory framework to ensure deep excavation underground projects are carried out in a safe manner and the supervision of deep excavation underground projects are well managed. This session will illustrate the BCA regulatory framework in Singapore for design submission approval and construction supervision and management of deep excavation projects. This session will use some case histories to illustrate some of the more commonly encountered regulations to be complied with and it will also highlight some of the latest guidelines for supervision of deep excavation projects.

### **Course Outline**

- Introduction of current underground projects in Singapore such as Mass Rapid Transit (MRT) Thomson East Coast Line (TEL), North South Corridor (NSC) highway, Deep Tunnel Sewerage System (DTSS), Singapore Power Underground Substation (UGSS), underground drainage, sewerage and water pipelines projects
- Understanding of the comprehensive and clear regulatory framework to ensure deep excavation underground projects are carried out in a safe manner
- Understanding of the supervision procedures of deep excavation underground projects
- Illustration of the BCA regulatory framework in Singapore for design submission approval and construction supervision and management
- Discussion of some case histories to illustrate some of the more commonly encountered regulations to be complied for deep excavation projects.
- Discussion of some case histories to highlight some of the latest guidelines

## **Part 3: Basic Principles and Key Performance Indicators for Supervision of Bored Tunneling & Pipe Jacking Works (2 Hours)**

In this session, the participants will learn about the basic principles of segmental lining bored tunneling with Earth Pressure Balance Machine (EPBM) and Slurry Shield tunnel boring machine (Slurry TBM), as well as pipe jacking micro tunnel boring machine. With this understanding, the participants will next learn about the various Key Performance Indicator (KPI) for the safe bore tunneling process using bored tunnel machine (TBM). KPI for bored tunneling is important to ensure that the tunneling is safe and does not have adverse impact to the adjacent ground and buildings. The participants will learn about the sequence of work for bored tunneling from construction of TBM shaft, erection of reaction frame, temporary rings, initial drive and main drive. This will equip the participant the necessary basic knowledge in supervision of bore tunneling works.

### **Course Outline**

- Learning about the basic principles of segmental lining bored tunneling with Earth Pressure Balance Machine (EPBM) and Slurry Shield tunnel boring machine (Slurry TBM), as well as pipe jacking micro tunnel boring machine
- Learning about the various Key Performance Indicator (KPI) for the safe bore tunneling process using bored tunnel machine (TBM)
- Understanding of the importance of KPI for bored tunneling to ensure that the tunnelling is safe and does not have adverse impact to the adjacent ground and buildings

- Learning about the sequence of work for bored tunneling from construction of TBM shaft, erection of reaction frame, temporary rings, initial drive and main drive
- Learning the other necessary basic knowledge in supervision of bore tunneling works;
- Understanding of the supervision procedures for bored tunnelling works

#### **Part 4: BCA Regulatory Framework for Supervision of Tunneling Projects Illustrated with Case Histories (1 Hour)**

It is very important to have a comprehensive and clear regulatory framework to ensure bored tunnelling underground projects are carried out in a safe manner and the supervision of these tunnelling underground projects are well managed. This session will illustrate the BCA regulatory framework in Singapore for design submission approval and construction supervision and management for bored tunnelling works. This session will use some case histories to illustrate some of the more commonly encountered regulations to be complied with and it will also highlight some of the latest guidelines for supervision of bored tunnelling works.

##### **Course Outline**

- Introduction of current underground projects in Singapore such as Mass Rapid Transit (MRT) Thomson East Coast Line (TEL), North South Corridor (NSC) highway, Deep Tunnel Sewerage System (DTSS), Singapore Power Underground Substation (UGSS), underground drainage, sewerage and water pipelines projects
- Understanding of the comprehensive and clear regulatory framework to ensure these underground projects are carried out in a safe manner
- Understanding of the supervision procedures of underground projects with bored tunnelling
- Illustration of the BCA regulatory framework in Singapore for design submission approval and construction supervision and management for bored tunnelling works
- Discussion of some case histories to illustrate some of the more commonly encountered regulations to be complied for bored tunnelling works
- Discussion of some case histories to highlight some of the latest guidelines for bored tunnelling work

##### **Speaker Profile**



**Er. David Ng** is a Professional Engineer (Civil) and Specialist Professional Engineer (Geotechnical) in Singapore. He has been involved in publication of more than 70 technical papers in the field of geotechnical and environmental engineering. He has more than 20 years of experience in management, planning, design and construction of major infrastructure and transportation projects in Singapore, Malaysia and India. He is co-founder of One Smart Engineering Pte Ltd which has offices and operations in Singapore, Malaysia and India.

## **Part II: Safe Entry & Work in Confined Spaces Entry & Work 2<sup>nd</sup> Edition (4 Hours)**

### **Objective:**

Confined space work is one of the most serious of all workplace hazards but is also one that is often underestimated. The unfortunate reality is that many stakeholders and workers do not fully understand the hazards and the risks that are “hidden” in confined spaces until actual entry and work needs to be performed in them. The objective of this module is to inculcate and raise awareness in participants (especially Resident Engineers, Resident Technical Officers and Resident Architects) on the hazards of confined space entry and work that are present in construction sites. This will enable them to understand the control measures that are implemented onsite to mitigate confined space hazards. Their perspectives will be enhanced through the sharing of legal and other requirements on confined space entry and work as well as accident case studies.

### **Course Outline/Outcomes:**

This module will equip RE/RTOs (QSS) with the necessary WSH knowledge (including legal and other requirements for their course of work.

1. Definitions of confined spaces and examples of confined spaces
2. Common confined space hazards onsite
3. Lessons learnt from past confined space accidents / case studies
4. Legal and other requirements relevant to confined space entry and work
5. Good practices and control measures for confined space entry and work
6. Risk management and risk assessment
7. Permit to work system for confined space entry and work

### **Speaker Profile**



**Er. Winson Lee** is a Principal Engineer at the Building Plans and Management Group of the Building and Construction Authority. He graduated with a Bachelor's degree in Mechanical Engineering from the National University of Singapore in 2005. After graduation, he joined the Occupational Safety and Health Division, Ministry of Manpower (MOM) where he subsequently obtained a Master's degree in Safety, Health and Environmental Technology from his alma mater in 2009.

Er. Lee had served the Ministry of Manpower from 2006 where he led inspectors in conducting workplace safety and health inspections and audits, conducting investigations into serious and fatal industrial accidents, prosecuting culpable parties under the WSH Act and its Regulations. Having joined the Building and Construction Authority in 2012 after

serving a brief stint as a Senior Workplace Safety and Health (WSH) Manager in the private sector, he assumes regulatory role by enforcing the Amusement Rides Safety Act.

Er. Lee obtained his Professional Engineer status in 2012 under the new Professional Engineer registration framework since 2006. He had passed the Fundamentals of Engineering Examinations, the Practice of Professional Engineering Examinations and the Professional Engineers Board interview panel all in one sitting. He subsequently obtained his Specialist Professional Engineer status in Amusement Rides Engineering in 2013. As an MOM Authorised Examiner in lifting equipment, Er. Lee's interest lies in lifting and hoisting operations as well as WSH risk management. He previously conducts presentations to the industry on WSH matters and currently conducts in-house training courses in WSH. Er. Lee is a member of the Working Group for SS595, Singapore Standard for Steel Wire Ropes for hoisting (formerly known as CP 35 and SS297) and for Singapore Standard SS343, Specifications for Lifting Gears.

## **Pre-requisites for Zoom session on 6 June 2024 from 2.00pm to 5.15pm**

Prior to attending this course, you should:

- Have a PC / laptop / tablet / smart phone with built-in or external webcam.
- Installed the Zoom client.
- Have Wi-Fi / high speed internet connection available.
- Receive an email with a link for you to submit a registration for webinar 1 week prior to the commencement.
- Receive an email with a link and password for you to join the webinar session after your registration is successful.
- ***It is recommended that participants join the course on a 12-inch or larger screen in order to view clearly the text and photos in the presentation materials.***
- ***ALL PARTICIPANTS ARE REQUIRED TO KEEP WEBCAM OR CAMERA TURNED ON DURING 3-hours of zoom, FAILING OF WHICH THE E-CERTIFICATE OF ATTENDANCE WILL NOT BE ISSUED and names will not be submitted to PE Board (if Attendees are Professional Engineers)***

### **Target Audience**

Consultant engineers & supervisors; Developers; Resident Engineer & Resident Technical Officer; Contractor PM, CM, site engineers & supervisors.

## **Supervision of Underground Projects with Deep Excavation & Bored Tunneling And Safe Entry & Work in Confined Spaces Entry & Work (2<sup>nd</sup> Edition) 4<sup>th</sup> Run**

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Time: 6 June 2024: 2.00pm to 5.15pm via Zoom(Virtual)

7 June 2024 9.00am to 5.45pm at Orchard Hotel Singapore(Physical)

Address: Orchard Hotel Singapore 442 Orchard Road (238879)

This course is UTAP & SFC Funded [TGS-2022017485](#)

CPD Programme: 6 STU(Structural) & 2 STU(Safety) - To Be Confirmed

10 PDU(PEB & CENG) – To Be Confirmed

This course DO NOT HAVE SDU Points

Fees\*: \$381.50 (IES Members) \$436.00 (Non-Members)

***(Please note Res/RTOs are registrars of IES but NOT members of IES)***

Please register online/email in the completed form by 22 May 2024 to:

Karen Phua, [karen@iesnet.org.sg](mailto:karen@iesnet.org.sg)

IES Academy@Jurong East, 80 Jurong East Street 21 #04-10

Devan Nair Institute For Employment and Employability, Singapore 609607

### **Participant Details**

Name: \_\_\_\_\_ NRIC: \_\_\_\_\_

Company: \_\_\_\_\_ Designation: \_\_\_\_\_

Address 1: \_\_\_\_\_  
(For mailing of invoice and receipt)

Address 2: \_\_\_\_\_  
(For mailing of Certificate)

Tel: \_\_\_\_\_

Email: \_\_\_\_\_

Please indicate: ☐ IES members IES M'ship No.: \_\_\_\_\_ P.E. No.: \_\_\_\_\_ (if applicable)

☐ Non-members ☐ Sponsored by company

### **Contact Person Details (if different from participant)**

Name: \_\_\_\_\_ Designation: \_\_\_\_\_

Tel: \_\_\_\_\_ Fax: \_\_\_\_\_

Email: \_\_\_\_\_

### **Payment Details**

Bank / Cheque No.: \_\_\_\_\_ Amount(\$): \_\_\_\_\_

\* All Fees are inclusive of Prevailing GST

\* Cheque Not Acceptable

### **Acceptance of Terms and Conditions for Registrations of IES Academy's Events**

I agree to abide by the Terms and Conditions for Registration of IES Academy's Event.

Name : \_\_\_\_\_ Signature: \_\_\_\_\_

## **TERMS & CONDITIONS COURSE REGISTRATION**

### **Registration**

Any registration, whether on-line or fax will be on a ***first-come-first-served basis*** and will only be confirmed upon receipt of full payment by Engineers Singapore Pte Ltd unless otherwise invoice to company.

All registrations must be submitted with duly completed registration form.

### **Closing Date & Payment**

The closing date of the event will be 2 week prior to event commencement date or earlier.

Payment to be made at least 21 days prior to event date.

### **Confirmation of Registration**

Confirmation of registration will be given at least 12 days before the commencement date via email. ***If you do not receive the said confirmation email, you are required to contact IESA at 6463 9211 during office hours.***

IESA reserves the right to allow only confirmed registrants to attend the Event.

### **Withdrawals/Refunds of Fees**

***Written notice at least 16 days in advance before the commencement of the event***

Full course fee shall be refunded subjected to 4.5% transaction charge.

➤ **NO** refund otherwise.

No show of participant would not be accepted as a valid reason for withdrawal/refund.

One time replacement is allowed only if written notice is received by us at least 1 week before the commencement of the event. However, when an IES member is replaced by a non-member, the participant has to pay the difference in the relevant fees.

### **Cancellation/Postponement**

Changes in Venue, Dates, Time and Speakers for the Events can occur due to unforeseen circumstances. IES reserves the full rights to cancel or postpone the Event under such circumstances without prior reasons. Every effort, however, will be made to inform the participants or contact person of any cancellation or postponement.

Fees will be refunded in FULL if any Event is cancelled by IESA.

**UTAP (Union Training Assistance Programme)** is an individual skill upgrading account especially for NTUC members. As a member, you enjoy UTAP funding at 50% of the unfunded course fee capped at \$250 every year.

**SkillsFuture Credit (SFC)** “All Singaporeans aged 25 and above can use their \$500 SkillsFuture Credit from the government to pay for a wide range of approved skills-related courses. Visit the SkillsFuture Credit website ([www.skillsfuture.sg/credit](http://www.skillsfuture.sg/credit)) to choose from the courses available on the SkillsFuture Credit course directory.”

Please visit [HERE](#) for more information on SFC & UTAP claim

### **PERSONAL DATA PROTECTION ACT**

I consent to the processing by Institution of Engineers, Singapore of personal data, including sensitive personal data as defined in the Data Protection Act 2014, about me for the proper purposes of Institution of Engineers, Singapore (IES). I undertake to observe the provisions of the Data Protection Act 2014 in relation to any personal data I may myself hold and process as a Members of Institution of Engineers, Singapore, and I agree to indemnify Institution of Engineers, Singapore from liability for any claims or damages that may arise from the processing of this data. For more information kindly refer to [here](#).

### **Enquiries**

For further enquiries, please contact IESA general office at Tel: 6463 9211.