

One Day Seminar

# Resilient Buried Infrastructure: Challenges, Innovations and Future Directions

Buried infrastructure is becoming increasingly critical in supporting the safety, sustainability, and functionality of modern cities, yet it is constantly challenged by complex ground conditions, construction activities, and ageing underground assets.

This seminar brings together leading experts and practitioners to share the latest advances in understanding ground-related risks, innovative construction approaches, and strategies for protecting and enhancing underground infrastructure resilience.



**FRIDAY**

**21 August 2026**



**ARMADA HOTEL  
PETALING JAYA**

**REGISTER NOW**



## THE SPEAKERS



**Prof Albert Shou Keh-Jian**

Immediate Past Vice President  
(Asia), ISSMGE



**Ir. Assoc Prof Dr Choo  
Chung Shiung**

Senior Lecturer, Swinburne  
University of Technology, Malaysia



**Ir. Dr Khoo Chee Min**

Director, CMKS  
Consultancy Sdn  
Bhd



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# PROGRAMME

## 21 AUGUST 2026

8.30am - 8.50am

Registration & Light Refreshment

8.50am - 9.00am

Opening Ceremony

9.00am - 10.00am

Session 1 - Sinkhole urban geohazard and No Dig countermeasures - Part 1 (*Prof Albert Shou*)

10.00am - 10.15am

Question & Answer Session

10.15am - 10.45am

MORNING TEA BREAK

10.45am - 11.45am

Session 1 - Sinkhole urban geohazard and No Dig countermeasures - Part 2 (*Prof Albert Shou*)

11.45am - 12.00nn

Question & Answer Session

12.00nn - 2.30pm

LUNCH AND FRIDAY PRAYERS

2.30pm - 3.45pm

Session 2 - A Decade of Pipe Jacking Research: Weathered Geology, Jacking Forces, and the Road to Geotechnical Digital Twins (*Ir. Assoc Prof Dr Choo Chung Siung*)

3.45pm - 4.00pm

Question & Answer Session

4.00pm - 4.30pm

AFTERNOON TEA BREAK

4.30pm - 5.15pm

Session 3 - Risk-Based Geotechnical Assessment for Buried Utility Pipelines: Bridging International Frameworks and Local Experience (*Ir. Dr Khoo Chee Min*)

5.15pm - 5.30pm

Question & Answer Session

5.30pm

CLOSURE



## SYNOPSIS AND SPEAKER BIODATA



### Prof Albert Shou Jian-Keh

#### Biodata

Professor Keh-Jian (Albert) Shou is Immediate VP Asia of ISSMGE (2022~2026), Immediate Past Chairman of ISTT (2022-2025), Honorary Chairman of CTSTT, Professor of Tongji University, and Emeritus Professor, National Chung-Hsing University, Taiwan. His research interests include rock mechanics/engineering, engineering geology, and trenchless technologies. He has published more than 200 papers on these topics and is now the Editor of Tunnelling and Underground Space Technology (SCI), Associate Editor of the ASCE Journal of Pipeline Systems Engineering and Practice (SCI) and associate Editor of Underground Space (SCI). He obtained his Ph.D. degree (Civil Engineering) from University of Minnesota, U.S.A. in 1993. His major experience includes:

1. Visiting Professor, CNR-IRPI, Perugia, Italy (2013/8~2014/1).
2. Senior Principal Engineer, Shannon & Wilson, Seattle, USA (2008/2~2008/9).
3. Visiting Professor, TTC, Louisiana Technical University, USA (2006/1~2006/2).
4. Visiting Professor, RCUS, Kobe University, Japan (2003/10~2004/3).
5. Research Engineer, CSIR/Miningtek, South Africa (1998/2~1999/1).
6. Geotechnical Engineer, National Expressway Engineering Bureau, Taiwan (1993-1994).

#### Synopsis

In recent years, due to the climate change, incidents of 'road collapse' (commonly known as sinkholes) caused by urban underground excavation or aging and damaged pipelines have occurred increasingly in the major cities worldwide. This study not only collects relevant cases to understand the causes and mechanisms of road subsidence and collapse, and to identify and classify high-potential areas for such collapses, but also assesses existing no-dig techniques for detecting and inspecting pipelines and road quality. The related findings can serve as a basis for establishing construction and maintenance guidelines, revising construction specifications, recommending regular inspection and monitoring of roads and pipelines in the areas with high-risk collapse potential, and suggesting rehabilitation countermeasures. As the CIPP, one of the major rehabilitation trenchless technologies for underground pipelines, was adopted to show how the design analysis could be performed to make the rehabilitation more reliable and more resilient.

#### Biodata

Ir. Assoc. Prof. Dr. Choo Chung Siung is Associate Professor of Geotechnical Engineering and Geomechanics at Swinburne University of Technology, Sarawak Campus, where he also serves as Director of the Centre for Innovative Society. He is Secretary General of the Malaysian Geotechnical Society and serves as Malaysia's nationally nominated member on two ISSMGE Technical Committees: TC105 Geo-mechanics and TC309 Machine Learning and Big Data. His PhD, awarded by Swinburne University of Technology, focused on back-analysis of pipe jacking forces in weathered geology.



### Ir. Assoc Prof Dr Choo Chung Siung

Over the past decade, he has built a sustained research programme on pipe jacking, spanning geomaterial characterisation, machine learning and explainable AI for jacking force prediction, and geotechnical digital twins for construction monitoring.

#### Synopsis

Pipe-jacking through weathered tropical geology presents persistent geotechnical challenges for buried infrastructure construction. Weathered geology in Malaysia are spatially variable and difficult to characterise geotechnically using standard frameworks, creating construction challenges particularly involving the estimation of jacking forces.

This talk traces a decade of research addressing these challenges in sequence. It begins with geotechnical characterisation of weathered rock, establishing frameworks for ex situ testing and reconstitution of tunneling spoil, and in situ pressuremeter testing. It then covers machine learning models for jacking force prediction in weathered geology, and the application of explainable AI to identify which geotechnical and operational variables govern jacking forces under different ground conditions.

The talk also presents an approach that reconstructs geotechnical parameters from monitored jacking force data in real time, effectively turning the pipe string into a ground sensor. These capabilities are then brought together in an emerging geotechnical digital twin framework for supporting decision-making during pipe jacking. The work demonstrates that rigorous ground characterisation and interpretable AI are complementary, and together offer a promising path towards resilient buried infrastructure.



### Ir. Dr Khoo Chee Min

#### Biodata

Dr. Cheemin Khoo is a geotechnical and tunnel engineering specialist with more than 20 years of experience in consultancy and design management. He holds a First Class Honours degree in Civil Engineering from Universiti Teknologi Malaysia and a PhD from Universiti Teknologi PETRONAS. He is currently the Director of CMKS Consultancy Sdn Bhd and has been involved in major urban underground infrastructure projects across the region, including the Kajang and Putrajaya Lines in Malaysia, as well as the Thomson-East Coast Line in Singapore.

Dr. Khoo is a member of ISSMGE Technical Committees TC103 (Numerical Methods in Geomechanics) and TC204 (Underground Construction), as well as ITA Working Groups WG2 (Design and Engineering) and WG11 (Immersed and Floating Tunnels). He has published over 50 technical papers and journal articles, including award-winning works recognised by the prestigious Tan Sri Hj. Yusoff Prize in 2019 and 2026.

#### Synopsis

This presentation explores a risk-based geotechnical approach for assessing and managing construction-induced impacts on buried utility pipelines, drawing upon internationally recognised principles currently being developed within the International Tunnelling and Underground Space Association (ITA) Working Group 2 (Design and Engineering). The presentation will outline the key components of pipeline impact assessment, including asset vulnerability and pipe failure mechanisms, ground movement mechanisms, the concept of impact strain, the staged assessment process, and monitoring strategies. The risk-based approach places emphasis on rationalising the assessment process to better reflect uncertainties associated with ground and asset conditions, the potential consequence of asset failures and the implementation of control and mitigation measures. Through selected case histories from Malaysia – covering deep excavation, tunnelling, pile installation works, the presentation will demonstrate how international frameworks can be effectively integrated with local engineering judgement and site-specific considerations to enhance infrastructure resilience. The session will also highlight emerging practices in instrumentation-informed back-analysis and performance-based construction control for improving the resilience of buried infrastructure.

## REGISTRATION FORM

| CATEGORY                                    | Registration Fee (RM) |
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| Members (MGS/IEM/GeoSS/CTGS/MyIGS/HATTI)    | RM400.00              |
| Non-Member                                  | RM800.00              |
| Group Registration (5 and more) Members     | RM350.00              |
| Group Registration (5 and more) Non-members | RM700.00              |

Full payment of the registration fee is required before participants are permitted to enter the lecture hall

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### TERMS AND CONDITIONS

- 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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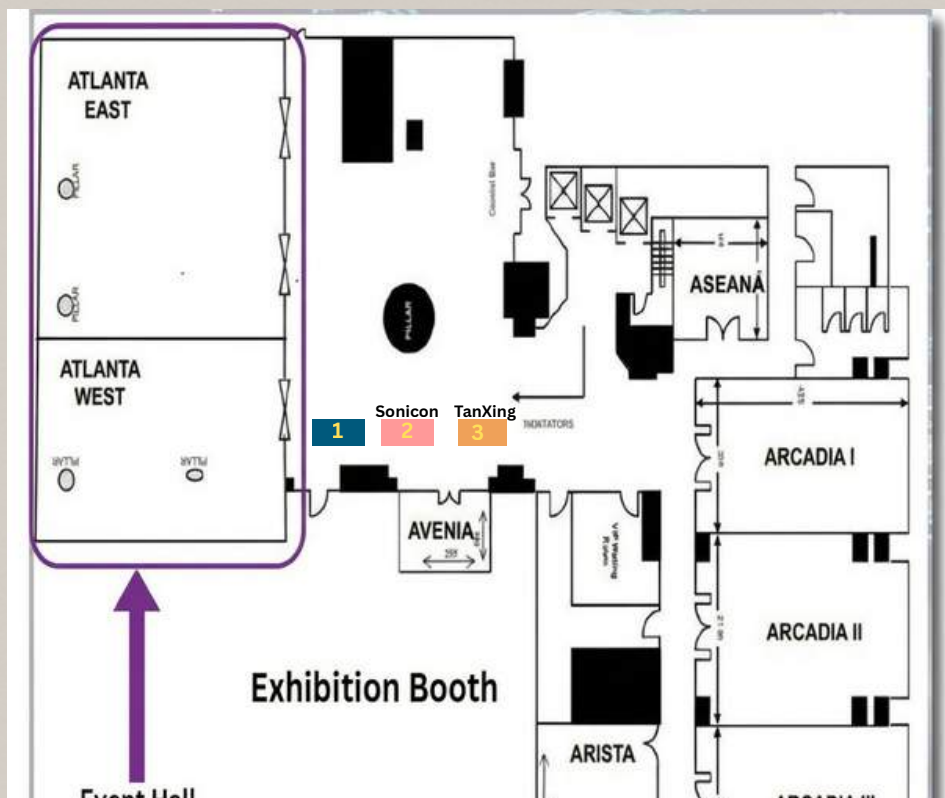
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