

## REGISTRATION FORM

### TWO DAY PRACTICAL SHORT COURSE IN TUNNELS AND UNDERGROUND SPACE (PSCTUS2019)

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## TWO DAY PRACTICAL SHORT COURSE IN TUNNELS AND UNDERGROUND SPACE (PSCTUS2019)

Jointly organised by: World Tunnel Congress (WTC2020) and Tunnelling and Underground Space Technical Division (TUSTD)  
 Managed by: IEM Academy Sdn Bhd

Date: 16<sup>th</sup> – 17<sup>th</sup> July 2019

Time: 8.30am – 6.00pm

Venue: Sheraton 3 & 5 Hall,  
 Sheraton Hotel in Petaling Jaya, Selangor, MALAYSIA

*An event endorsed by*



BEM Approved CPD/PDP : 13.0  
 Ref. No.: IEM19/HQ/318/C

### REGISTRATION FEES:

(for inquiry please call +603-7931 5296 or visit [www.iemasb.com](http://www.iemasb.com))

Grade	Online Fee	Normal Fee
IEM/ITA Member	<b>RM 1,060.00</b>	<b>RM 1,166.00</b>
Non IEM/ITA Member	<b>RM 1,484.00</b>	<b>RM 1,590.00</b>

**Closing for registration: 12<sup>th</sup> July 2019**

#### Terms & Conditions

- ✓ We wish to remind that all registration fees must be FULLY paid before commencement of the course. IEM Academy Sdn. Bhd. reserves the right to refuse entry for participant(s) who have not paid their registration fees to attend the course. THIS REQUIREMENT WILL BE STRICTLY ENFORCED.
- ✓ Payment via CASH / CHEQUE / BANK-IN TRANSMISSION / BANK DRAFT / MONEY ORDER / POSTAL ORDER / LO / WALK -IN will be considered as NORMAL REGISTRATION
- ✓ FULL PAYMENT must be settled before commencement of the course, otherwise participants will not be allowed to enter the hall. If a place is reserved and the intended participants fail to attend the course, the fee is to be settled in full.
- ✓ 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, intending participants are advised to send their registrations as early as possible so as to avoid disappointment.

# TENTATIVE PROGRAMME

## Day 1 – 16<sup>th</sup> July 2019

0830-0900	Scan-in Registration	
0900-0905	<b>Welcome Address</b>	<b>President of ITA, Prof. Jenny Yan</b>
0905-0915	Welcome and Opening Ceremony	
<b>Session 1: Sustainable Use of Underground Space</b>		
0915-1000	Underground Space Use to Reach the Sustainability Development Goals	Mr. Oliver Vion
1000-1045	Overview of Tunnelling Development in Malaysia	Ir. Dr Ooi Teik Aun
1045-1115	Coffee Break	
<b>Session 2: Ground Investigation &amp; Instrumentation for Tunnelling</b>		
1115-1200	A Review on the Objectives and Design of Ground Investigation & Instrumentation for Tunnelling	Ir. Dr Ooi Lean Hock
1200-1245	Geotechnical Baseline Reports – A Risk Management Tool	Mr. Randall Essex
1245-1400	Lunch and Networking	
<b>Session 3: Design Challenges with Conventional Tunnelling</b>		
1400-1445	Pipe Roofing System Thru Reinforced Earth Wall Road Ramp	Dr Esam Ahmad S. Al-Samaraee
1445-1530	Issues related to the Design and Construction of Tunnel Cross Passages	Ing. Dr Oskar Sigl
1530-1600	Coffee Break	
<b>Session 4: Challenges in Urban Underground Construction</b>		
1600-1645	Underground Construction Challenges of KVMRT Line 1 and Line 2	Mr. Ng Hau Wei
1645-1730	Challenges in Design and Construction of Deep Excavation in Urban Areas	Ir. Dr Tan Yean Chin
1730-1800	Question & Answer	
1800	Scan-out	

## Day 2 – 17<sup>th</sup> July 2019

0830-0900	Scan-in Registration	
<b>Session 5: Tunnelling 4.0 (Digital Age)</b>		
0900-0945	Insights and Experiences from International AEC Practices in Digital Automated Construction – Smart underground Infrastructure and Tunneling	Ir. Dr Julian Lee
0945-1030	Tunnelling 4.0 (BIM, Automation and Virtual with Technologies)	Ir. Ronan Collins
1030-1100	Coffee Break	
<b>Session 6: Strategic Communication and Engagement in Tunnelling Works</b>		
1100-1145	Introduction and Overview	Dr Bhavani Krishna
1145-1230	Sustainability and the Communication with Stakeholder Engagement	Dr Bhavani Krishna
1230-1400	Lunch and Networking	
<b>Session 7: Hard Rock vs. Soft Ground Tunnelling – Design Aspects</b>		
1400-1445	Rock Mass Classification for Tunnelling in Rock	Ir. Dr Rini Asnida Abdullah
1445-1530	Tunnelling in Soft Ground: Principle for Design and Analysis	Dr Siti Noraida Jusoh
1530-1600	Coffee Break	
<b>Session 8: Technological Advances</b>		
1600-1645	Distributed Fiber Optic Sensors for the Monitoring of Tunnel	Ir. Associate Prof. Dr Hisham Mohamad
1645-1730	In Pursuit of an Autonomous Tunnelling	Mr. Justin Chin Jing Ho
1730-1800	Question & Answer	
1800-1815	Closing Ceremony	
1815	Scan-out	

# Abstract & About Speakers

## Underground Space Use to Reach the Sustainability Development Goals

### Abstract:

The presentation will try to demonstrate that a better planning and use of underground space will facilitate, all over the world, the accomplishment of the SDGs defined by the United Nations. ITA has for many years been promoting the use of underground space which is notably very important to reach the SDGS 6, 9, 11 and 13.

### Speaker:



**Mr. Olivier Vion** is a consulting engineer specialized in marketing for tunnelling and underground space use worldwide. He has accepted the mission to be the Executive Director of the International Tunnelling and Underground Space Association since January 2009. He was before in charge of the communication of the Association. He is a chartered civil engineer, specialized as structural engineer, has a master's degree in human resources and is a former auditor of the College for High Study in Sustainable Development. He is Vice-President of Eurosud-Team Association for the development of mobilities in South-West Europe and President of the Toulouse Chapter of the French Association of Scientists and Engineers.

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## Overview of Tunnelling Development in Malaysia

### Abstract:

Tunnelling activities in Malaysia have gone through a rising and flourishing time in the past decades. Not only many tunnels have been successfully constructed for a large number of applications but the whole tunnelling industry has made a great leap forward since the construction of the SMART project to solve the problems of the frequent flooding and traffic congestion in the business district of Kuala Lumpur in Malaysia. The SMART project is the first of its kind in the world and received the UN Habitat Scroll of Honour Award in 2011 for its innovative and unique management of storm water and peak hour traffic. The tunnel is 9.7km long and is the longest storm water tunnel in Southeast Asia and the second longest in Asia. Construction started in 2003 and completed and operational in May 2007. Since operation it has prevented at least seven potentially disastrous flash floods in the city centre. The Institution of Engineers, Malaysia (IEM) in 2006 organized an International Conference and Exhibition on Tunnelling and Underground Space (ICETUS2006) to record this significant development and a special session was dedicated to papers from the SMART project which won the British Construction Industry International Award in 2008. The continuation of tunnelling works succeeded by the construction of Bukit Berapit and Larut tunnels in electrified double track railway project in 2008. The 3300m twin tube Bukit Berapit tunnel is the longest rail tunnel in Malaysia and believed to be the longest drill and blast rail tunnel in Southeast Asia. On another note, the construction of the interstate water transfer tunnel consisting of three tunnels measuring 44.6km makes it the world's 11th longest tunnel and the longest in Southeast Asia. Construction activity started in 2010 and the excavation works were completed by May 2014. The water tunnel was built as part of the Pahang Selangor Raw Water Transfer (PSRWT) project aimed at supplying raw water from the River Semantan to the states of Pahang, Selangor, Kuala Lumpur, Putra Jaya and Negeri Sembilan. The construction of the Klang Valley Mass Rapid Transit (KVMRT) in 2011 will change the landscape of tunnelling in Malaysia significantly as it

will generate a sustainable market for the tunnelling industry. The KVMRT consists of a planned 3 line mass rapid transit system in the Greater Kuala Lumpur (which is part of Klang Valley) in Malaysia. Line 1 the Sungai Buloh-Kajang (SBK) Line was scheduled for operation in 2 phases, December 2016 and July 2017 respectively. Line 2 is the Sungai Buloh-Serdang-Putrajaya (SSP) Line and construction is in progress and expected to be operational in 2021. Line 3 the circle line is in the planning stage. The construction of highway, rail, sewage, water and power generation tunnels and others also will increased tremendously. All these developments of the tunnelling activities have been recorded by IEM in the ICETUS2011, ICETUS2015 and SEACETUS2017. Earlier development of tunnels in Malaysia has been recorded by Ooi & Neoh (2000). Ting et al. (1995) and Ting et al. (2006) summarised the issues of geology relating to tunnelling activities in Malaysia up to 1995 and 1995-2005 respectively. This paper continues the effort of documenting tunnelling activities in Malaysia for the last decade from 2005-2015 as well as the up-coming tunnelling projects. It also outlines the recent achievements in tunnel and tunnelling technology and development in risk management of tunnel works locally. The introduction of ITA-FIDIC Emerald Book at WTC2019 will further enhance the tunnelling industry. An Open Session on this subject is expected at WTC2020.

### Speaker:



**Ir. Dr. Ooi Teik Aun** obtained his Bachelor of Civil Engineering and Master of Engineering from Auckland University in 1966 and 1968 respectively. He obtained his PhD from University of Sheffield in 1980. He was the Co - Organizing Chairman of the recently concluded SEAGC2016. He is the immediate Past President of the Southeast Asian Geotechnical Society (SEAGS), Founder Chairman of the Association of Geotechnical Societies in Southeast Asia (AGSSEA). He is a Past President of the Malaysian Institute of Arbitrators (MIArb). He is the Immediate Past ICE Country Representative for Malaysia (2000 - 2015), Founder Chairman of IEM Tunnelling and Underground Space Technical Division (TUSTD), Founder Chairman of IEM Consulting Engineering Special Interest Group (CESIG). He is an Honorary Fellow of The Institution of Engineers, Malaysia (Hon. FIEM), Fellow of the Institution of Civil Engineers (CEng FICE), Fellow of the MIArb (FMIArb), Fellow of Malaysian Society of Adjudicators (FMSA) and Fellow of ASEAN Academy of Engineering and Technology (FAAET). Dr. Ooi has fifty years of experience in the Construction Industry. He spent his initial fourteen years with the Public Works Department Malaysia before leaving to work in the private sector where he spent seventeen years working in the construction sector. He played major role in the Johore Baru Causeway widening and the design and construction of Senai Airport in 1970s. He was the Project manager for the Wisma Saberkas Building Project in Kuching in 1980s. In 1993-1996 He was Project Director in the Design and Construction of Kuching Deep water port at Kampung Senari, Kuching, Sarawak. He is currently Organising Chairman WTC2020 to be held in Kuala Lumpur. WTC2020 will attract over 2000 participants and will be the first world class event to be held in Malaysia by IEM.

## A Review on the Objectives and Design of Ground Investigation & Instrumentation for Tunnelling

### Abstract:

*To be update at later stages*

### Speaker:



**Ir. Dr. Ooi Lean Hock** graduated with PhD from University of Sydney, Australia. In the past he has worked as a geotechnical consultant and a specialist contractor. He is currently the lead geotechnical engineer in the Design and Technical Department of MMC GAMUDA KVMRT (T) Sdn Bhd for the second line of Klang Valley Mass Rapid Transit from Sg Buloh-Serdang- Putrajaya (SSP) line. He has extensive experience in ground treatment works, more recently in deep excavation and tunneling works. He also has a keen interest in geotechnical instrumentation and testing. He has been involved in many interesting infrastructural projects such as railways, runways, highways, tunnels and hydropower both locally and abroad.

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## Geotechnical Baseline Reports – A Risk Management Tool

### Abstract:

*To be update at later stages*

### Speaker:



**Mr. Randall Essex** is with Mott MacDonald's Tunnels Practice in North America. Randy has 42 years of tunnel engineering experience across North America and overseas and is a Registered Professional Engineer in multiple states. Randy holds a B.S. degree in Geomechanics from the University of Rochester, and M.S. and M. Eng. degrees in Geotechnical and Civil Engineering from the University of California, Berkeley. Involved primarily with the design and construction engineering of underground projects, Randy's focus has been the management of commercial risks associated with variable subsurface conditions. He has provided planning, design, construction engineering, expert witness, and Dispute Review Board services for more than 175 tunnel projects. Among his 45 technical papers, book chapters, and

magazine articles, Randy is principal author of ASCE's publication Geotechnical Baseline Reports for Construction, known in the tunneling industry as the "Gold Book". Past and present professional associations include the Underground Construction Association of SME, the American Underground Space Association, the Underground Technology Research Council, and the ITA, where he is a Vice President and Tutor to Working Group 3, Contractual Practices. Randy is a member of the Moles construction fraternity and was recently awarded the Beaver's Golden Beaver Award for Engineering.

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## Pipe Roofing System Thru Reinforced Earth Wall Road Ramp

### Abstract:

Construction of cast-in-situ RC Box Tunnel (serving later as a pump gate drainage culvert) thru the existing Reinforced Earth (RE) wall road ramp (part of AKLEH highway), a temporary pipe-roofing system (Microtunnelling) is introduced.

The first of its kind in the world pipe-roofing tunnelling system through RE wall road ramp has been designed for the above purpose. The system encompasses the insertion of a series of horizontal contiguous steel pipes (600mm dia.) at shallow depth beneath and through the existing highway RE wall road ramp by hydraulic steel pipe jacking, including jacking in the vertical directions.

Vital and essential steps have been taken to keep the road traffic life & safe at all time during tunnelling process, as well as enhance the stability of the RE walls prior to the construction, these main steps are ; Horizontal cement-bentonite grout (TAM) to solidify RE wall infill granular material, Vertical (Permeation) cement slurry grout is injected below the RE wall strip foundation to enhance its bearing capacity, Steel Tie Rods inserted and tightened horizontally to ensemble and sandwich both faces of the RE wall panels to enhance the ramp stability against the pipe jacking forces. These measures not only serve to enhance the stability of the RE walls but also serve to limit ground movements during the pipejacking operation. This is so that settlements of both overlying and road pavement as well as the movement of RE walls are minimised and maintained within acceptable limits. Otherwise, this would cause subsidence of the highway above and disrupting the live traffic and for that purpose, two types of Monitoring Systems are implemented; Automatic Total Station (ATS) & Terrestrial Laser Scanning (TLS), which have been counterchecked by precise manual levelling monitoring survey. A series of 6m deep well points have been installed adjacent to one side of the contiguous steel piperooting, which was for the purpose of lowering the fluctuating water-table so as to facilitate the jacking operation of the steel pipes below the existing ground level.

Manual excavation with small excavator machine shall be conducted and a series of steel frame supports to be installed at 3.0m interval to transfer the piperooting load to the ground safely, and allow for the construction of the permanent RC culvert slabs and walls. The RC box culvert shall act as vital connection between Sg. Bunus and Sg. Klang acting as the control gate structure that hoist force main drainage pump system lifting low water level from diverted Sg. Bunus to high water level of Sg. Klang.

### Speaker:



**Dr. Esam Ahmad S. Al-Samarrae** has over 25 years' experience in geotechnical engineering on a wide range of infrastructure projects through Middle East & South East Asia. Dr. Esam has worked for contractors, consultants, owners and government agencies, both in offices and on site, and most of his work in the last 25 years has been on major projects in areas where tropical residual soils are prevalent. These have included elevated highways, building structures and deep basements with variety of earth retaining structures (Secant Piles, CBP,

Diaphragm walls, top down constructions, etc.), culvert jacking & pipe roofing system, embankments on soft soil and tunnels in Malaysia, Earth Dam Design Iraq, deep excavation for basement construction and land reclamation work in UAE. His main interests are deep foundations, especially the interaction with the structure, deep excavations, tunnelling and soft ground engineering. He obtained Ph.D. Geotechnical Engineering from University Malaya, 2013, M.Sc. Geotechnical Engineering from University of Technology, Baghdad, Iraq 1996 and B.Sc. Civil Engineering from University of Mosul, Iraq, 1991.

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## Issues Related to the Design and Construction of Tunnel Cross Passages

### Abstract:

Presentation focuses first on basic principles related to the assessment of settlements for TBM tunnelling in soft ground conditions. Then the presentation will address and explain issues related to the operation of tunnel boring machines, mainly focusing on the assessment of face pressures, cutterhead interventions and the analysis and assessment of TBM performance during construction.

### Speaker:



**Ing. Dr Oskar Sigl** graduated as Diploma Engineer (MSc) 1985 from Technical University of Graz (Austria), in Civil Engineering specializing in geotechnics and soil mechanics. In 1991, he achieved with distinction the PhD in mining engineering at the Mining University of Leoben (Austria). Oskar's 34 years of experience cover a wide range of projects such as subways, railways, roads, power transmission cables, sewerage mains, underground storage schemes and caverns. Oskar has been working in Singapore since 1997, where he was involved in the detailed design of almost all major underground infra structure projects. Outside of Singapore, Dr. Sigl was involved in leading roles in the design of underground subway systems in Dubai, Perth, Hong Kong, Kuala Lumpur as well as the design of underground oil and fuel storage cavern schemes in Saudi Arabia, India and the UAE.

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## Underground Construction Challenges of KVMRT Line 1 and Line 2

### Abstract:

MMC Gamuda KVMRT (T) Sdn Bhd is the main contractor for the underground works packages of the Klang Valley MRT1 and MRT2 projects in Kuala Lumpur. The underground alignment and twin bored tunnels of the projects (9.5km and 13.5km in length respectively) traverse through a variety of geological formations including the Kenny Hill, granite and the notorious karstic limestone formation with its characteristic erratic rock head, highly developed fissures and ubiquitous cavities. This presentation describes the experiences gained and lessons learnt from addressing the various risks and challenges presented by the tunnelling and underground works on the projects with a focus on TBM operations and careful management of ground, programme and external risks such as 3rd party stakeholders.

### Speaker:



**Mr. Ng Hau Wei** is currently the Deputy Project Director on the KVMRT Line 2 Project in Kuala Lumpur, Malaysia. A veteran of 20 years in the tunnelling industry, Hau Wei has been involved in iconic tunnel project across Malaysia including the revolutionary SMART tunnel project, 330km Electrified Double Track project and currently the Klang Valley Line 1 and Line 2. Rising up the ranks from an engineer to deputy project director, Hau Wei has a wealth of experience that envelops both technical and management aspect of tunnelling. Hau Wei is passionate about innovative and was a leading figure in the joint development of the world's first Variable Density Tunnel Boring Machine. At the 44th International Federation of Asian and Western Pacific Contractors Associations (IFAWPCA), Hau Wei was awarded the Choi Construction Fieldman Award at the convention for his excellent contribution towards the construction industry.

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## Challenges in Design and Construction of Deep Excavation in Urban Areas

### Abstract:

Due to scarcity of land, especially in urban areas, the need for basements to optimise the use of land has resulted in construction of deep excavation works. Deep excavation works pose great challenges to geotechnical engineers, particularly in complex ground conditions such as in limestone, where it exhibits notorious karstic features with irregular bedrock profiles, variable weathering condition, cavities and slime zones. With proper geotechnical input, costly failure and delay associated with underground works such as excessive groundwater lowering, occurrences of sinkholes, excessive ground settlements, etc. can be prevented. Suitable temporary earth retaining system and rock strengthening works have to be properly designed to prevent such failures. This paper presents design principles of temporary earth retaining system together with vertical rock excavation as well as three case studies including from Mass Rapid Transport (MRT) projects, from various challenging geological formations found within the Klang Valley of Malaysia; Limestone, Kenny Hill formation and Alluvium with high ground water table.

### Speaker:



**Ir. Dr Tan Yean Chin** obtained his Bachelor Degree in Civil Engineering with First Class Honours from University Technology Malaysia (UTM) in 1992. He later obtained his Masters Degree in Geotechnical Engineering and The Chin Fung Kee Prize for outstanding academic performance from Asian Institute of Technology (AIT), Bangkok in 1994. He attained his Engineering Doctorate from UTM in 2017. Ir. Dr Tan is the Immediate Past President of The Institution of Engineers, Malaysia (IEM) (2017/2018). He also holds the position of Secretary General of the Federation of Engineering Institutions of Asia and the Pacific (FEIAP), an independent umbrella organisation for the engineering institutions in the Asia and the Pacific region. Ir. Dr. Tan is a Professional Engineer and an Accredited Checker (Geotechnical) registered with the BEM. A registered ASEAN Chartered Professional Engineer (ACPE) as well as in the APEC and International Professional Engineers registers. Ir. Dr. Tan is also an Honorary Fellow of the ASEAN Federation of Engineering Organisations (AFEO), Fellow of IEM, Institution of Civil Engineers (ICE, UK), ASEAN Academy of Engineering & Technology (AAET) and Academy of Engineering and Technology of the Developing World (AETDEW). He is one of the Founder and Senior Director of G&P Professionals group of multi disciplines engineering consulting firms. He has lead his team in geotechnical design of mega projects such as high rise building and infrastructure schemes. He has published more than 70 technical papers on geotechnical engineering in local and overseas conferences and seminars.

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## Insights and Experiences from International AEC Practices in Digital Automated Construction – Smart underground Infrastructure and Tunneling

### Abstract:

Application of digital tool such as, Building Information Modelling (BIM) is considered the latest global construction industry towards automation. BIM is changing the building and construction process and provide an effective platform for construction professionals to develop and monitor the project throughout the whole life cycle. In this presentation, the speaker will share his international experience on the recent projects- underground infrastructure and tunnel in New Zealand and worldwide. Those projects have demonstrated the successful adoption of BIM to change the traditional workflow by the application of reality modelling, point cloud data in verification of as-built tolerances, asset information modelling and geographical information system (GIS). It will include the key contents such as the trends of AEC practice globally on digital and automated construction. The necessary factors to overcome the barriers to facilitate BIM application will be discussed with attention of workflow, procurement, and contract & legal matter. The highlight will be given to the collaboration between stakeholder in Malaysia and the global partners. Some countries and cities have been mandatory required the adoption of BIM for capital works projects. This is a clear indication of a firm commitment to the promotion and adoption of BIM technology to improve the processes of design, construction, project management and asset management. The challenges and prospects in response to the coming digital transformation for the construction industry among AEC consultants will be discussed.

### Speaker:



**Ir. Dr. Julian Lee** is the Chief Executive and Founder of Cinnotek International Group, New Zealand, Malaysia and Singapore. He is serving the Civil Engineering Society as an Adjunct Professor at the Department of Civil Engineering in the University of Hong Kong. Ir Dr. Lee has taken significant role as Civil, Structural and Geotechnical Engineer for different kinds of construction projects in Hong Kong and worldwide. Ir Dr. Lee is a Chartered Engineer (CEng) and a Member of Institute of Civil Engineer (MICE), UK and member of the Hong Kong Institution of Engineers (MHKIE), Hong Kong. Prior to his current position in New Zealand. Ir. Dr Lee was formerly Senior Manager – Research and Development of the Construction Industry Council (CIC), Hong Kong; and Lead Engineer (Civil and Structural) of Worley Parsons Pte Ltd, Singapore. Since 1998, he has managed various infrastructure and building projects in the Asia Pacific region, as well as various construction-related research projects. The projects cover construction areas including structural steel, construction technology, sustainability for green building development, construction health & safety, Building Information Modelling (BIM), construction materials and productivity.

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## Tunnelling 4.0 (BIM, Automation and Virtual with Technologies)

### Abstract:

What are the challenges and limitations of designing road and rail tunnels using BIM processes and platforms? How can design models for tunnels be used for construction planning and in particular for complex tunnelling operations in complex or confined sites? Are there benefits in using Virtual Reality for tunnel construction? Using case studies from Kuala Lumpur, Singapore

and Hong Kong Ir. Collins will illustrate how to implement BIM for designing tunnels, planning construction works and engage with the project participants using VR. Attendees will learn the importance of information management, collaboration and training from the lessons and experience of the speaker.

### Speaker:



**Ir. Ronan Collins** graduated from University College Dublin with BEng in 1996. He worked for Arup in 1996 – 2002. In 2003 – 2010 he was Managing Director of Civil & Structural Computing (HK); Managing Director InteliBuild Groupe Canam / Canam Group 2010 – 2016 in Hong Kong; Managing Director InteliBuild 2003 – 2016 in Hong Kong. He then joined AECOM Malaysia as Executive Director in 2016 – 2018, Recently he joined Gamuda as Head of Project Information Management in Kuala Lumpur, Malaysia. Ronan is Civil & structural engineer, Project Information Management Professional, BIM (Building Information Management), VDC (Virtual Design and Construction) specialist, and experienced speaker and narrator passionate about Construction. Ronan Collins is committed to driving innovation and digital transformation in the construction industry in Malaysia. He believes that the business benefits provided by a well-planned digital engineering BIM processes will transform the way we design, construct and maintain our infrastructure and buildings. Throughout his career, he has implemented digital solutions and services for large scale developments including airports, hotels, residential complexes, railway stations, educational facilities, exhibition centres, casinos and complex industrial projects all around the world. As a certified Professional Project Manager, he is able to provide expert advice on how to specify and how to plan the implementation of BIM processes. He is always willing to share his knowledge, experiences (good and bad) and guidance on project specifications, training and technical support for people working with BIM. Given a chance to speak at conferences, he openly share his ideas and suggestions on how to get the maximum value from BIM, digital engineering and virtual construction. Using examples from recent projects, he does his best to provide practical insights on the dos and don'ts of digital transformation for engineering and construction.

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## Strategic Communication and Engagement in Tunnelling Works: Introduction & Overview

### Abstract:

MALAYSIA's largest single infrastructure project, KVMRT, took off on a much-hyped note with a promise to redefine urban transport in Klang Valley. The 9.5km of the 51 km was taken Underground with 7.8km of twin bored tunnels running beneath live traffic and concrete jungles in the City of Kuala Lumpur. Home to some 5 million people, it is a city that never sleeps, the challenge looming was immense. The PR and Stakeholder Management Team (PRSM) had two major responsibilities, one was to get the Public Relations activities mooted and going and the second was to get buy-in from the stakeholders so that the job is completed within time and cost. Time and cost were the KPIs being pursued by every department right down to individuals, including PRSM. The Stakeholder Management team rose to the challenge, into swift action with an exceptionally detailed engagement plan involving the public, communities, politicians, media, building owners, tenants and business operators. A Scientific and Systematic approach to Engagement was adopted with the underlying philosophy of "Caring and Making a Difference", embraced at all levels right from the start of the project. Community Engagements at MGKT are based on these three Cs: Care, Compassion and Consideration. The three Cs were infused into the three main branches which formed the basis of our Community Engagement: Social and Community Outreach, Capacity Building and Building Trust with Transparency. In this session the speaker will outline the detailed preparation that went into outlining the PR and Stakeholder Management Plan including the tools that were used in managing and dealing with the public.

## Sustainability and the Communication with Stakeholder Engagement

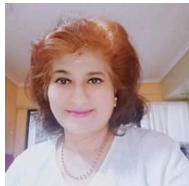
### Abstract:

As a government-funded infrastructure megaproject, the Project is high on public news radar. This, coupled with the inherently high-risk nature of geotechnical construction projects, especially since we're mining under live utilities, traffic and buildings, would mean that the biggest local sensitivity issue is in ensuring public safety and protection of existing structures, the failure of which would seriously jeopardize the organization's credibility and future.

Some of the station sites are situated close to existing railway lines, highways, important tourist hubs and commercial centers, for which any downtime may incur penalty from local authorities and lead to significant financial losses. Tunnelling in limestone, particularly in Extreme V karstic type identified in parts of our alignment, can lead to major sinkholes and TBM blowouts. While a risk-based strategy has been developed to mitigate these effects, sinkholes do occur and no effort has been spared to rectify the situation and reinstate public spaces.

The Project has also brought about massive disruption and public inconvenience due to the traffic diversions, construction works happening 24/7 and environmental pollution generated. This further aggravates public perception towards construction and contractors, which previously was usually stereotyped as prioritizing profit over public welfare. To overcome stakeholders of the NIMBY camp and assuage those directly affected, it is crucial that we demonstrate our commitment and establish trust and transparency from the get-go. Apart from implementing internationally recognized construction SHE and QAQC best practices, we also strive to strategically enhance builder to public relationships via various approaches. With these I mind, the stakeholder team took on a very open and transparent approach to managing stakeholders. In this session, the speaker recounts her experience using specific case studies demonstrating granularity in planning "which greatly eased and facilitated the overall project delivery and organization's performance.

### Speaker:



**Dr Bhavani Krishna** graduated with PhD from UIAM. She has been Public Relations and Stakeholder Management portfolio since 2001 and has seen through major infrastructure projects in Klang Valley. She has been involved in MRT Line 1 and Line 2 with extensive experience in strategic public relations and stakeholder management for MMC Gamuda liaising with project owner, media and stakeholders and the general public to create sustainable relationship and rapport during the construction phase. Her tactical approach combined with empathetic ways in dealing with people has seen the project through during challenging times.

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## Rock Mass Classification and Site Application in Tunnelling

### Abstract:

Quantifying rock mass quality for engineering design of structures in or on rocks is a common practice worldwide. This lecture will cover on the classifying the rock mass for tunnel support requirement based on Rock Mass Rating (RMR) and Q-System.

It also will provide a case history of the use of rock mass classification for the determination of tunnel primary support in the construction of Lawari Rail Tunnel (LRT), now Modified Road Tunnel (MRT), a road tunnel in Pakistan. As per the earlier plan, a rail tunnel was proposed with small cross sectional area called LRT with a cross-section of 63m<sup>2</sup> (excavation of this part has been performed by drill and blast method during the years 1975 to 1978), but later, after the completion of excavation work, using the same tunnel for trade with the Central Asia, enlargement of the tunnel was decided for two-way traffic called MRT.

### Speaker:



**Ir. Dr Rini Asnida Abdullah** is Senior Lecturer at School of Civil Engineering, Faculty of Engineering, Universiti Teknologi Malaysia (UTM), and also Manager for Academic Leadership and Professional Development, UTM Lead, UTM. She is currently a Secretary-General of the ISRM Malaysia National Group and Co-Opt Member of Tunneling and Underground Space Technical Division (TUSTD) of Institute of Engineers Malaysia (IEM). She obtained her Bachelor and Master degree in Geotechnics from UTM. And she received her PhD degree in Rock Mechanics from University of Leeds, United Kingdom in 2012. Before joining the UTM as the academic staff in 2003, she has 3 years working experience with the Minconsult Sdn. Bhd. and Public Work Department. She has been supervising Ph.D. Master students, while published in the peer-reviewed domestic and international journal articles, including the conference presentations. Her research interests include rock mass classification, rock slope modelling, rock fractures and fragmentation, underground excavation and blasting. Her contribution in the rock mechanics field has been recognized twice in the Asian Rock Mechanics Symposium as one of the award recipients, from the International Society of Rock Mechanics (ISRM). She served as an editor board member of Journal of Geotechnical Engineering and Jurnal Teknologi (Special Issue).

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## Tunnelling in Soft Ground: Principle for Design and Analysis

### Abstract:

Modelling of tunnel can often be accommodated in tunnel design to help predict real tunnel behaviour. Investigate the tunnel response is critical as it affects the overall ground surrounding behaviour. Modelling also used to optimise the design of lining, lead to cost effective and increase safety design. It is also important tools as one can use for design back analysis during construction and for design validation. In tunnel design, it is important to understand the development of geomechanical model, structural model, calculation and simulations. One also needs to wisely choose select appropriate type of model, parameters and to decide between a 2D or 3D model analyses. It is important as to ensure quality of work delivered. At the end of modelling, one can reduce and in the same time integrate risk and construction management as well as to plan any contingency and emergency conditions. By considering behaviour of the segment tunnel joints (can affect the integrity of tunnel in both circumference and longitudinal directions), the surface settlement trough were investigated in more certainty. A soil-tunnel simulation model was developed using ABAQUS with various segment joint parametric models with the use of flexible segment joints that allow movement (hinge-nonlinear model) in staggered ring tunnel model, the ground deformation depicted higher resemblance of surface settlement pattern to the field data. Steady state settlement was observed after 10m of cutter head distance.

Speaker:



**Dr Siti Norafida** is a Senior Lecturer at Department of Geotechnics and Transportation, School of Civil Engineering, Universiti Teknologi Malaysia. She graduated with B Eng (Civil) and M Eng (Geotechnics) from UTM, Malaysia. Her Phd thesis entitles, Performance of Precast Bolted Tunnel Lining Through Physical and Numerical Modelling. It covers the soft ground and soil-tunnel interaction study. Her research interest focuses on soil-structure interaction, soft soil, tunnel, earth dam analysis, foundation, geo-environment, ground improvement, site investigation and any geotechnics and civil engineering field. Her biggest interest is finite element modelling in geotechnics although there also laboratory testing available. Her current research project is involving tunnel in soft soil and rock both in laboratory and numerical modeling.

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## Distributed Fiber Optic Sensors for the Monitoring of a Tunnel

Abstract:

Over the years, technology advancements have led to various innovations of instrumentation for civil and geotechnical infrastructures. Recently, several field studies have adopted distributed optical fibre strain sensors to monitor structural behaviour of tunnels.

Specifically, Brillouin Optical Time-Domain Reflectometry or Analysis (BOTDR/A) is used to measure strain and temperature continuously at every centimetre along the whole length of an optical cable sensor of kilometres long. When embedded in tunnel lining or attached on the tunnel support system, one can obtain the circumference and longitudinal movement as well as detect location of joint-cracking. Methods of installation, measurement methods, cable protection, data interpretation are discussed. Several case studies are presented to exemplified the tunnel lining monitoring with BOTDR/A and lessons learned

Speaker:



**Ir. Assoc. Prof. Dr Hisham Mohamad** is an Associate Professor at Civil & Environmental Engineering Department, Universiti Teknologi PETRONAS. Hisham specializes in the area of Geotechnical Engineering and an expert in fibre-optic distributed sensing.

Some of his notable involvements of construction monitoring projects using innovative fibre-optic sensing include monitoring tunnel deformation at London King's Cross and Singapore's Mass Rapid Transport (MRT) Circle Line. In 2013, Hisham joined Geotechnics Division, Ministry of Mobility and Public Works in Belgium for a year and was involved in monitoring ground excavation and construction project of the world's largest shipping lock in Antwerp.

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## In Pursuit of an Autonomous Tunnelling

Abstract:

Our Autonomous TBM system has given TBMs unprecedented capabilities to drive themselves with minimal human input. We saw an opportunity to innovate and disrupt traditional tunnelling processes with the introduction of Artificial Intelligence algorithms to control and operate various sub-systems on our TBMs. The algorithms were developed, tested and

Speaker:



**Mr. Justin Chin** graduated with a master's degree in Civil & Environmental Engineering from Imperial College London. He has 7 years' experience in the field of bored tunnelling and is currently the Acting General Manager for tunnelling works on the KVMRT Line 2 Project in Kuala Lumpur managing the tunnelling operations for the 16 tunnel drives on the project. He has previously worked on KVMRT Line 1 and his experience includes mined tunnels and micro-tunnelling / pipe jacking. Justin also leads Gamuda's R&D initiatives for tunnelling including the development of the world's first Autonomous TBM.

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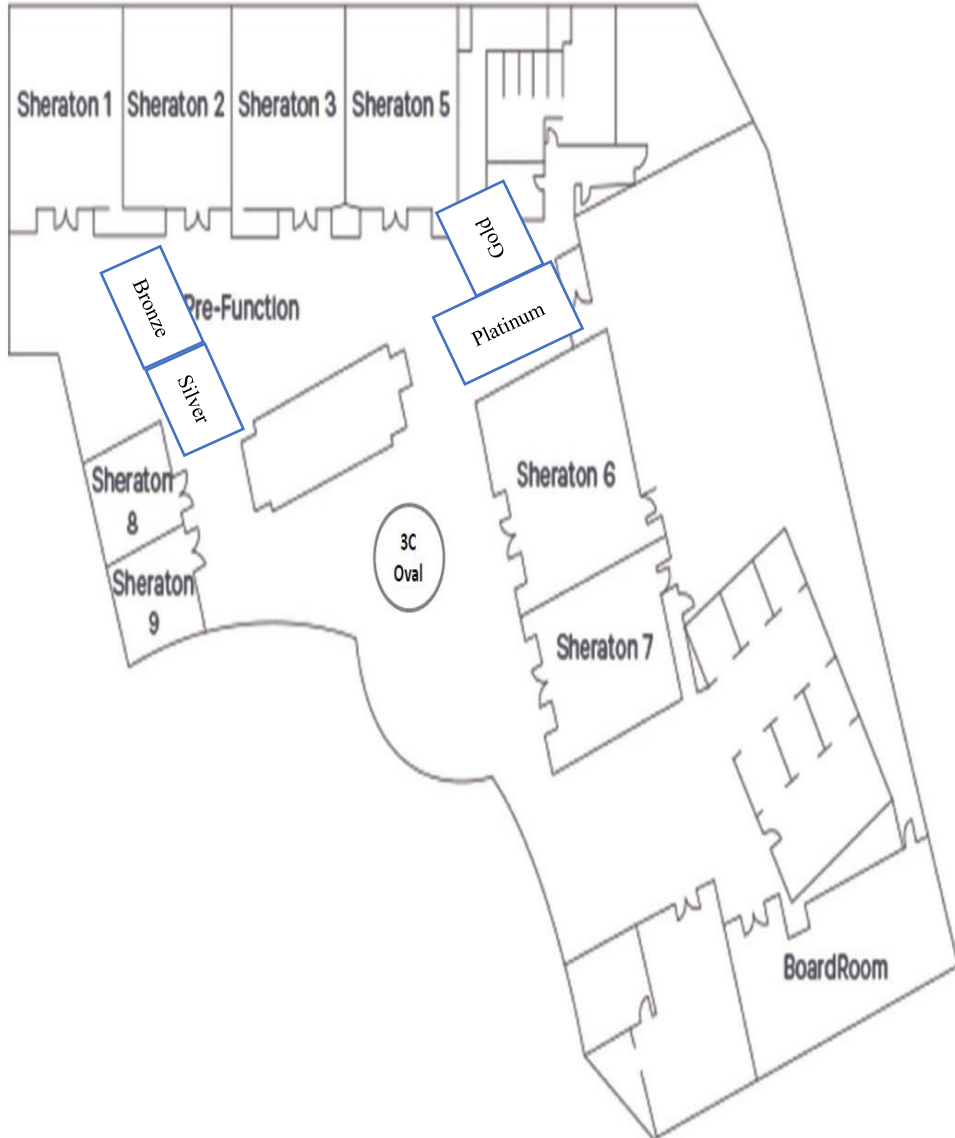
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