

Tunnelling & Underground Space Development in Malaysia



Photo 1: TBM breakthrough at KVMRT Maluri Station in April 2014 (Picture courtesy of Ir. CK Lee)



By Ir. Dr. Ooi Teik Aun

Ir. Dr. Ooi Teik Aun is the Founder Chairman of the IEM Tunnelling and Underground Space Technical Division and an Organizing Chairman of the International Conference & Exhibition 2015 (ICETUS2015). He is also the current Chairman of Dispute Resolution Practice (DRP) Subcommittee. He is an Advisor for Consulting Engineering Special Interest Group (CESIG). Ir. Dr. Ooi is an Honorary Fellow of IEM, Fellow of the Malaysian Institute of Arbitrators and Past President and is ICE Country Representative for Malaysia. He is currently the Chairman of Dispute Resolution Practice (DRP) Sub-committee and an Advisor for Consulting Engineering Special Interest Group (CESIG). Ir. Dr. Ooi is an Honorary Fellow of IEM, Fellow of the Malaysian Institute of Arbitrators, Past President, the ICE Country Representative for Malaysia and the President of Southeast Asia Geotechnical Society (2010-2016).

The development of tunnels and underground space in Malaysia has been slow due, perhaps, to the geology of Kuala Lumpur and the lack of know-how and confidence among the construction industry in tackling the problems presented by the Kuala Lumpur Limestone Formation.

But with the rapid development of tunnelling and ground improvement technologies in the last 30 years, this is set to change, especially with the active participation of the International Tunnelling Association (ITA) and the implementation of Line 1 of the Klang Valley Mass Rapid Transit (KVMRT) in 2012.

In July 1994, the Institution of Engineers, Malaysia (IEM) organised an International Conference cum Exhibition on Trenchless Construction – Towards Trenchless Cities. In February 2000, IEM also organised a seminar on Design, Construction, Operation And Other Aspects Of Tunnels. Prior to the seminar, the ITA held its executive committee meeting in Petaling Jaya, Selangor.

With the encouragement of ITA, the Tunnelling and Underground Space Technical Division (TUSTD) of IEM was

formed at the seminar and inaugurated in 2001 with the objective to undertake activities related to the promotion and advancement of the science and engineering of tunnels and underground space technologies. IEM TUSTD becomes a country member of ITA representing Malaysia. The first and second International Conference and Exhibition on Tunnelling and Trenchless Technology were held in Malaysia in 2006 and 2011 respectively.

In 2003, construction of The Stormwater Management And Road Tunnel (SMART) in Kuala Lumpur, started. The storm drainage and road structure was aimed at solving the problems of repeated flooding and traffic congestion in the business district of the city. The 9.7km tunnel is the longest stormwater tunnel in South East Asia and the second longest in Asia.

At the 2006 Conference, a special session was dedicated to papers from the SMART project which won the British Construction Industry International Award in 2008. In 2011, the SMART project received the UN Habitat Scroll of Honour Award for its innovative and unique management of storm water and peak hour traffic.

This year, IEM will again organise the third conference and exhibition on Tunnelling and Underground Space on 3rd - 5th March at Dorsett Grand Subang Hotel, Subang Jaya, Selangor. This event coincides with the development of the massive Klang Valley Mass Rapid Transit (KVMRT) Line 1. Currently at construction stage, it is expected to be in an advanced stage of completion this year.

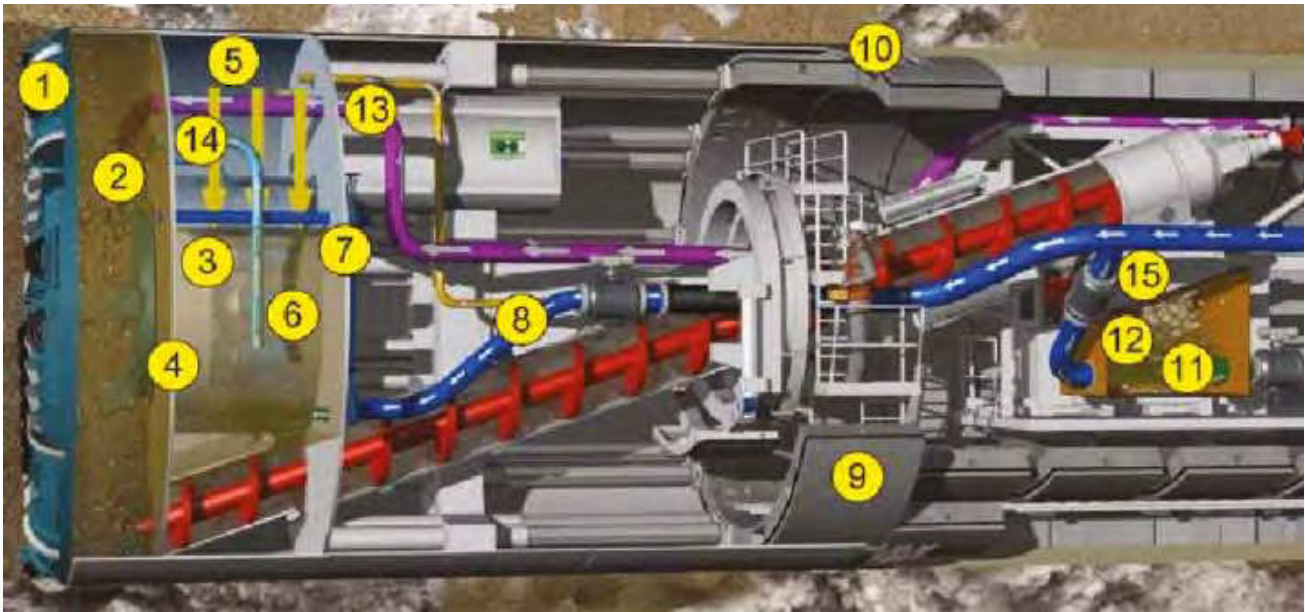


Figure 1: VDTBM components (after Klados et al., 2015)

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|------------------------|--------------------|----------------------------|
| 1. Cutting wheel | 6. Working chamber | 11. Slurry line |
| 2. Excavation chamber | 7. Bulkhead | 12. Slurryfier box |
| 3. Face support medium | 8. Feedline (LDSM) | 13. Suspension line (HDSM) |
| 4. Submerged wall | 9. Segment | 14. Communication pipes |
| 5. Air bubble | 10. Tailskin | 15. Rotary crusher |

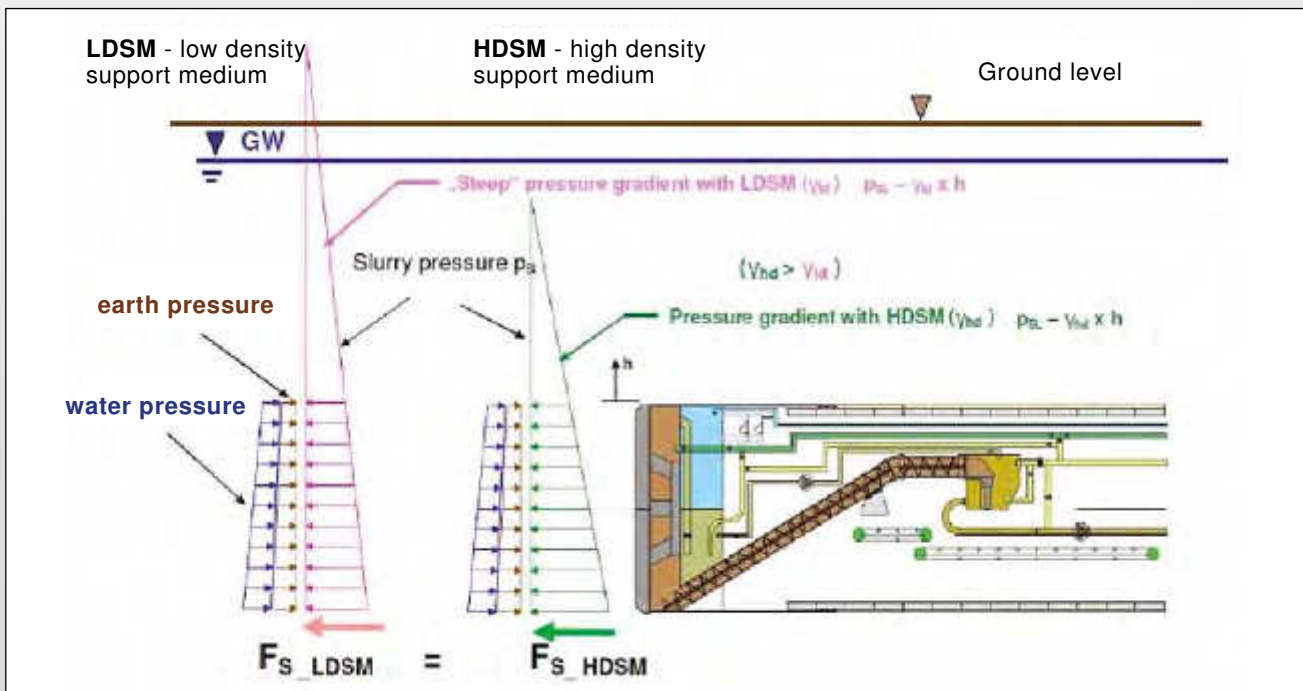


Figure 2: Effect of variation of support medium density (after Klados et al., 2015)



IEM 56th Annual Dinner and Awards Night 2015 Programme Book



We are pleased to inform that IEM will be holding the 56th Annual Dinner and Awards Night 2015 on **18 April 2015**. Dimension Publishing has been appointed to put together the Annual Dinner Programme Book which will be circulated to all **1,200 guests** on that night at **Sime Darby Convention Centre**.

It is an annual event organised by IEM to present awards to winners of projects and at the same time to announce the new committee for year 2015/16. Special guests of honour will be invited to officiate the event.

We are now calling for interested advertisers to book their preferred advertising position in this programme book. Below please find the advertising rates for your immediate action and reply. We hope to hear from you soon before the closing date on **16 March 2015**.

Book Size	:	210mm(W) x 285mm(H). Please provide extra 6mm for bleed area on all 4 sides
Printing Specifications	:	230gsm art card (Cover), 105gsm art paper (Text), 4C + 4C, Staple binding, UV varnish on Cover
Quantity	:	1,200 copies
Advertisement Format	:	High resolution PDF file, with crop marks, bleed area, text being outlined
Deadlines	:	16 March 2015 (Mon) (Ad Booking) 23 March 2015 (Mon) (Artwork Submission)

Kindly tick in the relevant bracket. IEM reserves the right to edit, revise or reject any advertisement deemed unsuitable or inappropriate. The final print-ready artwork to be furnished by advertisers.

SPECIFIED POSITION	PRICE PER INSERTION (RM)	I WISH TO BOOK (Please tick)	ADDITIONAL BENEFITS
Outside Back Cover (OBC)	4,000	()	Company logo will be appeared in the Acknowledgement Page in both IEM Dinner Programme Book (1,200 copies) and JURUTERA May 2015 (30,000 copies)
Inside Front Cover (IFC)	3,500	()	
Inside Back Cover (IBC)	3,200	()	
Page 1	3,000	()	
Facing Chairman's Message	2,800	()	
Facing President's Message	2,800	()	
Facing Past Presidents List	2,800	()	
Run-On-Page (ROP)	1,900	()	
Double Page Spread (DPS)	4,500	()	

Remarks:

- Space availability is subject to booking on first-come-first-served basis
- Advertising rate is subject to 6% GST. Please take note that the advertising rates shown above exclude the 6% GST
- Prices shown above exclude 15% Advertising Agency commission
- Any cancellation after signing the Advertising Contract shall result in a 50% penalty charge
- Payment term: 14 days upon invoicing

Name of Company:

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Date:

KVMRT Line 2 is currently in the detailed design stage for the elevated sections and construction work is expected to start in 2016, while the underground section is in tender stage. The conference will have 1 Opening Keynote Lecture, 3 Keynote Lectures, 5 Special Lectures, 1 Special Technical Session for KVMRT papers and other Technical Sessions consisting of 20 Technical Papers. The conference is endorsed by the International Tunnelling and Underground Space Association (ITA) and supported by Construction Industry Development Malaysia (CIDB), Mass Rapid Transit Corporation Sdn. Bhd. (MRT Corp) and The Institution of Civil Engineers (ICE), UK. It is sponsored by Gamuda Berhad, China Railway Engineering Corporation, Herrenknecht Asia Headquarters Pte. Ltd. and Sepakat Setia Perunding Sdn. Bhd.

Tunnelling activity is increasing all over the world and the last three decades have seen great advances being made in the construction of tunnels for various purposes. Malaysia is no exception, starting from the days of railway tunnels back in the 1900s. Tunnelling activity has been steadily increasing and tunnels are associated with water

supply and power generation from the 1960s. From 1970s, roads and highway tunnels were built.

By and large, these tunnels were constructed using drill and blast method. The use of TBMs in Malaysia started with the Sungei Kelinchi water transfer tunnel project in 1995 in Negeri Sembilan. The TBMs were also used in the 1990s in the Kuala Lumpur LRT tunnel construction and in sewerage projects in Kuala Lumpur.

With the experience gained in the innovative use of EPB Shield TBM technique in the SMART project to overcome the treacherous Kuala Lumpur Limestone Formation, the project team made further advances in TBM technology in the KVMRT project by using the Variable Density TBM (VDTBM).

It is understood that this innovation is the first in the world. The mixed tunnel face is characterised by the simultaneous presence of soft soil and intact or fractured rock within the excavated cross-section. Excavations are carried out in karstic ground where fractured rock or mixed face conditions are often encountered in KVMRT. ■

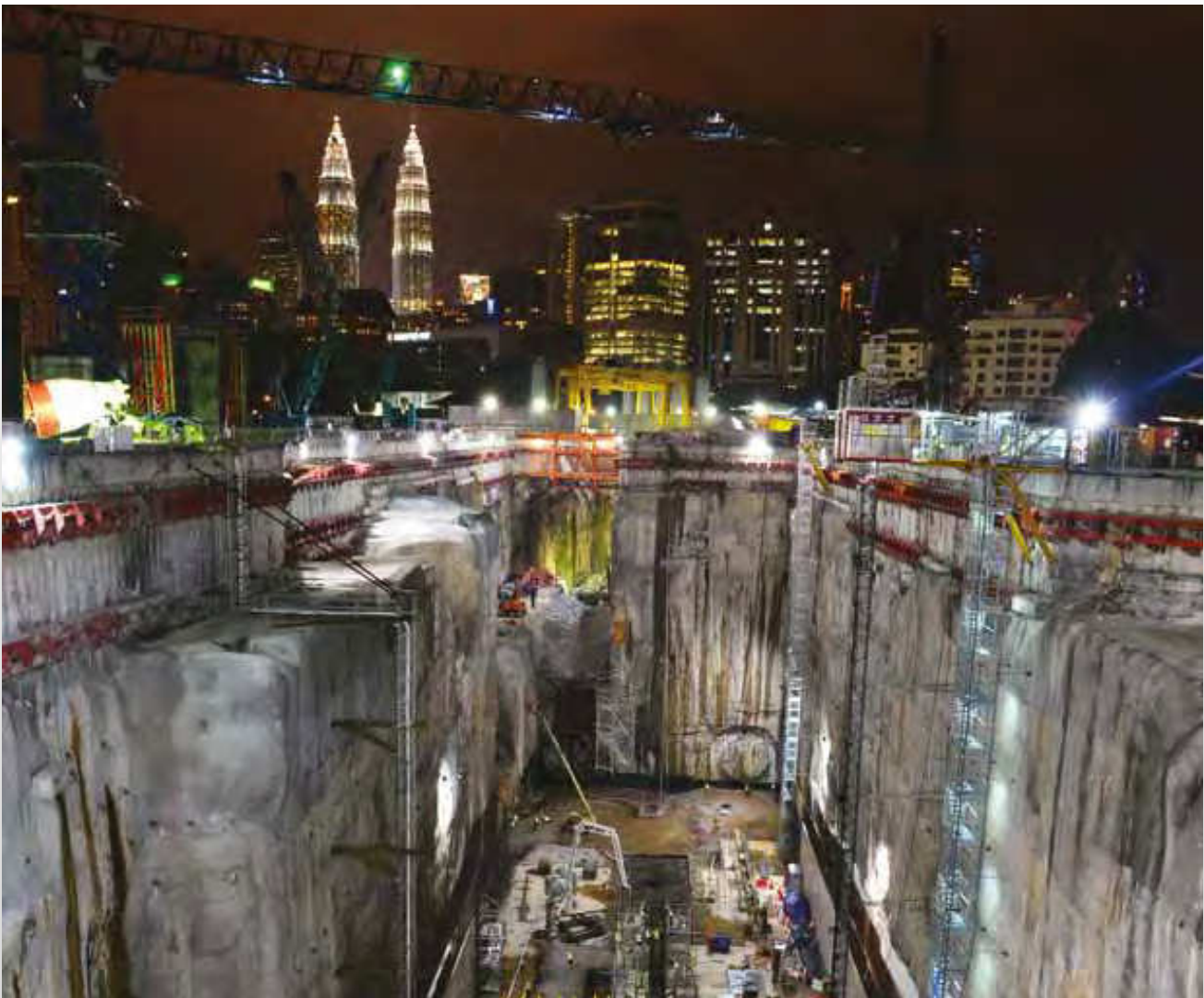


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