

# AN INSPIRATION TO YOUNG ENGINEERS

Ir. Dr Ooi Teik Aun has garnered a string of achievements and accolades in five decades of his career. His commitment to lifelong learning and knowledge-sharing is nothing short of inspirational.



For his excellent contribution to the pool of knowledge, Ir. Dr Ooi Teik Aun was awarded the coveted Tan Sri Ir. Hj. Yusoff Prize 2019 from IEM in April. The award is the highest recognition for outstanding technical papers on engineering contributed by corporate members of IEM in the civil engineering discipline.

Ir. Dr Ooi's winning paper, titled The Present & Future Sustainable Use of Underground Space in Malaysia, contains his detailed research findings, expert opinions and assessments for the advancement of Malaysia's Sustainable Tunnelling & Underground Space Development.

Knowledge-sharing has always been a priority for Ir. Dr Ooi, who now helms the IEM Training Centre Sdn. Bhd. and IEM Academy Sdn. Bhd. He finds deep satisfaction in imparting knowledge and grooming young engineers into professionals with the necessary skills, exposure and attitude. He says integrity is one of the most important traits a professional must have.

"You can be the best engineer but if you don't have integrity and you place money above everything else to the point of jeopardising your honour, then you will lose your self-respect," he says, adding that everyone should embrace lifelong learning as knowledge is wealth beyond money and other material things.

"When we use knowledge in the proper direction and have the right attitude, money will come," adds Ir. Dr Ooi, who started his career more than 5 decades ago. He has held numerous positions in various professional bodies in the field of his expertise, such as Founder Chairman of Tunnelling & Underground Space Development under the ambit of IEM's Tunnelling & Underground Space Technical Division (TUSTD).

## KEY FIGURE IN AWARD-WINNING PROJECT

Among his most notable achievements was his major involvement in the elaborate design of the SMART project in Kuala Lumpur nearly 2 decades ago, with the use of the innovative Variable Density Tunnel Boring Machine (VDTBM) in the Klang Valley MRT project. The project won several international awards, including the British Construction Industry International Award (2008) and the UN Habitat Scroll of Honour Award (2011) for its innovative and unique management of stormwater and peak hour traffic.

The United Nations hailed it as one of the most innovative projects in the world for an urban issue, while CNN listed the SMART Project as one of the world's Top 10 greatest tunnels that could prevent billions of dollars in potential flood damage and costs from traffic congestion in the city centre.

Ir. Dr Ooi says the SMART Tunnel also gained the respect of the tunnelling fraternity around the world as it broke new ground, not only in Malaysia but also worldwide, by combining the functions of stormwater drainage and motorway tunnel. Stretching 9.7km, SMART Tunnel is the longest tunnel in South-East Asia and the second longest in Asia. Constructed using a slurry shield Tunnel Boring Machine (TBM), it is also among the largest diameter tunnels in the world, with a diameter of 13.2m.

"The Variable Density TBM tunnelling was 'reinvented' in Malaysia, whereby all conservative rules were broken," says Ir. Dr Ooi, who is noted for having the right skills and expertise to take tunnelling to the next level in innovation technology.

## WHAT YOUNG ENGINEERS SHOULD LOOK OUT FOR

Ir. Dr Ooi says tunnelling and underground space development in the likes of MRT works will go on for a long time. He emphasises that a developed country must have MRT transportation networks, without which it is considered underdeveloped. As urban centres become more and more crowded, MRT transportation networks are necessary to move people quickly and efficiently. This sector of transportation as well as tunnelling and underground space development also opens up many job opportunities for the engineering and construction sector. He advises young engineers to look at the potential of this sector and to seek not only opportunities and prospects but also mentors from whom they can learn and get guidance.

"In theory, tunnelling and underground space development is a lifelong employment. Fresh graduates should learn from good mentors and learn the right skills in investigation, design and construction supervision. Money is important but this should take second place for a fresh graduate, who must be orientated to have good professional ethics in the formative years. His integrity and service for the protection of public interest must be entrenched at this stage. In the long term, the blue ocean is yours. Get all the professional memberships which will give you a passport to the global market," he adds.

Engineering undergraduates and young engineers who join IEM can gain from its training and development programmes. Ir. Dr Ooi says that IEM, through the IEM Academy, has signed an MoU to organise the Master of Civil Engineering degree with specialisation in Tunnelling & Underground Space. In addition, IEM TUSTD will continue with IEM Academy to hold tunnelling conferences, talks, seminars and workshops.

"Civil and Structural Engineers will always be required in each and every project. The demand may be cyclical, depending on the economy as well as supply and demand. At present, the building sector is in an oversupply situation. Nevertheless opportunities, while challenging, will still be there. Malaysia is expected to achieve developed status by 2025. The growth will be slow and more opportunities will be

available in Maintenance Engineering/Asset Management,” he says, adding that it is important for engineers to keep themselves updated and to make it a point to attend educational events such as talks and lectures.

At the third Ir. Chiam Teong Tee Memorial Lecture held in March this year, Academician Dato’ Ir. Prof. Dr Chuah Hean Teik gave a lecture on *Developing Engineering Workforce, Designing A Better Future*, which focused on trends and challenges the world was facing, with the coming of the new Digital Revolution or 4th Industrial Revolution (4IR). These include urbanisation and inequality in wealth distribution, clean air and clean water, food distribution, energy, global warming, climate change, ageing population and physical-space and cyber-space security. Dato’ Ir. Prof. Dr Chuah also touched on challenges that future engineers will face, vis-à-vis globalisation and mobility and the skills young graduates should acquire to overcome these challenges as well as issues and challenges for STEM education in Malaysia.

“To tackle the challenges, one requires new ideas and inventions which will only be possible with excellent knowledge workers. New technological breakthroughs will require brand new skill sets, particularly Science, Technology, Engineering & Mathematics (STEM) skill sets, in the engineering workforce. A good engineering workforce (engineer, engineering technologist and engineering technician) is considered the driver for success in this globalised world,” says Ir. Dr Ooi.

“What is important now is for universities to produce graduates who can embrace lifelong learning and possess strong basic fundamentals of natural sciences and engineering, and who are ready to evolve rather than graduates who are just ready-to-market as many will be entering a whole new sea of employment,” he says, emphasising that it is important to deal with the mobility of the engineering workforce globally and to look at how IEM can work with the institutions of higher learning and the Ministry of Education. “Let us look forward to having locally trained graduates with a global employment outlook and benchmark with the global best.”

To gain international acceptance, Ir. Dr Ooi says the initiative must come from young engineers themselves. “In my opinion, young graduates must plan to sit for MIEM and CEng MICE for Civil Engineers within the first five years after graduation. For each year of delay, it will become progressively more difficult to achieve these qualifications,” he says.

## IMPORTANCE OF MENTORS

According to Ir. Dr Ooi, it is an advantage for young engineers to have mentors to help them develop their careers. “Mentoring is important as I myself can testify. I would not be where I am today without mentors who helped guide me in my early career development,” he says.

He names nine mentors. The first was the late **Prof. P.W. Taylor**, a Professor in Geotechnical Engineering and later Dean of School of Engineering, Auckland University, New Zealand, who put him on the right path for research and development work, paper writing and getting papers published, including internationally.

Next was the late **Ir. Thean Lip Thong**, Director-General of PWD (1971-1974), President IEM (1964-1966), Director Perunding SSP (1974-1988) and Founder of the IEM Thean Lip Tong Scholarship (from 1989). Ir. Thean regarded Ir. Dr Ooi’s assessments of two incidences – Bukit Gasing Development landslide in Petaling Jaya and the collapse of a low-level bridge in Temerloh in 1970 – as highly credible and accepted them as expert witness reports. He also picked Ir. Dr Ooi to attend the 3rd Southeast Asian Geotechnical Society (SEAGS) conference in Hong Kong in November 1972, which opened up opportunities to network with fellow engineers in the same field of interest.

His other mentors are:

The late **Tan Sri Datuk Ir. Prof. Dr Chin Fung Kee**, who had a long list of achievements and contributions, including being the honorary consultant to the Malaysian Government on numerous engineering problems and projects. He appointed Ir. Dr Ooi as Honorary Secretary to the 4th SEAGS and shaped both his

career path and higher academic achievements to reach the doctorate level.

**Ir. Dr Ting Wen Hui**, who held various positions including Superintendent Engineer, Research and Laboratory, PWD, and IEM President (1995/97). Both Ir. Dr Ooi and Ir. Dr Ting co-authored numerous papers on Geotechnical Engineering. Ir. Dr Ting made an impact on Ir. Dr Ooi's life, both professionally and academically.

The late **Tan Sri Datuk Ir. Mahfoz bin Khalid**, Director-General of PWD (1977) and President of IEM (1977), had a close relationship with Ir. Dr Ooi and was responsible for him pursuing a PhD degree overseas.

The late **Dato' Ir. Mustafa b. Ahmad**, Director-General of Malaysian Highway Authority (1980 - 1992) and the President of IEM (1990/1992) opened many doors for Ir. Dr Ooi in

The late **Prof. Thomas Hamilton Hanna**, Professor and Head of Civil & Structural Engineering at University of Sheffield, United Kingdom, was a dear friend who lent a shoulder for Ir. Dr Ooi's trials and tribulations.

The late **Ir. Chiam Teong Tee**, lecturer and later Dean of Engineering Department, University Malaya (1973 - 1976), President of IEM (1981/1982) and Founder of Perunding Bakti Sdn Bhd in 1976. Ir. Dr Ooi credits him for his initial involvement in a big arbitration case and for sharing knowledge on arbitration and dispute resolution.

**Prof. Bala Subramaniam**, Professor of Geotechnical Engineering, Asian Institute of Technology, Bangkok, who also sits on the SEAGS Executive Committee and the Editorial Board of *Geotechnical Engineering Journal*. He and Ir. Dr Ooi had been President of SEAGS and knew each other since 1975. Prof. Bala had always been there to help Ir. Dr Ooi in his times of need.

## LOOKING BACK WITH REGRETS

Ir. Dr Ooi's life is not one without regrets. If he could turn back the clock, he said, he would not have left PWD because serving the government meant opportunities to serve the people, to get first-hand knowledge of government developmental plans for the nation and to make an impact on the people's wellbeing.

He explains: "My greatest regret was leaving PWD in 1982. I was Superintendent of Laboratory & Research in the Design & Research Branch of PWD. I often tell people that during my time, Class 1 Engineers were those in Government Service. They had the authority and everyone wanted to see them. Class 2 Engineers were engineering consultants who had secured jobs from Government contracts but were subservient to Class 1 Engineers. Class 3 Engineers worked as contractors or served contracting organisations. In turn, they were subservient to Class 1 and Class 2 Engineers.

"In today's context, Class 3 Engineers can obtain jobs from Class 1 Engineers and employ Class 2 Engineers to work for them. Roles have been swapped. This means engineers in consulting practice have become Class 3 Engineers. Class 1 Engineers have a greater role to play in shaping the country and changing the livelihood of the people. Fortunately, I am always friendly with everyone. Those in the industry still regard me as a geotechnical expert, as if I have not left PWD. When Highland Tower Condominium collapsed in December 1993, I was invited to serve on the Technical Committee Independent Investigation team of the Ampang Jaya Municipal Council Commission of Enquiry. At that time, I had already left PWD for 10 years but I still played a key role in that independent voluntary service," he says.

## TO SERVE WITH INTEGRITY

In the public service, integrity is a must and Ir. Dr Ooi stresses that without it, society and even the nation will collapse. He says: "In Malaysia or anywhere in the world, mega infrastructure projects are usually driven by politicians in power. It is believed that rampant corruption brings about kleptocracy, a term to describe a government ruled by corrupt politicians who use their political power to receive kickbacks, bribes and special favours at the expense of the populace."

He adds that kleptocrats may use political leverage to pass laws which enrich them or their constituents and they usually circumvent the rule of law. Situations can get very bad, requiring the government to cut and suspend infrastructure projects,

as well as impose contract price reductions. Professionalism and ethics of protection of public interest have been called to question.

"Unfair prices topped up by greedy politicians and unscrupulous contractors will inflate the tender price for private interest at the expense of public interest. The rot must stop in order to allow the country to progress and to achieve developed nation status. Professional engineers must uphold their ethics. People must reject kleptocracy for the sake of public interest," he says.

In relation to the protection of public interest, he reveals that the International Tunnelling & Underground Space Association (ITA-AITES), in collaboration with FIDIC, is preparing the Emerald Book for Tunnelling & Underground Space Works, due for publication at the World Tunnel Congress 2019 (WTC 2019) in Naples, Italy on 2-8 May, 2019.

"I have suggested to the drafting committee of the ITA ExCo (Executive Council) to include an exclusion clause in the Conditions of Contract contained in the Emerald Book to outlaw any clause of the contract document which is in conflict with the protection of public interest. A professional engineer who prepares the contract document for mega infrastructure project is duty-bound to protect public interest as spelt out in his professional conduct and ethics," he says.

Through his involvement in such professional associations, Ir. Dr Ooi continues to play his part in highlighting issues and influencing decisions in areas that matter, particularly those concerning public interest protection.

"We can be successful in everything we pursue, provided we have certain sets of discipline, such as having integrity, being prudent in our spending and having wisdom when making investments for our future," he says.

## WORLD TUNNELLING CONGRESS (WTC) 2020

Ir. Dr Ooi says his latest achievements are bringing the World Tunnelling Congress (WTC) 2020 and the 46th General Assembly to Malaysia through IEM for the first time in 46 years since the founding of the International Tunnelling & Underground Space Development Association (ITA-AITES). The event is held annually and member nations wishing to play host can bid for it three years in advance. At the WTC 2018 General Assembly, ITA had 75 Member Nations and 300 corporate/individual Affiliate Members.

"IEM TUSTD was formed in February 2000 and I became the founder Chairman. It was endorsed as the 50th Member Nation of ITA at the General Assembly in Durban in May 2000. By hosting WTC 2020 in Malaysia, IEM has achieved Global Engineering Player status, especially in the emerging market of tunnelling & underground space. Furthermore, Malaysia is acknowledged by the tunnelling world as the most innovative Member Nation and has won many awards," says Ir. Dr Ooi.

IEM TUSTD has systematically organised International Conferences & Exhibitions in Tunnels & Underground Space (ICETUS) to record the significant stages of the development such as ICETUS 2006, ICETUS 2011, ICETUS 2015, SEACETUS 2017, SEASET 2018 and WTC 2020. IEM TUSTD has also held evening talks, short courses, workshops and seminars.

Ir. Dr Ooi and the WTC 2020 organising committee have specific deliverables to achieve. "We aim to hit the target of more than 2,000 participants, which will be the biggest historical recorded number of participants from all over the world. We also want to get the largest number of exhibitors in the history of WTCs with a target of 200 booths. In addition, we want the best keynote lectures to be delivered by invited professionals," he says.

The professionals are Prof. Charles Ng, Chair Professor of Civil & Environmental Engineering, The Hong Kong University of Science & Technology and President of International Society of Soil Mechanics & Geotechnical Engineering (ISSMGE), Prof. Chung Sik Yoo, Professor of Civil & Environmental Engineering at Sungkyunkwan University in South Korea and President of International Geosynthetic Society (IGS), Er. Seng Tiok Poh, Planning and Design Director for Mass Rapid Transit Corporation (MRTC), Malaysia, and Prof. HeHua Zhu, Distinguished Professor in Geotechnical Engineering of Tongji University, Changjiang Scholar Chair Professor of China, Director of Engineering Research Center of Information Technology in Civil Engineering of the Ministry of Education of China.

Ir. Dr Ooi adds that the MuirWood Lecture will be decided by the ITA Council and the WTC 2020 committee expects to receive paper contributions of more than 500, which will add to the existing wealth of knowledge.

## WALKING THE TALK

What's next for Ir. Dr Ooi? Despite his tight schedule, the 78-year-old has another "big job" in the pipeline. He is writing a book. This comprehensive account of his life will include stories about people who have helped shape him into what he is today, from close family members to professionals in the engineering fraternity. Through this book, which will be self-published before the end of the year, Ir. Dr Ooi shares personal stories, peppered with the rags-to-riches family history, his setbacks and achievements and his principles and outlook in life. He is also imparting his knowledge in engineering by including many papers which contain his research findings, opinions and assessments in his areas of expertise.

"I hope to inspire the young generation and tell them the route I have taken in my professional journey as well as the principles that I hold dear in discharging my duties and responsibilities. I believe in mentorship and, while I would love to become mentor to every young engineer I meet, I know that's beyond my capacity so I hope this book can do that and reach out to as many young engineers and aspiring engineers as possible," he says.

With his roles in the educational arms of IEM to help develop both young talents and professionals in engineering, Ir. Dr Ooi walks the talk, driven by his belief in lifelong learning not only for others but also for himself, as well as his love to continuously impart knowledge and serve the community. ■

## Profile

*A pioneer in geotechnical engineering, Ir. Dr Ooi Teik Aun is Director of IEM Training Centre Sdn. Bhd. and IEM Academy Sdn. Bhd., practising Consulting Engineer, Arbitrator and an Adjudicator. He is the Organising Chairman of World Tunnelling Congress (WTC) 2020 and Executive Council Member of the International Tunnelling & Underground Space Association (ITA).*