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The Institution of Engineers, Malaysia

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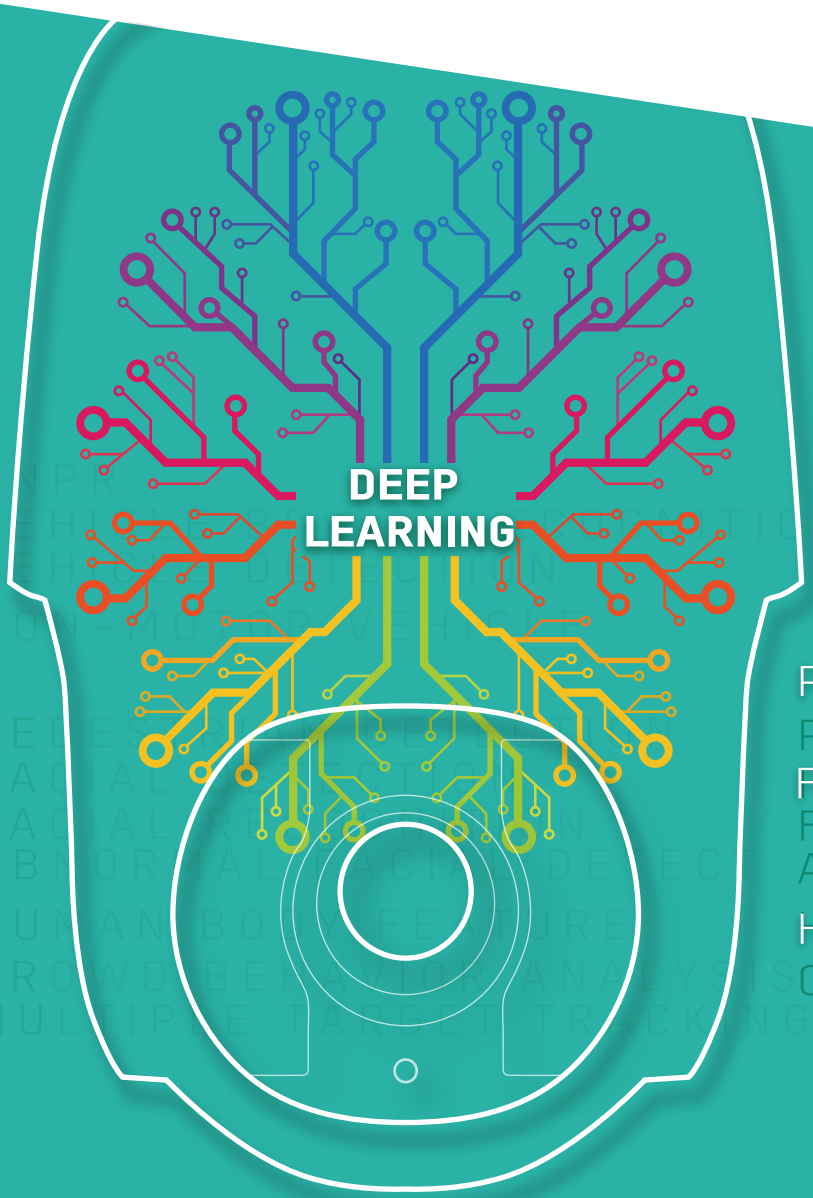

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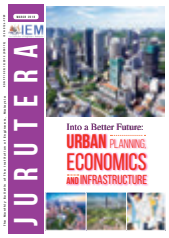
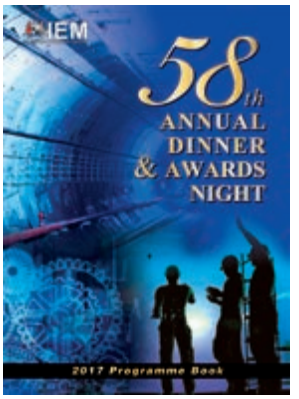


CONTENTS

The Institution of Engineers, Malaysia

IEM 59th Annual Dinner and Awards Night 2018 Programme Book



We are pleased to inform that IEM will be holding the 59th Annual Dinner and Awards Night 2018 on **21 April, 2018**. 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 **Sunway Resort Hotel & Spa, Petaling Jaya**.

It is an annual event organised by IEM to present awards to winners of projects and to announce the new committee for year 2018/2019. Special guests of honour will be invited to officiate at 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 **19 March 2018**.

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Deadlines	: :	**19 March 2018 (Mon)** *(Ad Booking)* **26 March 2018 (Mon)** *(Artwork Submission)*

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cover note

Future Smart Cities

by Ir. Dr Wang Hong Kok
Chairman,
Urban Engineering Development Special Interest Group

When the Urban Engineering Development Special Interest Group (UEDSIG) was formed, one of the goals was to promote issues on urban planning, housing and economics for discussion within the engineering fraternity. This is a very wide field, so through time, attempts will be made to narrow it down.

This month's Cover Story deals with a popular topic: A smart city and the elements to be considered in such an ideal state. Two elements deserve closer examination. The first, ICT provision, is discussed in the Cover Story. The second, Rail-based Transit, is discussed in the other relevant articles. First, there's Dr Zhang Miao's article on "China's Belt & Road Initiative". Second, Ir. Khoo Chee Min's article looks at past and recent rail developments in "Railway Transportation Opportunities".

Third, with the soon-to-start construction of the Kuala Lumpur-Singapore High Speed Rail, Ir. Dr Wang Hong Kok writes on "Expected Economic Benefits of a High Speed Rail Network". Fourth, from a talk by Mr. Ishmael Ho, Ir. Tiong Choong Han writes on "Opportunities for Engineers: Future Hot Spots of Cities". Fifth, En. Azhar Azmi writes on "Solving Engineering Problems with Systematic Innovative Approach", based on a talk by Dr Yip Mum Wai. ■

IEM DIARY OF EVENTS

Title: Technical Visit to "ABB Malaysia Sdn. Bhd."

20 March 2018

Organised by: Education Engineering Technical Division
Time : 9.30 a.m. - 12.30 p.m.
CPD/PDP : 2.5

Title: Technical Talk on "Revised MS2015 : Public Toilet - Design Criteria & Selection of Sanitary Fixture"

20 March 2018

Organised by: Building Services Technical Division
Time : 5.30 p.m. - 7.30 p.m.
CPD/PDP : Applying

Kindly note that the scheduled events are subject to change. Please visit the IEM website at www.myiem.org.my for more information on the upcoming events.

Creating a Smart City in Greater Kuala Lumpur:

WHAT THE FUTURE HOLDS

Town & Country Planning will help turn Greater Kuala Lumpur into a Smart City

Most of us think of a smart city as one which makes use of digital and telecommunication technologies for more efficient networks and services but, according to various definitions, the smart city concept goes beyond that.

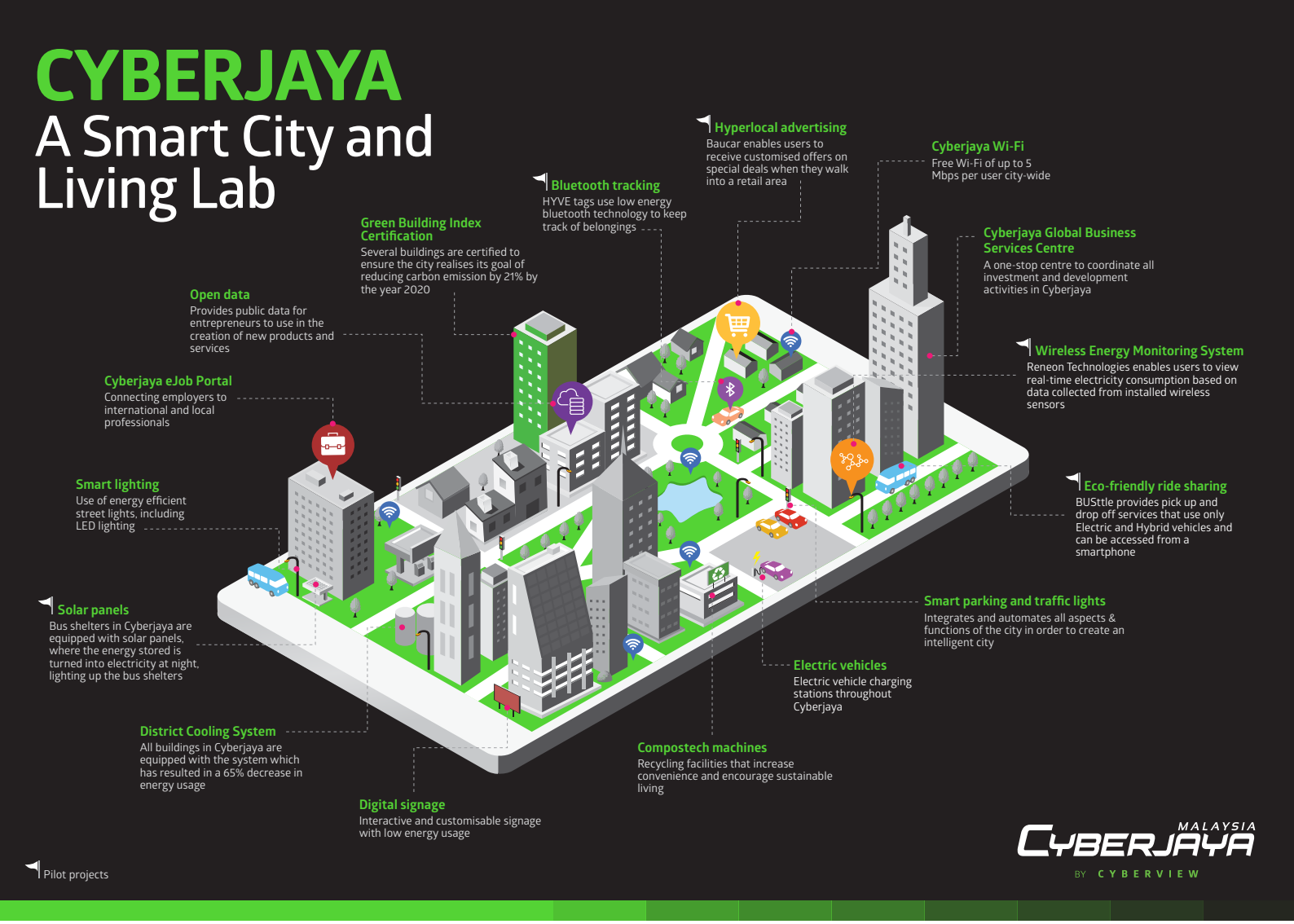
In "Digital Agenda For Europe", the European Commission defined a smart city as one that has "smarter urban transport networks, upgraded water supply and waste disposal facilities, and more efficient ways to light and heat buildings. It also encompasses a more interactive and responsive city administration, safer public spaces and meeting the needs of an ageing population" [1].

Meanwhile, the Smart Cities Initiative launched in the USA in September 2016, funded new investments and collaborations to tackle energy and climate challenges, to evolve the future of urban transportation, to help cities adopt promising innovations in social programs, and to fund for public safety, resilience, and disaster response [2].

In China, the *People's Daily Online* reported that over 500 of its cities embarked on smart city programmes in 2017. These included mobile payment service provided for drivers to pay toll fees, use of mobile phones by hospital patients to take care of preliminary processes and more smart-city applications onboard [3].

According to the Smart City Initiative by Malaysia's Federal Town & Country Planning Department, Ministry of Urban Wellbeing, Housing and Local Government (KPKT), there are currently 21 smart cities in the world; the number is expected to increase to 88 by 2025. Of these, 32 will be in the Asia Pacific, 31 in Europe, and 25 in Americas. Smart cities around the world include Nice, Amsterdam, Barcelona, Kyoto, Beijing, Singapore, Seoul, Songdo, San Francisco, and Stockholm. [4]

In Malaysia, blueprints, frameworks and initiatives have been launched in cities such as Iskandar Malaysia, Greater Kuala Lumpur, Putrajaya, Cyberjaya and Labuan.



Synergizing with the Living Lab initiative (which is a platform in Cyberjaya to make great ideas to become a reality), Cyberjaya Smart City Initiative embraces intelligent technologies to develop a township with more efficient public service and urban living, higher quality of life, safer, and more environmental-friendly.[15]

Photo credit: *Cyberview Sdn. Bhd. (2018). Resources/Publications. Retrieved from Cyberjaya Malaysia: http://www.cyberjayamalaysia.com.my/docs/default-source/publications/brochures/cyberjaya---smart-city-amp-living-lab.pdf?sfvrsn=2*

The Smart City Initiative by the Federal Department of Town & Country Planning (JBPD) is recognised by the National Urbanisation Policy through its third principle, i.e. to generate a competitive urban economy.

A competitive urban marketplace includes improving the readiness of its municipal services through digital application and encouraging its use through information dissemination and hands-on training. The policy also outlines the need for an active and efficient communication system to ensure smart city implementation through the provision of high-speed broadband in urban areas, comprehensively and competitively.[4]

The Smart City Initiative is also part of the National Physical Plan 3 (NPP3) which outlines strategic directions and actions related to the continued growth of urban and rural areas. All these efforts will stimulate social, economic and physical development in a dynamic, balanced and sustainable manner.[4]

Why do we need smart city initiatives? The Department recognised drawbacks of rapid urbanisation which included overcrowding, traffic congestion, environmental pollution, shortage of affordable housing, flooding, landslides, waste disposal and the inefficient deployment of urban services. These problems are difficult to solve with traditional methods.

Smart cities are not only a new trend of development. It is "a new idea and new mode of promoting smart city planning, construction, management, and services, by using the internet of things, cloud computing, big data and spatial geographic information integration."[4]

The Department further defines the central concepts of a smart city: Smart living, smart governance, smart economy, smart environment, smart people and smart mobility. Policies, strategies and action plans are established (or will be built) based on these urban categories, by referring to the National Urbanisation Policy.[4]

PUBLIC SERVICES AND GOVERNANCE

Regarding public services and governance, the 11th Malaysia Plan (2016-2020) highlights five focus areas for transforming public services to be more efficient and productive. According to Smart City Initiative[4], these are:

1. Strengthening service delivery to citizens at the centre.
2. Enhancing talent management for the public service.
3. Improving project management for better and faster outcomes.

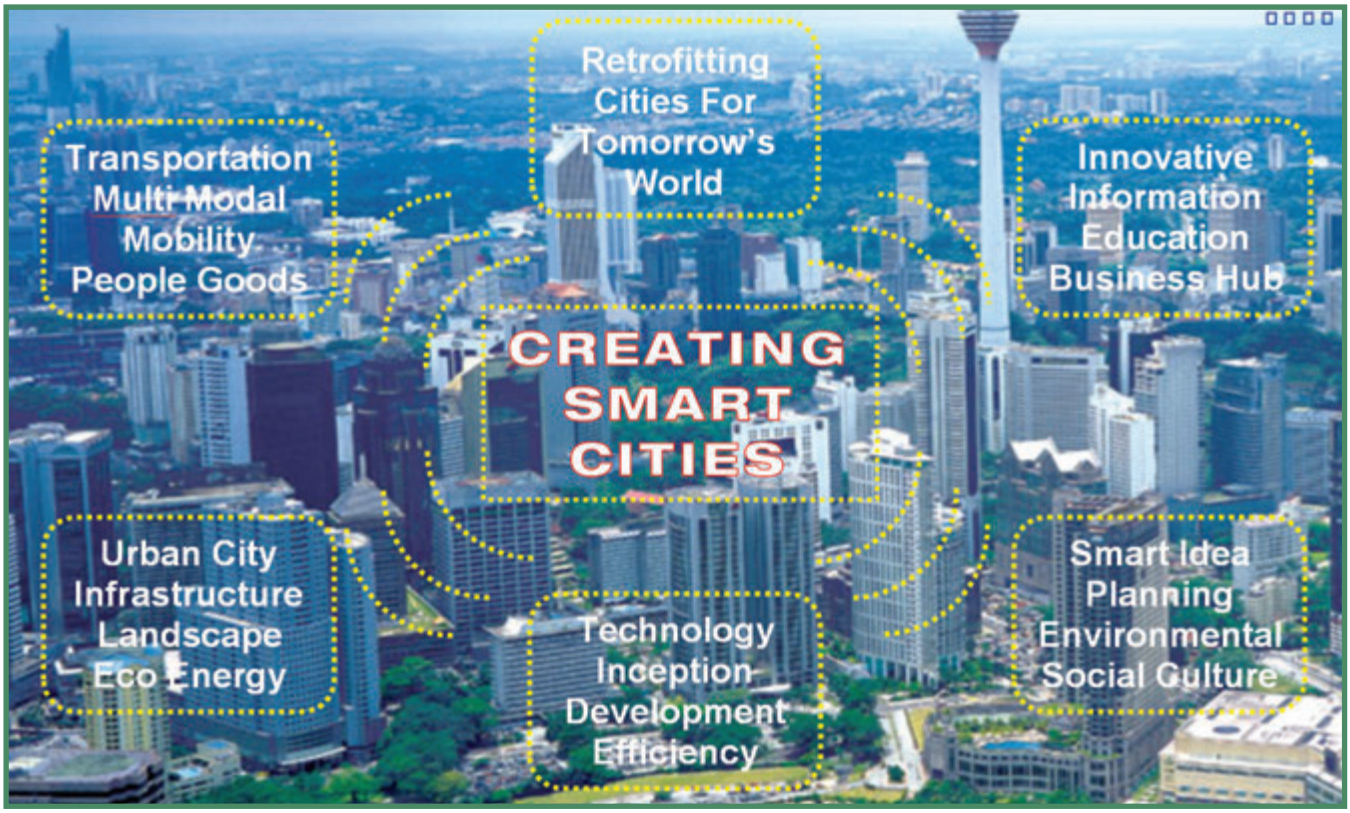


Figure 1: Creating Tomorrow's Smart Cities (Source: UEDSIG (2018) Committee)

4. Capitalising on local authorities for quality services at the local level.
5. Rationalising public institutions for higher productivity and performance.

The concept of smart cities has always been in line with the 11th Malaysia Plan. The government is embarking on digital or e-government to enhance the delivery of public services to the people. The Department broadly defines digital governance as "an application of information technology to the functioning of the government, primarily on providing information and online transaction kinds of services."[4]

The Department said information technology or ICT can influence governance processes in three ways. Firstly, the automation of repetitive governance tasks, for instance, the electronic filing of tax forms, e-voting, periodic information reporting and so on. Secondly, ICT is used to complement existing efforts and processes to improve governance, for example, use of the internet to catalyse existing efforts towards transparency in government information or embedding use of emails in connecting decision-makers with their constituencies. Lastly, ICT is used to initiate new governance services or new mechanisms which would otherwise be impossible through non-ICT modes, for example, online checking of the status of an application, providing instant access to the same information to all individuals through emails and website, ability to instantly access, compare or triangulate data from outside of the constituency or government sources etc.[4]

INFRASTRUCTURE, MOBILITY & CONNECTIVITY

We can foresee a high connected Malaysia by utilising new technologies and new infrastructure. According to Smart City Initiative, highways, interstate highways and railways will tie the entire nation together. With new infrastructure, large-scale urban development will spread, inducing the emergence of more dispersed cities and the rise of new towns will spur growth in less developed regions.[4]

Tan Sri Mohd. Irwan Serigar Abdullah, the Chairperson of National Regulatory Sandbox Taskforce, uses Cyberjaya to illustrate infrastructure and connectivity in a smart city. He said there are many "living labs" in Cyberjaya, in terms of infrastructure, solutions and innovations that are going to fruit include an intelligent traffic light system, mobile payment platform and even a 5th generation mobile network (5G). "This is our hope," he said at the start of the National Regulatory Sandbox Initiative. Tan Sri Irwan is also Secretary General of Treasury.

THINGS IN STORE

One example of digital governance is an online web application called Integrated Landuse Planning Information System (I-Plan) which enables users to make geospatial reference information related to land use planning in the peninsula. With I-Plan, the public can view and access information and check current zoning of land use as established by the Local Plan.

It allows users to search interactively and perform spatial analysis tools. Other than that, I-Plan also provides various

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other functions such as display of statistical information, maps, charts or graphs. It also has links to applications related to geospatial.[5]

Apart from that, the Federal Territories Director of Land & Mines Office developed the e-Tanah system, an Integrated Electronic Land Administration System, designed to improve land administrative procedures and processes.

e-Tanah has 9 main modules: Registration, revenue, consent, strata, disposal, acquisition, development, enforcement and auction.[6] A new World Bank report, "Enhancing Public Sector Performance: Malaysia's Experience with Transforming Land Administration", published on 15 November, 2017, commended the introduction of e-Tanah as the development of explicit interfaces to other systems had improved services and helped generate spatial and textual data integration.[7]

On the other hand, when sharing TN50 regulatory sandbox overview at the start of the National Regulatory Sandbox Initiative, Encik Mahadhir Aziz, General Manager, Technology Hub Development Division at Cyberview Sdn. Bhd., said Futurise Centre is one of its latest products. Cyberview Sdn. Bhd. is the company that spearhead the development of Cyberjaya.

"We are making available facilities such as Futurise Centre for us to do innovation, to look at regulation, to create things and test them within the city," he said, adding that in Cyberjaya, they want data critically planned. "Data does not belong to local authorities; it belongs to bus companies… it belongs to building owners… it belongs to developers."

Overall, according to the Department's recommendations, a smart city initiative should include expanding and enhancing digital infrastructure, strengthening and expanding broadband coverage, and strengthening the provision of infrastructure facilities and services.[4]

FOCUS ON KUALA LUMPUR

Highlighted in "Startup My City" by *The Economist*, The Malaysian government outlined Greater Kuala Lumpur as one of 12 National Key Economic Areas of the Economic Transformation Programme (ETP). The objective is to transform the capital through the adoption of technology.[8]

"Startup My City: Smart & Sustainable Cities in Asia" is a research programme from The Economist Intelligence Unit (EIU) sponsored by Hitachi, which examines sustainable and smart city initiatives in 20 cities across ASEAN and Asia-Pacific. [9]

Datuk Hj. Mohd. Najib bin Hj. Mohd., Executive Director of Planning, KL City Hall, regards Kuala Lumpur as a smart and connected city. In an interview with *The Economist*, he said: "If you talk about a connected city, yes, we are connected to our citizens. We have our portal and our payment gateway; people can pay their bills through electronic banking. We also put up one mobile app where people can complain or give us feedback."[10]

He added that KL is also a city where people are connected with information. "We have the bus system and bus timing system so people can see how long they have to wait for a bus or the train… these are initiatives in the smart city."

Figure 2: Smart Urban City Multi-Modal Transportation Infrastructure (Source: UEDSIG (2018) Committee)

As for broadband coverage, he said City Hall allows telcos to provide good coverage in every area. KL City Centre, Cyberjaya and technological parks are provided with high-speed broadband. "Another initiative will be to allow all telcos to put antennas on street land so that people can receive coverage, without ups and downs on the signals they receive." Some areas such as low-cost public housing areas are also provided with free WiFi.

He said smart city initiatives go hand-in-hand with other green initiatives by City Hall. "Smart cities are not only about using gadgets but we are also aiming for smart citizens who appreciate what is in the city. What we are looking at is sustainable living in the city. The understanding of the people towards green city and green living is one of the features that we'd like to implant in our citizens."

He believed that by using smart city concept, the process of building smart citizens will be much faster.

Beyond that, Greater KL will soon benefit from higher connectivity through the on-going development of LRTs, MRTs, East Coast Rail Link and KL-Singapore High-Speed Rail.

HOW SMART IS KUALA LUMPUR?

To provide an insight into the development of smart and sustainable cities in ASEAN and the Asia-Pacific, The Economist Intelligence Unit (EIU) established an expert advisory board and conducted a survey of 2,000 citizens in 20 cities across ASEAN and Asia-Pacific[11].

According to the survey, about one-third (or 30%) of Malaysian citizens considered Kuala Lumpur to be smart today[8]. Neighbouring cities ahead of us included Danang (84%), Bandung (74%), Ho Chi Minh City (70%), Davao City (67%) and Singapore (63%).

The EIU survey showed that Singapore's success was due to its leadership in making high-speed broadband widely available and being at the forefront in smart city initiatives such as self-driving taxis and an environment that was safe and secure.[12] Meanwhile, Bandung already had 5,000 free WiFi hotspots and aimed to increase that to 40,000 while the local government was working to improve the number of e-government apps from 320 in 2016 to 1,000 by 2017[13].

Davao City which was rated among the world's 15 safest cities, had a centralised dashboard at its Public Safety & Security Command Centre (PSSCC). The dashboard allowed government personnel to monitor the city via CCTV cameras and used analytics software in real-time.[14]

The EIU survey showed that Kuala Lumpur was far more behind cities in ASEAN and the Asia Pacific in terms of smart city development. 54% of Malaysian respondents expected the primary benefits of living in a smart city to be improved environment and 47% thought they would have a higher quality of education. 47% expected better connectivity and 41% hoped smart city initiatives would create a safe and secure environment while 36% looked forward to more job opportunities[8]. ■

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Expected Economic Benefits of a High Speed Rail Network

Ir. Dr Wang Hong Kok

In 2016, the Malaysia and Singapore Governments signed a Memorandum of Understanding (MOU) for the joint development of a 350km Kuala Lumpur-Singapore High Speed Rail (HSR) with a travelling speed of 320km per hour, at a cost of S$15 billion (RM45 billion).

In 2016, the Malaysia and Singapore Governments signed a Memorandum of Understanding (MOU) for the joint development of a 350km Kuala Lumpur-Singapore High Speed Rail (HSR) with a travelling speed of 320km per hour, at a cost of S$15 billion (RM45 billion).

Six years have since passed. The HSR project was identified as a key element that would propel Kuala Lumpur into the ranks of World City under the Economic Transformation Programme (MYHSR, 2017). According to a report in Focus Malaysia (18-24 November, 2017), it was believed that the joint economic benefits derived from the HSR would amount to US$1.12 billion (RM4.69 billion) per annum, with the lion's share going to Malaysia.

What would be the economic benefits and expectations for the average HSR commuter?

The details of the KL-Singapore HSR were put on public display for feedback from November 2017 to January 2018. See Figures 1 and 2.

Even though policy-makers are upbeat about the role of the HSR in economic development, its acceptance as a global phenomenon was slow since it made its debut as Japan's Shinkansen Line in 1964. According to Blanquart and Koning (2017), by 2016, the HSR lines in 16 countries covered a total distance of 34,679km (China alone operated 21,688km or 62.53%). Worldwide, HSR lines under construction total 14,559km while 8,390km are under planning.

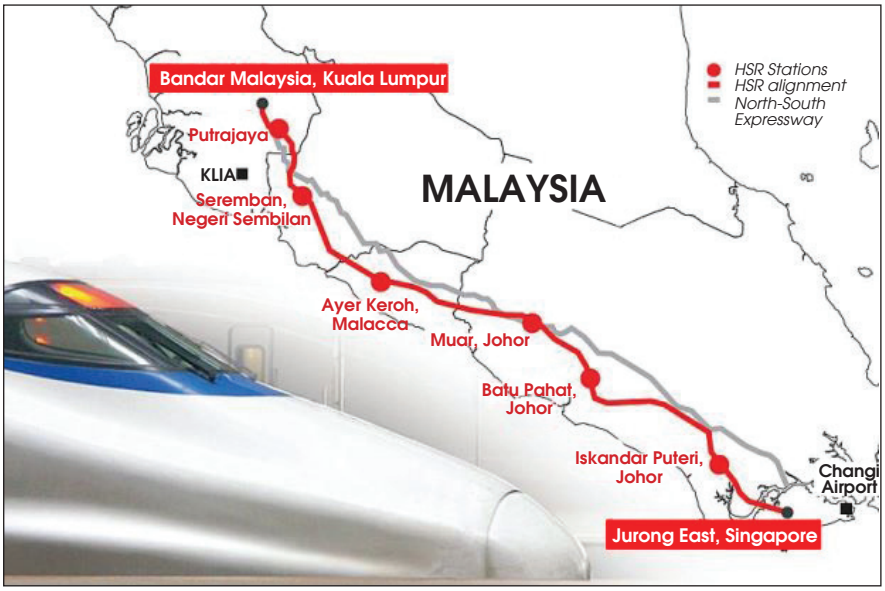

Figure 1: The seven proposed HSR Stations
Source: MYHSR Corporation Sdn. Bhd.

Figure 2: HSR Station, Seremban, is inspired by Sri Menanti Palace.
Source: MYHSR Corporation Shn Bhd

Besides China, the next largest operators of HSR lines are Japan (2,892km), Spain (2,871km) and France (2,036km) while US (362km) and UK (113km) have shown little interest. However, by the end of 2017, would be served by the HSR and eight more countries would be making them accessible, including Russia and Argentina.

In analysing optimal transport mode conditions, the HSR works best when the distance between two points is greater than 100km but less than 500km (USHSR Association, 2017). See Figure 3. See also De Rus (2012, pp. 11-12).

Who then benefits from the HSR? Can economic benefits be measured from the HSR?

With regards to economic geography (urban land economics), a study of the benefits of investing in HSR can be found in "new economic geography theories", where the dynamic impact of an external element such as HSR is discussed (Venables, 2005; Ahlfeldt, 2017).

In this article, we ask two basic questions related to the HSR.

1. What are the expected common economic benefits?
2. How are these economic benefits measured?

COMMON ECONOMIC BENEFITS

Most literature on the subject have been positive as to the contributions of the HSR and tend to tout the HSR as the 21st century transport solution to a number of urban traffic woes.

In their proposal to build the Alberta High Speed Rail, researchers from Transportation Economics & Management Systems, Inc. (TEMS, 2008) categorised economic benefits into user benefits and community benefits.

User benefits: This refers to time and cost savings that arise from using the HSR instead of other transport modes such as car, train or plane. Broadly, HSR users may observe at least eight benefits, according to Markam and Green (2017): Less smog in the city, reverse sprawl, increased walkability, more efficient use of time, reduced congestion (less chance being caught in traffic gridlocks), reduced dependence on foreign oil (use renewable source of energy), safer than driving (HSR is the safest form of transportation) and promoted economic boost.

A researcher from the University of Las Palmas, Spain, suggested six other economic benefits in the user category: Lower travel time, higher comfort and reliability, reduced probability of accidents, release of extra capacity to other modes of transport, improved environment and encouraged regional development (De Rus, 2008).

Community benefits: This refers to benefits reaped when firms have accessibility to this new mode of transport and, in the process, engage in newfound or better business opportunities. Properties located near HSR stations will see an increase in value. Data obtained from firms located near Kyushu Shinkansen in 2004 before and after the opening of the HSR, indicated that sales and productivity rose for firms nearer to the new stations. Bernard (2014) also found that the HSR could foster a better buyer-supplier network, thus reducing business costs: "The findings suggest an important role for enhanced transport infrastructure in facilitating face-to-face interactions and improved matching between suppliers and customers".

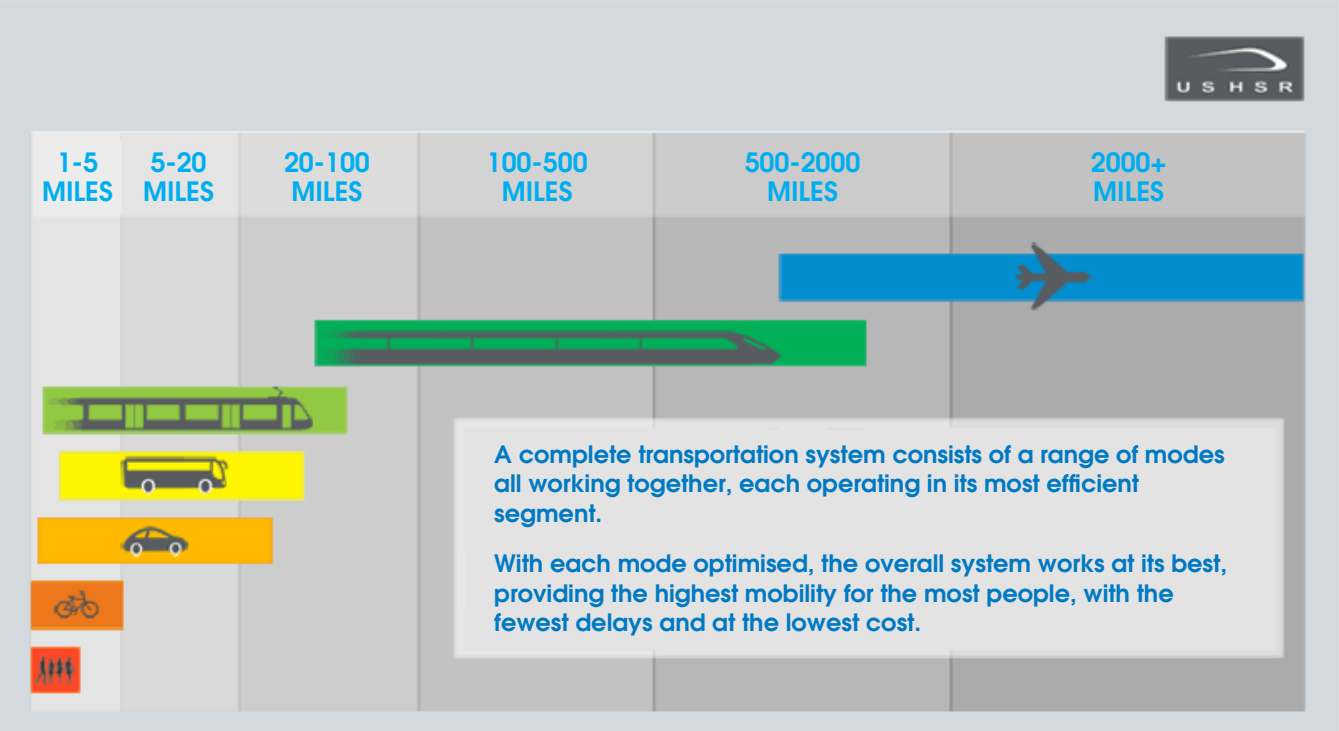

Figure 3: A complete transportation system
Source: US High Speed Rail Association

Based on their research conducted on the Cologne and Frankfurt HSR Line built in 2002, Ahlfeldt and Feddersen's spatial economic analysis (2010) of two new HSR stations in the smaller towns of Montabaur and Limburg alongside these two major big cities, showed evidence of economic growth. "Counties adjacent to new intermediate stations experience 2.7% shift level in GDP due to exogenous treatment in variation accessibility," Ahlfeldt and Feddersen explained. See Figure 4.

Similar findings were observed by a team of World Bank researchers based on its review of the recent China HSR projects (Amos, Ballock and Sondhi, 2010). The HSR was also noted to be particularly good for cities located 150-300km apart in the eastern plains of China.

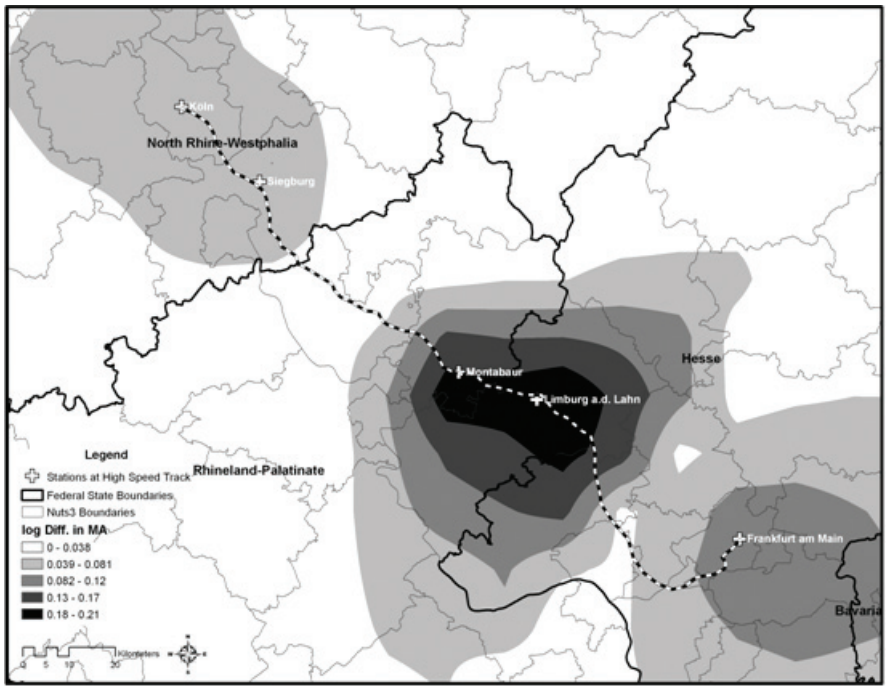

Figure 4: Accessibility impact
Source: Ahlfeldt and Feddersen (2010, p. 17)

MEASURING ECONOMIC BENEFITS

De Rus (2008) showed a simple cost-benefit model of evaluating the HSR (Figure 5): Annual social benefits must be greater than the sum of investment costs, annual fixed maintenance and operating costs as well as annual maintenance and operating costs depending on passenger trips.

In considering whether public funds should to be used in building the HSR line, De Rus (2008) argued that one key rationality exists: That the HSR line can alleviate traffic congestion on the road, rail or air. One example was China where the implementation of the HSR networks took years of studying and planning: "Official State planning began in the 1990s and the first line, the Qinhuangdao-Shenyang Passenger Railway opened in 2003," (Burton, 2017).

If economic benefits are aplenty, what about viability? As a recent World Bank report asserted, "a developing country must reasonably expect at least 20 million passengers per year with significant purchasing power, just to have the possibility of covering the working expenses and interest costs of providing that capacity with high speed service and probably double that number of passengers to have any possibility of recovering the capital cost," (Amos, Ballock, and Sondhi, 2010). Very few HSR lines, however, achieve 20 million passengers per year.

The social profitability of the investment in HSR requires the fulfilment of the following condition:

$$\int_0^T B(H)e^{-(r-g)t}dt > I + \int_0^T C_f e^{-rt}dt + \int_0^T C_q(Q)e^{-(r-g)t}dt, \qquad (1)$$

where:

$B(H)$: annual social benefits of the project.
C_f: annual fixed maintenance and operating cost.
$C_q(Q)$: annual maintenance and operating cost depending on Q.
Q: passenger-trips.
I: investment costs.
T: project life.
r: social discount rate.
g: annual growth of benefits and costs.

Figure 5: Simple cost-benefit model of evaluating HSR
Source: De Rus (2008)

Amos, Ballock and Sondhi (2010) estimated the costs of the HSR (construction cost and rolling stock capital) to be in the region of US$35-70 million per km. Assuming an average cost of US$40 million per km, then the KL-Singapore HSR Project may cost US$14 billion (40 x 350km = 14,000 million).

CONCLUSION

The HSR may best serve pairs of cities located 300-500km apart. The KL-Singapore HSR may be an economically viable transport option, as evidenced by the Cologne-Frankfurt line and the Kyushu Shinkansen. The "silver bullets" as the trains are popularly called in the West, will solve four urban planning woes at once: Energy, climate, safety and capacity.

The HSR promises to be business-friendly and can offer hassle-free travel, time-saving and fast mobility. The viability constrain, however, is the high infrastructure cost which may require a long payback time. Yet, the potential commuters of the KL-Singapore HSR have reasons to believe they will stand to benefit from this "game changer" when it is completed in 2026. ■

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Time : 8.30 a.m. - 12.30 p.m.
CPD/PDP : Applying

Title: Technical Visit to "KDK Fans (M) Sdn. Bhd."

24 March 2018

Organised by: Building Services Technical Division
Time : 9.00 a.m. - 1.30 p.m.
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China's "Belt and Road" Initiative: How Malaysia Can Benefit

Dr Zhang Miao

China's Belt and Road Initiative (OBOR) is gaining wide recognition and media coverage in public opinion across Malaysia. As one of the hottest destinations for foreign investment, Malaysia has attracted massive Chinese capital in recent years. It was reported that at 2015, China had invested US$25.4 billion in various sectors including real estate, metal fabrication and more. Net capital inflow from China to Malaysia also increased significantly, from US$56 million in 2005 to US$616 million in 2013, recording an average annual growth rate of 34% in the same period (China Global Investment Tracker, 2015).

However, this massive capital inflow from China in such a short period has created much public buzz. While it is believed that China's investment has played an important role to revive local economy, it is also widely argued that China has asserted its influence over the region through these investments. However, most see the investments as ground-breaking feats that will boost our flagging economy.

Still, given China's large presence here (especially in the infrastructure and construction sectors), questions remain as to "how" and "to what extent" will Malaysian stakeholders, in particular engineers, benefit from this huge national project.

With connectivity as the keyword for OBOR, developing inter-connectivity of infrastructure development forms a central part of China's OBOR Initiative. The fact that the projected investment will amount to US$1.4 trillion is giving Malaysia the opportunity to upgrade its own infrastructure, including ports and railways.

Though the priority to develop infrastructure is arguably associated with China's current needs to export its excess capacity in construction industries, there is no doubt that the infrastructure-emphasised programme is essentially needed for a sustainable and inclusive social-economic development. It has been testified, though in theory, that 1 unit of infrastructure investment can generate 3.05 units of production expansion from other industries (Andrei, 2016).

Malaysia needs to seize this opportunity and acquire financial support from the newly launched multilateral institution, Asia Infrastructure Investment Bank (AIIB), and the Silk Road Fund, both of which are oriented towards funding specific infrastructure projects, with railways, roads and pipelines at the top of their agenda.

As Chinese companies increasingly experiment with PPP-type investments in infrastructure in emerging markets, the fact that most of them are aided by very substantial Chinese public sector financing and guarantee under the OBOR banner has drastically improved the risk-return profile of the projects.

Many of the China's State-Owned-Enterprise (SOE) players are arguably "too big to fail", with substantial government backing in negative case scenarios. In the extreme case, China's state-owned policy insurer will cover certain projects during political or social incidents. Though it is the banks' concern that the risks may become entangled in projects where commercial logic and demand for roads/bridges are subordinate to political considerations, the collaboration with China's SOE has certainly helped local stakeholders reduce the risks.

Malaysian stakeholders can also potentialy gain market entry through partnerships with Chinese clients. The majority of Chinese players reaping fruit from OBOR funding so far are China's mega-sized SOEs. A successful project partnership with these players can help build goodwill and track record to gain an edge in domestic bids and overseas business. For example, a state-owned construction company subsidiary doing business in Malaysia, can recommend its Malaysian suppliers to other subsidiaries in other markets in the region, such as Indonesia and the Philippines. By leveraging on such customer relationships, Malaysian engineering, procurement and construction companies will be able to tap the overseas market or re-enter the Chinese market.

In addition to creating more jobs, the beauty of foreign investment lies in its stimulating effect on local stakeholders to enhance productivity and competitiveness through technology transfer. Truly, the technology know-how from certain industries in China (e.g. High Speed Railway, telecommunication service, Internet-based industry) and

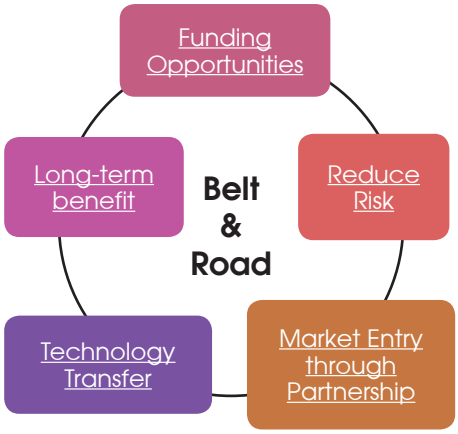

Figure 1: The Opportunities of OBOR Initiative
Source: author

managerial skills in some industries (e.g. construction industry) will provide the opportunity for Malaysian business stakeholders to enhance their competitiveness by learning and innovating.

China's investments in Malaysia will translate into not only improved infrastructure and logistics but also high-value job creation and industrial upgrading which will ultimately facilitate Malaysia to become a high-income country by 2020. Last but not least, there will be positive long-term macro impacts for international firms by shortening lead time and reducing transportation costs especially when OBOR's objective to facilitate smoother trade flow is realised within the connected regions. Improved linkage via railway and maritime connectivity is expected to further reduce the transit time between Malaysia and China.

The possible effect of combining Kuantan Port and the East Coast Railway Link will be an alternative trade route for the movement of goods and commodities to be transported in a more efficient manner, compared to the traditional trade route of sea transportation via Singapore. This will greatly benefit those who export raw materials from Malaysia to China, as well as international players seeking to further penetrate large consumer markets with finished products.

Initially, the sectors which will possibly benefit the most from the OBOR Initiative will be those in infrastructure. After more than 20 years of building roads, railways and airports, China now has a world-class infrastructure industry.

Infrastructure, which plays a leading role in the development of the OBOR Initiative, requires investment and project contracting; it will certainly drive demand for relevant services. In this connection, Malaysia should be able to find a considerable array of opportunities in financing, project risk management, real estate services and other related industries.

With the extensive industry value chain, a well-developed supply-buyer relationship will benefit local stakeholders which can be engaged in the mega transport and logistics project. In addition, the transport and logistics industry can also be an area of potential cooperation with a promising future.

In term of industrial co-operation, the twin industrial parks may become platforms for the clustering of industries, especially advanced manufacturing. The demand for logistics, supply chain management, consumer products and services will see an increase with the overall growth of these regions.

Then there are other service sectors, such as financing and legal services, which stand to benefit. As such, professionals in diverse areas such as design, quality control, high-tech electronics and arbitrations should also be assessing the possibilities. ■

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Railway Transportation Opportunities

Ir. Khoo Chee Min

Recently, railway transportation and its associated infrastructures have been highlighted extensively in the local media. Refocusing on railway transportation opportunities has highlighted the future significance and potential of railway development in Malaysia.

Suffice to say it is now at an all-time high and, following the recent completion of the Klang Valley Mass Rapid Transit (KVMRT), Line 1 from Sg. Buloh to Kajang, which began operations on 17 July, 2017, one can truly grasp the significance of the MRT services. Through a self-effacing appraisal of the past, recent and close-future development, the author will attempt to analyse the opportunities of rail transportation and connectivity in Malaysia.

PRE-INDEPENDENCE DAYS

Railways have been a part of our lives for more than 100 years. Railways began because of the need to transport tin from mines in the hinterland of the west coast states to coastal areas. The first railway line, opened on 1 June, 1885, was 13km long, linking Taiping and Port Weld in the state of Perak.

A second line was opened a year later to link Kuala Lumpur (again the centre of tin mining activity in Klang Valley) and Port Swettenham (Port Klang today) (1). Subsequently, several branch lines (between Batu Junction and Batu Caves, Bukit Mertajam and Butterworth, Tapah Road and Teluk Intan, Kempas and Tanjung Pelepas, Kempas and Pasir Gudang, Pasir Mas and Rantau Panjang) were built.

These formed the early north-south connectivity of two main lines, namely the KTM West Coast Line between Padang Besar in Perlis and Singapore in 1913, and the KTM East Coast Line between Gemas in Negeri Sembilan and Tumpat in Kelantan in 1930 (see Figure 1).

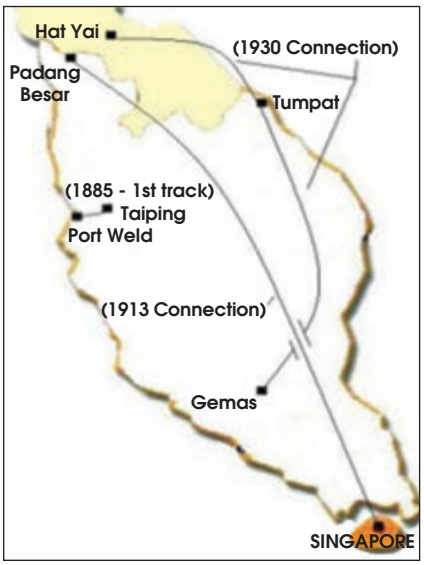


Figure 1: KTM main railway connectivity

In 1923, the Johor-Singapore Causeway was opened, connecting Singapore's railway network with that of Malaya. This network is also linked to the Thailand railway network in Hat Yai. The network covers most of the 11 states in Peninsular Malaysia. In East Malaysia, only Sabah has railways tracks.

PAST AND RECENT PAST DEVELOPMENTS OF RAIL TRANSIT IN KLANG VALLEY

Since then, there were no railway developments until late 20th century when the Light Rail Transit (LRT), also known as the Star LRT Line (or Ampang/Sri Petaling LRT Line), began service in July 1998 in conjunction with the Commonwealth Games which was held for the first time in Kuala Lumpur.

The Star LRT was first conceived in the 1981 Transport Master Plan, when the government proposed a network

Figure 2: Klang Valley rail transit map (2015)

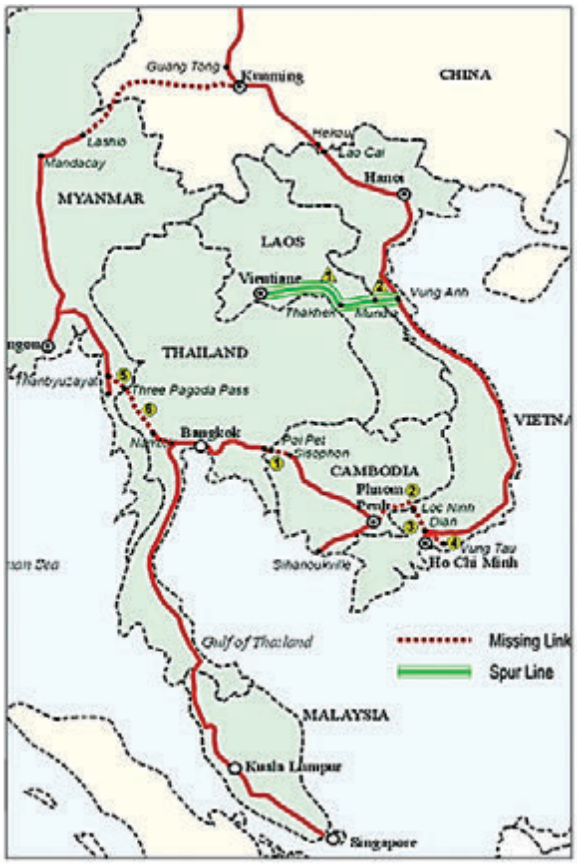


Figure 3: Singapore – Kunming Railway Link

of LRT lines connecting Kuala Lumpur to the surrounding areas.

A second LRT line, Putra LRT Line (or Kelana Jaya LRT Line) commenced full service on 1 June 1999 (construction started in 1994, about the same time as the Star LRT Line); this was the first fully automated, driverless rail system.

Like in many other countries, Malaysia also has an airport express rail link service, linking Kuala Lumpur (KL Sentral Station) and Kuala Lumpur International Airport (KLIA) in Sepang. The service is run by Express Rail Link Sdn. Bhd., which began operations on 14 April, 2002. In 2003, KL Monorail, the first urban monorail system in Malaysia, was opened.

Together with the KTM Kommuter Lines running on existing railway lines, these light rail transit lines form the base rail network for the Klang Valley (Figure 2).

RAILWAY ELECTRIFICATION

Railway electrification is a relatively recent development in Malaysia. While the first railway dated back to 1885, it was not until 1995 that the first electrified railway service, KTM Kommuter, began operations. The term "railway electrification" mainly refers to the project to upgrade, by constructing a double-track, and to electrify the KTM West Coast Line from Padang Besar to Johor Bahru, including the entire KL-Port Klang branch line as well as the segment between KL and Sentul-Batu Caves branch line.

Initially, the double-track upgrading works were beset by problems and delays; however, the first segment from Rawang to Ipoh was completed in early 2008, followed by the segment between Seremban and Gemas in 2013. By October 2014, the northern stretch between Padang Besar and Ipoh was completed. The remaining southern segment of the double-track upgrading works between Gemas and Johor Bahru is incomplete in the north-south railway line measuring total 808km. The corridor is part of the Singapore-Kunming Rail Link (SKRL) network (Figure 3).

THE FUTURE OF RAIL

With rapid development taking place in Greater KL/Klang Valley, an integrated, comprehensive, affordable and comfortable public transport system is needed. The Land Public Transport Master Plan (2013) has set a number of goals and targets to achieve 40% modal share for public transport in the urban areas by 2030. It's not surprising that railway has been identified as the backbone for public transportation. There's been accelerated railway development in recent years and the completion of LRT Extension Line in 2016 and MRT Sg. Buloh-Kajang Line (MRT Line 1) in 2017, has further improved the connectivity and eased travelling in Klang Valley.

Urban Rail/Rapid Transit (LRT, MRT): To date, the Klang Valley Mass Rapid Transit (KVMRT) System is one of the most important and largest transport infrastructure projects Malaysia has embarked on. The KVMRT project sees the construction of three MRT lines (MRT Line 1, MRT Line 2 and MRT Line) 3, which will provide a major boost in the integration and efficiency of urban public transport. The 52.2km MRT Line 2 (Sg. Buloh-Serdang-Putrajaya Line) is under construction and is expected to be fully operational in 2022 while the third line (Circle Line) is awaiting confirmation for its alignment; it is set to be on public display in mid-2018. Recently, the Government decided to expedite the implementation of Line 3 with completion targeted for 2025. Figure 4 summarises the development journey of KVMRT within a short span of about 1½ decades.

Figure 4: Development journey of Klang Valley MRT

Besides KVMRT, the Urban Rail Development Plan (2010) (2), has also laid down an important future line, LRT3, connecting the Western Corridor of Klang Valley. LRT3 links Bandar Utama to Klang, with an overall distance of 37km and 25 stations along the route. Construction began in 2017 and it is expected to be completed in 2020/21.

In the south of the peninsula, the Rail Transit System (RTS) is a 4km shuttle system between Johor Bahru in Malaysia and Woodlands in Singapore. Conceived in 2010 and announced in 2011, the RTS serves as a convenient and cost-effective shuttle system integrated with both public transport systems on both sides of the border with co-located Singapore and Malaysia CIQ facilities. The rail transit system is targeted to open for service by December 2024.

Suburban Commuter Rail: To unlock the potential growth of the East Coast Economic Region (ECER), the East Coast Rail Link (ECRL) has been identified as a key enabler for the east coast region (Kelantan, Terengganu and Pahang) that can connect economic centres including industrial areas and provide an efficient link to Greater KL/Klang Valley. ECRL is a high impact infrastructure project that will form the backbone of ECER's multimodal transport infrastructure in complementing existing road/expressway infrastructure and KTMB East Coast Line and ports. There will be a total length of 688km of railway (including approximately 80km connecting ITT Gombak to Port Klang) and construction is planned to commence in early 2018. It is expected to create about 80,000 jobs and another 6,000 during operations as well as train up 3,000 students under the Road and Belt Initiative (3). See Figure 5.

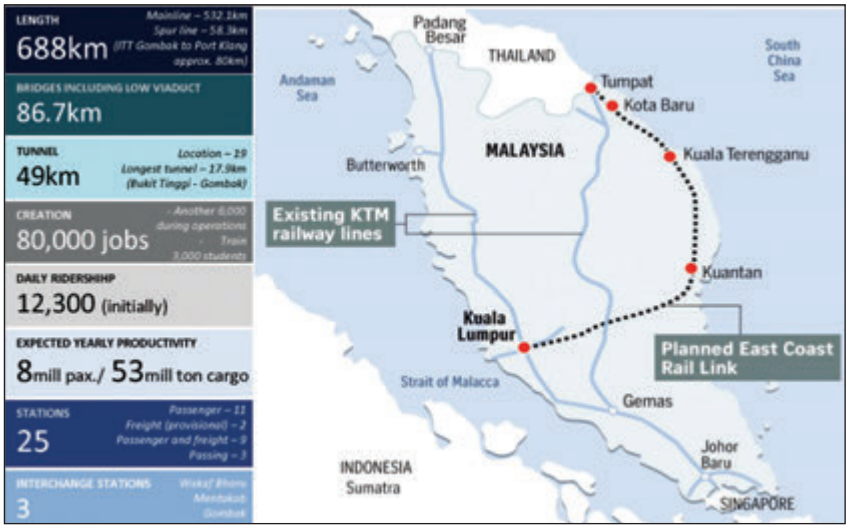
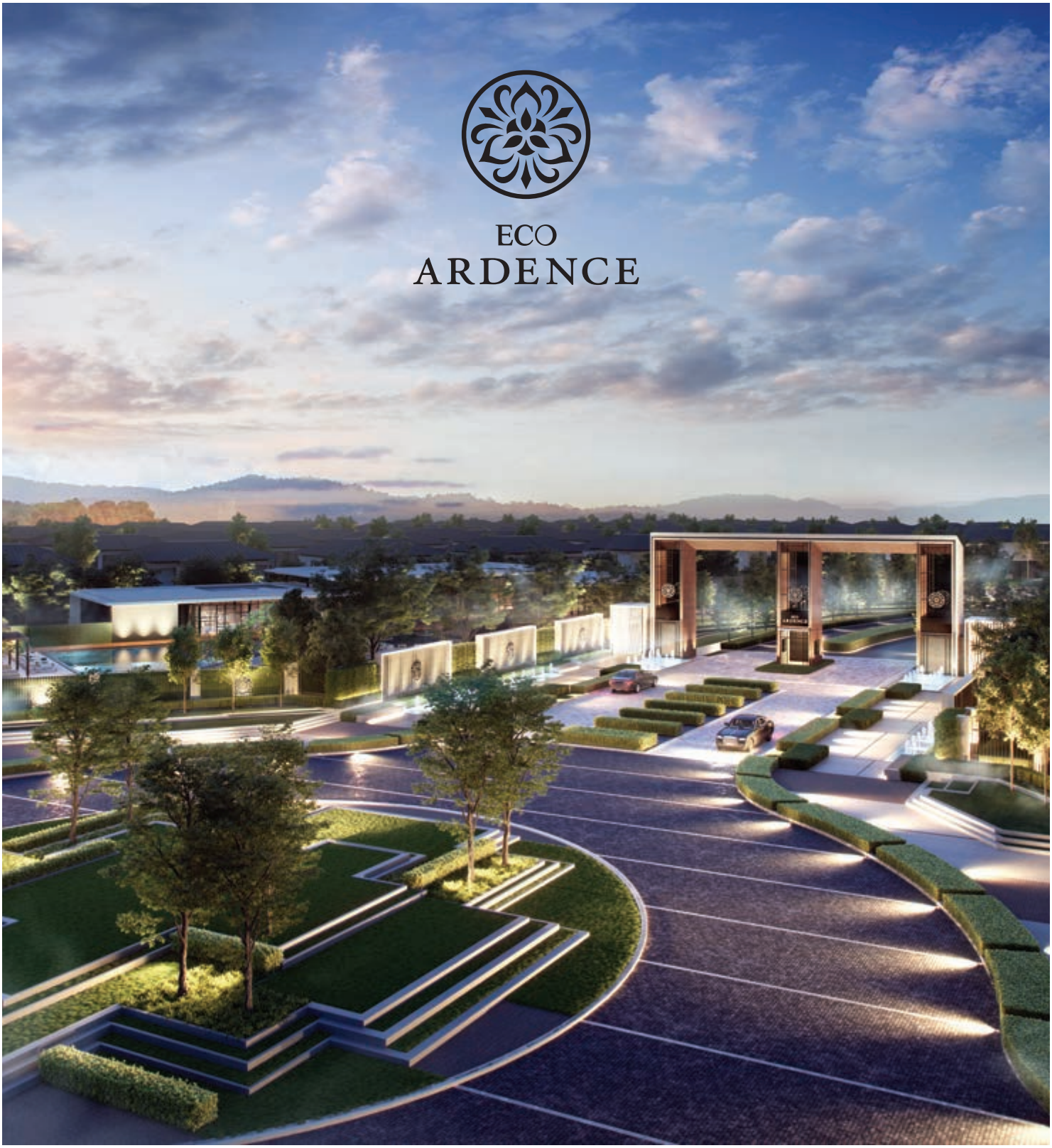


Figure 5: Fact sheet of East Coast Rail Link

On a separate note, the last stretch of double track electrified railway between Gemas and Johor Bahru is expected to be completed by 2020/21, accomplishing Malaysia's commitment to the Singapore-Kunming Rail Link (SKRL).

High Speed Rail (HSR): Meanwhile, the KL-Singapore HSR is moving ahead with the goal of reaching both cities quickly and safely, thereby strengthening the link between two of Southeast Asia's most vibrant and fast-growing economies. Additionally, the HSR presents an opportunity to build and rejuvenate smaller cities in Peninsular Malaysia by connecting them to the two major metropolises. The HSR will connect 5 intermediate stops in Malaysia to Singapore, following a coastal route.



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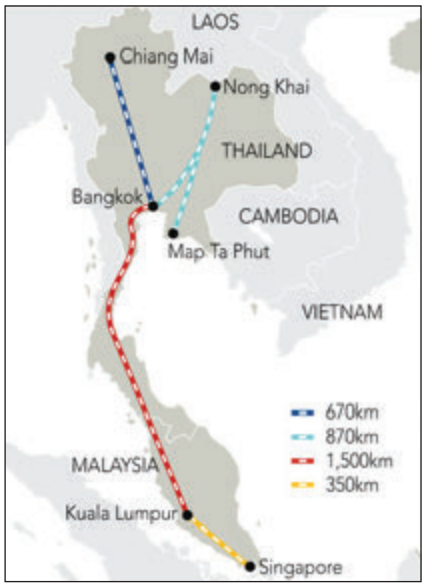

Figure 6: Planned major High Speed Railway projects in Southeast Asia

The KL-SG HSR appears to be just one of many links currently under development. Lately, Thailand has also expressed interest in holding talks with Malaysia for the construction of a HSR line from KL to Bangkok. Figure 6 shows other planned major high-speed railway projects in the region.

NEW OPPORTUNITIES

Malaysia's railway transportation is enjoying a time of unprecedented development thanks to huge government investments and a series of aggressive favourable policies.

Compared with just 20 years ago, there are more commuters and better rail connectivity. This growth trend is set to continue. Based on the announced projects as discussed above, another 1,500km of railway lines will be built by 2030. This opens up plenty of opportunities for engineers to engage with and be a part of this railway development journey (Figure 7).

The future has a way of arriving unannounced! ■

1885 KTM Taiping to Port Weld (First railway line in Malaya)
1886 - Kuala Lumpur to Klang
1891 - Seremban to Port Dickson
1983 - Teluk Anson to Tapah Road
1903 - Tank Road to Woodlands (Singapore)
1909 - Prai to Johor Bahru
1910 - Gemas to Bahau
1913 KTM Padang Besar to Singapore (1,151km)
1930 KTM Gemas to Tumpat to Hatyai (548km)
1998 LRT Ampang Line (27km)
1999 LRT Kelana Jaya Line (29km)
2002 ERL KL Sentral to KLIA (57km)
2003 Monorail KL Line (8.6km)
2008 ETS Rawang to Ipoh (179km)
2010 ETS Sentul to Batu Caves (9.2km)
2013 ETS Seremban to Gemas (100km)
2014 ETS Ipoh to Padang Besar (329km)
LRT Extension Line (35.5km) 2016
MRT Sungai Buloh - Kajang Line (Phase 1) - 2016
MRT Sungai Buloh - Kajang Line (51km) 2017
ETS Terminal Skypark Line (8.15km) - 2017
ETS Gemas to Johor Bahru (197km) 2020
LRT Line 3 (37km) 2021
MRT Sungai Buloh - Serdang - Putrajaya Line (Phase 1) - 2021
MRT Sungai Buloh - Serdang - Putrajaya Line (52.2km) 2022
East Coast Rail Link (688km) 2024
RTS Johor Bahru - Singapore (4km) 2024
MRT Circle Line (40km) 2025
HSR Kuala Lumpur - Singapore (350km) 2026

Figure 7: The chronology of rail development in Malaysia

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Author's Biodata

Ir. Khoo Chee Min *is Senior Manager at MRT Corporation, Deputy Chairman of IEM Tunnelling and Underground Space Technical Division (TUSTD 2017/18) and Deputy Organising Chairman of ITA-AITES World Tunnel Congress 2020.*

IEM DIARY OF EVENTS

Title: 1st Mentors Workshop 2018

24 March 2018
Organised by: Sub Committee on Log Book
Time : 9.00 a.m. - 1.00 p.m.
CPD/PDP : 3.5

Title: Technical Talk on "Sustainability in Wet Sprinkler Testing, Monitoring & Maintenance"

26 March 2018
Organised by: Building Services Technical Division
Time : 5.30 p.m. - 7.30 p.m.
CPD/PDP : Applying

Title: 1-Day Seminar on "Digital Edition of Urban Stormwater Management Manual from Malaysia (MSMA)"

28 March 2018
Organised by: Building Services Technical Division
Time : 8.30 a.m. - 5.15 p.m.
CPD/PDP : 6.5

Title: Technical Visit to "TM Research & Development Sdn. Bhd."

28 March 2018
Organised by: Education Engineering Technical Division
Time : 2.00 p.m. - 4.30 p.m.
CPD/PDP : 2

Title: Talk on "Managing Risk Through Engineering Solutions in Delivering Malaysia First Tension Leg Platform - Malikai"

28 March 2018
Organised by: Civil & Structural Engineering Technical Division
Time : 5.30 p.m. - 7.30 p.m.
CPD/PDP : Applying

Kindly note that the scheduled events are subject to change. Please visit the IEM website at www.myiem.org.my for more information on the upcoming events.

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Letter to EDITOR

Dear Editor,

Congratulations on a well written Cover Story on Marine Engineering. You have certainly chosen the right personality to give an insight into one of the key but often time forgotten industries in Malaysia.

While commerce has always been the prime objective of any business entity, I believe there are areas where other considerations need to be given due weightage.

The issue of human capital development is one of the key areas which IEM should be looking into earnestly. As suggested by Dato Ir. Abdul Hak, IEM and MASA can explore ways and opportunities for engineering graduates to enter the Marine Engineering sector and receive adequate opportunities for self-development.

With Malaysia securing a seat on the (International Maritime Organisation (IMO) Council, it is imperative that the Maritime sector be given due attention by all parties to come up with a road map for our future human capital.

Having the benefit of being involved in both maritime industry and engineering mainstream (construction, power supply and utilities management), I can safely say that a number of points which Dato Ir. Abdul Hak has raised warrants serious follow-through actions by IEM. I would be happy if a cover story does not remain just a good story but that it results in a desirable outcome that will benefit all stakeholders. Perhaps the Marine Engineering and Naval Architecture Technical Division can take the lead in this initiative.

Once again, kudos to the editorial team. Keep it up. ■

Abi Sofian Abdul Hamid
Member No. 13552
Email address: abisofianpartners@gmail.com

ANNOUNCEMENT

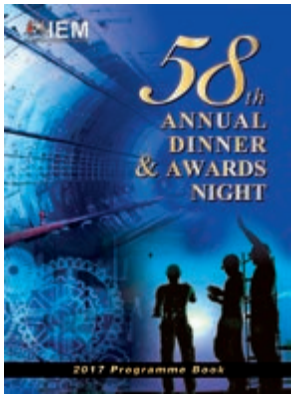
Publication for Sale!

The following publications are now available for purchase at the IEM Secretariat Office, 2nd Floor, Finance Department, Bangunan Ingenieur, Petaling Jaya, Selangor:

1. IEM Form of Contracts for Civil Engineering Works (Third Edition, January 2017) – RM 16.00 inclusive GST;
2. IEM Form of Contracts for Mechanical and Electrical Engineering Works (Third Edition, January 2017) – RM 16.00 inclusive GST;
3. IEM Form of Nominated Sub-Contract for Engineering Works (December 2017) – RM 16.00 inclusive GST;
4. IEM Arbitration Rules 2016 – RM 10.00 inclusive GST.

The Institution of Engineers, Malaysia

IEM 59th Annual Dinner and Awards Night 2018 Programme Book



We are pleased to inform that IEM will be holding the 59th Annual Dinner and Awards Night 2018 on **21 April, 2018**. 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 **Sunway Resort Hotel & Spa, Petaling Jaya**.

It is an annual event organised by IEM to present awards to winners of projects and to announce the new committee for year 2018/2019. Special guests of honour will be invited to officiate at 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 **19 March 2018**.

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Quantity	:	1,200 copies
Advertisement Format	:	High resolution PDF file, with crop marks, bleed area, text being outlined
Deadlines	: :	**19 March 2018 (Mon)** *(Ad Booking)* **26 March 2018 (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.

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Inside Back Cover (IBC)	3,200	(SOLD)	
Page 1	3,000	(SOLD)	
Facing Chairman's Message	2,800	(SOLD)	
Facing President's Message	2,800	(SOLD)	
Facing Past Presidents List	2,800	(SOLD)	
Facing Inside Back Cover	2,800	(SOLD)	
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ENGINEER'S

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Contributed by
Ir. Dr Oh Seong Por

Penang Rapid Ferry

The oldest ferry service in Malaysia, the Penang Ferry links Georgetown (Raja Tun Uda Ferry Terminal) on the island and Butterworth (Sultan Abdul Halim Ferry Terminal) on the mainland.

The first service, started in 1894 by two Chinese men called the Beng brothers, only carried passengers and goods. Then in 1925, diesel powered ferries allowed motorised vehicles to be transported as well.

From 1971 to 2002, 9 ferries were built and named after islands: Pulau Labuan , Pulau Rawa , Pulau Talang Talang , Pulau Undan , Pulau Rimau, Pulau Angsa, Pulau Kapas, Pulau Payar and Pulau Pinang. At present, only 6 are in service.

Originally painted in plain betel-nut orange, they were later given a fresh look with bright colours and pictures. Although each ride takes only 15 mins, passengers on board can relax and enjoy a spectacular view of Penang Island.

The 49th World Federation of Engineering Organisations (WFEO) General Assembly 2017

STANDING COMMITTEE ON CORPORATE AFFAIRS (INTERNATIONAL AFFAIRS)

reported by

Ir. Yap Soon Hoe

IEM President Ir. Dr Tan Yean Chin and Honorary Secretary Ir. Yap Soon Hoe attended the 49th General Assembly of the World Federation of Engineering Organisations (WFEO), an international non-governmental organisation founded in 1968 under the auspices of the United Nations Educational, Scientific and Cultural Organizations (UNESCO) in Paris.

IEM is a founder member of WFEO which brings together national engineering organisations from over 90 nations and represents some 20 million engineers from around the world.

WFEO held its 49th General Assembly in Rome, Italy, from 1-2 December, 2017 and before that, in Kyoto, Japan, from 3-4 December, 2015.

Prior to the General Assembly, the following Standing and Technical Committees held their meetings:

1. Committee on Education in Engineering (CEIE).
2. Committee on Engineering and the Environment (CEE).
3. Committee on Information and Communication (CIC).
4. Committee on Engineering Innovative Technologies (CEIT).
5. Committee on Engineering Capacity Building (CECB).
6. Committee on Energy (CE).
7. Women in Engineering (WIE).
8. Committee on Anti-Corruption (CAC).
9. Committee on Disaster Risk Management (CDRM).
10. Young Engineers/Future Leaders (YE/FL).

IEM Executive Committee members Ir. Dr Tan Chee Fai and Ir. Assoc. Prof. Leong Wai Yie represented IEM at the CEIT, CEIE and CE, WIE meetings on a self-funded, voluntary basis.

At the 49th General Assembly, the following office bearers were elected to the WFEO Executive Board:

President	Dr Marlene Kanga (Engineers Australia)
President-Elect	Prof. Ke Gong (Chinese Association of Science and Technology
Past President	Eng. Jorge Spitalnik (Pan American Union of Engineers)
Exec. Vice President	Dr Reginald Vachon (American Society of Mechanical Engineers)
Exec. Vice President	Eng. Crtomir Remec (European Council of Engineers Chambers)
Treasurer	Er. Tan Seng Chuan (Institution of Engineers, Singapore)
Deputy Treasurer	Mr. Pierre de Boigne - non-voting member
Executive Director	Mr. Jacques de Mereuil - non-voting member

The WFEO Executive Council held its meeting on 30 November. IEM is not a member of the Executive Council and Ir. Dr Tan Yean Chin attended the meeting as the Secretary General of the Federation of Engineering Institutions of Asia and Pacific (FEIAP) which is a member of the WFEO Executive Council. Dato' Ir. (Dr) Lee Yee Chong and Ir. Yap Soon Hoe attended the meeting as observers.

During the meeting Ir. Dr Tan cast his objection vote against the proposal to increase the WFEO membership annual subscription, but nevertheless the proposal went through and was approved by the Executive Council.

The Commonwealth of Engineers Council (CEC), headed by Prof Paul Jowitt, Past President of the Institution of Civil Engineers United Kingdom, hosted a cocktail reception for the delegates on 29 November, 2017.

As FEIAP Secretary General, Ir. Dr Tan Yean Chin took the opportunity to network and foster closer rapport with the heads of other delegations such as Prof. Jose Pereira Vieira, President of European Federation of National Engineering Associations (FEANI), Mr. Carlos Mineiro Aires of the Council of Engineers Associations of Portuguese and Spanish Speaking Countries (Ordem Dos Engenheiros- CICP), Eng. Julius Riungu of the Federation of African Engineering Organisations (FAEO), Mr. Abderrahim Handoufe of the Union Nationale Des Ingeieurs

IEM President Ir. Dr Tan Yean Chin and IEM Honorary Secretary Ir. Yap Soon Hoe took the opportunity to network. Standing next to Ir. Dr Tan is WFEO President Dr Marlene Kanga

The WFEO General Assembly, chaired by Outgoing President Jorge Spitalnik

Some 90 countries were involved in the WFEO General Assembly @ WEF2017 in Rome

Marocaines and Prof. Edemar De Souza of the Pan American Federation of Engineers Organizations (UPADI).

The discussions were held with a view for FEIAP to engage the organisations to collaborate on engineering education and the formation of a network of international engineering organisations.

Such initiatives would forge greater cooperation between such organisations and FEIAP, which will indirectly boost the image of IEM as the FEIAP Secretariat. The ultimate aim is for members of IEM to have a platform to network globally and participate in international conferences and seminars. ■

IEM DIARY OF EVENTS

Title: 13th Malaysia Chem-e-car Competition 2018

30-31 March 2018

Organised by: Chemical Engineering Technical Division
Time : 9.00 a.m. - 6.30 p.m.
CPD/PDP : Applying

Title: Technical Visit to German Malaysian Institute (GMI) Conjuction with Open Day

31 March 2018

Organised by: Mechanical Engineering Technical Division
Time : 9.00 a.m. - 1.00 p.m.
CPD/PDP : Applying

Kindly note that the scheduled events are subject to change. Please visit the IEM website at www.myiem.org.my for more information on the upcoming events.

Solving Engineering Problems with Systematic Innovative Approach: Acquiring TRIZ as Your Skill

URBAN ENGINEERING DEVELOPMENT SPECIAL INTEREST GROUP

reported by

En. Azhar Azmi

Engineers are accustomed to coming up with innovative solutions for various engineering problems. The methods used to solve engineering problems usually require a certain systematic approach or strategy.

The TRIZ is one such method. To introduce IEM members to TRIZ, the Urban Engineering Development Special Interest Group (UEDSIG) organised a 2-hour lecture by Assoc. Prof. Dr Yip Mum Wai, Dean of Faculty of Engineering at Tunku Abdul Rahman University College (TARUC). Prof. Yip is a certified TRIZ instructor and a certified Theory of Open Problem-Solving instructor. He has won many innovation and research competitions and has embarked on several successful ventures in start-up innovative companies. The talk on 5 July, 2017, was attended by IEM members from varied engineering fields.

TRIZ is the acronym for a Russian phrase, *"Teoriya Resheniya Izobretatel'skih Zadatch"* which translates as "Theory of Inventive Problem Solving". It was initially developed by an acclaimed 20th century Russian engineer, scientist and inventor, Genrikh Saulovich Altshuller (15 Oct, 1926 – 24 Sept, 1998).

Dr Yip Mum Wai, Dean of Faculty of Engineering at Tunku Abdul Rahman University College (TARUC)

Russian engineer, scientist and inventor, Genrikh Saulovich Altshuller

Essentially, TRIZ is a method or procedure of systematic problem-solving skills (uncertainty) based on past successful solutions. It is used as a toolset or flowchart to solve possible future problems (uncertainty) in a systematic sequence. Consequently, the TRIZ method reduces wasted or down time by focusing quickly on real solutions in creative and innovative ways. Engineers can then focus on what they do best, that is problem solving and reducing down time in an efficient way. However, engineers should note that this method does not replace or substitute technical knowledge.

TRIZ is based on the study of patterns of problems and solutions. It is a systematic problem-solving method based on logic and data, instead of relying on the intuition of individuals or groups. A key feature

40 Inventive Principles

1. Segmentation
2. Taking Out or Extraction
3. Local Quality
4. Asymmetry
5. Merging or Combination
6. Universality
7. Nested Doll
8. Anti-weight or Counter weight
9. Preliminary anti action/Prior counter action
10. Preliminary action/Prior action
11. Beforehand cushioning/Prior Cushioning
12. Equipotentiality/Remove tension
13. The other way around
14. Spheroidality-Curvature
15. Dynamics
16. Partial or excessive actions
17. Another dimension
18. Mechanical vibratin
19. Periodic action
20. Continuity of useful action
21. Skipping/Hurrying
22. Blessing in Disguise
23. Feedback
24. Intermediary
25. Self-service
26. Copying
27. Cheap/Short Living
28. Mechanics substitution/Another sense
29. Pneumatics and hydraulics/Fluidity
30. Flexible shells and thin films/Thin & flexible
31. Porous Materials/Hotels
32. Colour changes
33. Homogeneity
34. Discarding and recovering
35. Parameter changes
36. Phase transitions
37. Thermal expansion/Relative change
38. Strong oxidants/Enriched Atmosphere
39. Inert Atmosphere/Calmed Atmosphere
40. Composite materials/Composite structure

Figure 1: 40 Inventive Principles

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of TRIZ is Inventive Principles. This is a basic, generalised rule that is accepted as fact and works in an exactly the same way consistently, such as Segmentation, Taking Out or Extraction, Local Quality and others. Another key feature is Contradiction Matrix. Contradiction is defined as "improvement in one characteristic of a system results in the degradation of another characteristic".

Segmentation is an inventive principle. It involves dividing an object into independent parts. It makes an object sectional for easy assembly and disassembly. Examples include do-it-yourself furniture, camping test, modular office, 3D puzzles and others.

Another inventive principle is Extraction or Taking Out. This involves separating an interfering part from an object. Examples include an air-conditioning compressor unit, tooth extraction and medical ampoules. Another inventive principle is symmetry. This involves changing the shape of an object from symmetrical to asymmetrical or, if an object is asymmetrical, increasing its degree of symmetry. Examples are chair design, fashion or hairstyles.

There are a total 40 inventive principles in TRIZ which can be used for innovation and problem solving. The 40 inventive principles are shown in Figure 1.

These inventive principles are then used within a contradiction matrix based on the analyses of 2.8 million international patents. It is a systematic method to solve engineering contradictions without trade-off solutions. With this, the user can identify improving and worsening features of the engineering system. An example of contradiction matrix is shown in Figure 2.

Group Photo

The workshop is just an introduction to TRIZ as there are several levels of training and certification for TRIZ. IEM plans to organise an advanced workshop (Level 1) on TRIZ in the near future. Those interested to learn more can refer to future TRIZ related talks/ workshop by IEM or directly contact Malaysia TRIZ Innovation Association (MyTRIZ) at www.mytriz.com.my. ■

Contradiction Matrix

39 Worsening Parameters

39 Improving Parameters

Worsening Feature → / Improving Feature ↓	Speed	Shape	Loss of Time	Reliability	Measurement accuracy	Ease of Operation	Adaptability or versatility	System complexity	Measurement Difficulty	Productivity
Speed	+	35, 15, 18, 34		11, 35, 27, 28	28, 32, 1, 24	32, 28, 13, 12	15, 10, 26	10, 28, 4, 34	3, 34, 27, 16	
Shape	35, 15, 34, 18	+	14, 10, 34, 17	10, 40, 16	28, 32, 1	32, 15, 26	1, 15, 29	16, 29, 1, 28	15, 13, 39	17, 26, 34, 10
Loss of Information	26, 32		24, 26, 28, 32	10, 28, 23		27, 22			35, 33	13, 23, 15
Loss of Time		4, 10, 34, 17	+	10, 30, 4	24, 34, 28, 32	4, 28, 10, 34	35, 28	6, 29	18, 28, 32, 10	
Measurement accuracy	28, 13, 32, 24	6, 28, 32	24, 34, 28, 32	5, 11, 1, 23	+	1, 13, 17, 34	13, 35, 2	27, 35, 10, 34	26, 24, 32, 28	10, 34, 28, 32
Ease of Operation	18, 13, 34	15, 34, 29, 28	4, 28, 10, 34	17, 27, 8, 40	25, 13, 2, 34	+	15, 34, 1, 16	32, 26, 12, 17		15, 1, 28
Ease of repair	34, 9	1, 13, 2, 4	32, 1, 10, 25	11, 10, 1, 16	10, 2, 13	1, 12, 26, 15	7, 1, 4, 16	35, 1, 13, 11		1, 32, 10
Adaptability or versatility	35, 10, 14	15, 37, 1, 8	35, 28	35, 13, 8, 24	35, 5, 1, 10	15, 34, 1, 16	+	15, 29, 37, 28	1	35, 28, 6, 37
System complexity	34, 10, 28	29, 13, 28, 15	6, 29	13, 35, 1	2, 26, 10, 34	27, 9, 26, 24	29, 15, 28, 37	+	15, 10, 37, 28	12, 17, 28
Productivity		14, 10, 34, 40		1, 35, 10, 38	1, 10, 34, 28	1, 28, 7, 10	1, 35, 28, 37	12, 17, 28, 24	35, 18, 27, 2	+

Figure 2: Contradiction Matrix

Opportunities for Engineers – Future Hotspots of Cities

URBAN ENGINEERING DEVELOPMENT SPECIAL INTEREST GROUP

reported by

Ir. Tiong Choong Han

The Urban Engineering Development Special Interest Group (UEDSIG) invited Mr. Ishmael Ho, the CEO of Ho Chin Soon Research Sdn. Bhd., to give a pre-AGM talk on "Opportunities for Engineers – Future Hotspots of Cities" on 9 December, 2017. The event was well attended by 67 IEM members who were eager to learn more about the locations of the future hotspots of cities, specifically Kuala Lumpur, in the process of economic development.

Ho Chin Soon Research Sdn. Bhd. is a property information company that provides information on land use and ownership data to those in the property industry, including real estate developers, property consultants, real estate agents and related government departments. Incidentally, Mr. Ho is the son of Sr. Ho Chin Soon, Malaysia's foremost map developer.

After session Chairman En. Azhar Azmi welcomed the participants and introduced the speaker, Mr. Ho began the talk with an introduction to Ho Chin Soon Research Sdn. Bhd. and explained the 3 real estate mantras/determinants: Location, Timing and Branding.

He then elaborated on these three critical factors and pointed out past and present hotspots by making references to MRT 1, 2, 3 as well as branded developers and townships. Invariably, a successful project is one that is blessed with these three mantras/determinants coming together.

Participants at the UEDSIG pre-AGM

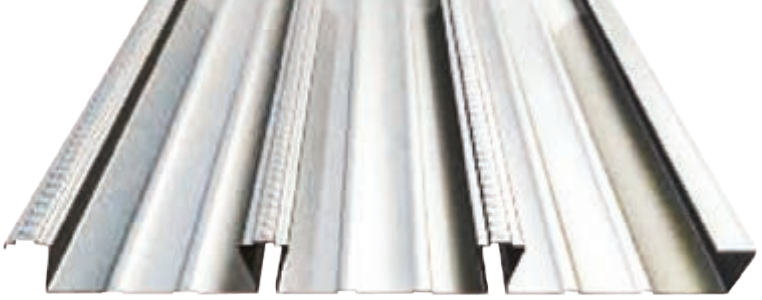
So how does one identify a hotspot? Mr. Ho ended his talk by predicting the locations of future hotspots in relation to the Kuala Lumpur-Singapore High Speed Rail (HSR) and the special development corridors resulting from it.

For the panel discussion that followed, Ir. Yam Teong Sian and Ir. Dr Wang Hong Kok were invited to join Mr. Ho on stage. Ir. Yam highlighted the factors which determined urban land use: General accessibility, special accessibility, additional factors and dynamic factors. As expected, the hotspots are commercial areas which enjoy the best connectivity with the rest of the city and their land value is the highest.

In an effort to link hotspots to the wealth generated by a city as a result of better connectivity, Ir. Dr Wang dealt with three concepts: Per capita in larger cities is higher, the theory of wealth refers to the price earned by an article and the house price decides the wealth of a city. Clearly, a city which is productive due to better connectivity is relatively wealthier.

After the panel discussion was the Q&A session, with lively engagement between the participants and the speakers. The talk ended with Ir. Dr Wang presenting a souvenir and a certificate of appreciation to Mr. Ho. ■

Empire Shopping Gallery, Subang



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From Ancient Silk Road to OBOR Initiative

Ir. Chin Mee Poon

***Ir. Chin Mee Poon** is a retired civil engineer who derives a great deal of joy and satisfaction from travelling to different parts of the globe, capturing fascinating insights of the places and people he encounters and sharing his experiences with others through his photographs and writing.*

During a state visit to Kazakhstan in September 2013, Chairman Xi Jinping of China first brought up the idea of an economic belt along the old Silk Road. One month later, when he was addressing the Indonesian parliament, he proposed the formation of a maritime silk road of the 21st Century.

Thus was born China's "Silk Road Economic Belt and 21st Century Maritime Silk Road" Initiative, also known as the One Belt One Road Initiative (OBOR). In just 4 short years, this has received extremely good response from countries from Southeast Asia to Africa. So many countries are benefitting from it that China has decided to extend the initiative to cover Latin America and to create a Silk Road on Ice. OBOR has become one of the hottest topics among politicians, economists, engineers and even ordinary folks worldwide.

The ancient Silk Road, on the other hand, remains just a name in most people's mind. Most historians regard the ancient Silk Road to begin in the city of Chang-an (Xian today) in central China and end in Rome in Italy. Contrary to popular belief, what linked these two great cities was not just a single road but a network of roads with branches extending north and south to various countries.

Such a dense network of roads had to have evolved over a long period of time. It was generally believed that the roads started to appear in the western part of Asia in present-day Syria, Iran, Afghanistan and Pakistan. During the West Han Dynasty (202BC – 8AD) of China, the Chinese Emperor sent his envoy, Zhang Qian, to establish diplomatic relations with states in the west. Zhang was away for 13 years and came back with many interesting stories about the places he visited. Subsequent envoys went as far as Persia and Egypt. The eastern section of the Silk Road network was thus established and Zhang Qian was often dubbed "Father of the Silk Road".

The Silk Road network played a very important role in facilitating international trade, but most traders carried out businesses only within a few hundred kilometres radius. Difficult road and climate conditions as well as bandits made the transporting of valuable commodities over long distances a highly risky venture. Goods usually changed many hands on their way from China to Europe and vice versa; yet technologies, ideas and religions managed to spread via this network of roads. Marco Polo travelled from Venice to Chang-an in the 13th Century, and the great Tang Dynasty monk Xuanzang travelled from Chang-an to India in the 7th Century to study Buddhism and bring back the holy scripts. They were among the few people who managed to cover very long distances on the Silk Road.

German Ferdinand von Richthofen first coined the term "Silk Road" in mid-19th Century to describe this vast network of roads but silk, though expensive, was not the most valuable item traded. Even more valuable were gold, jewellery and ivory. Before the secret of silk making was leaked to the outside world, silk was one of China's most precious exports and it garnered great admiration from the Europeans.

Today China is exporting its technologies and finance to developing countries along the old Silk Road, helping to speed up infrastructure development essential for economic growth. This creates a win-win situation in which China can channel its surplus construction capacity and financial prowess for good investments abroad while recipient countries can enjoy the basic infrastructures which they can hardly afford otherwise. ■

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Kepada Semua Ahli,

SENARAI CALON-CALON YANG LAYAK MENDUDUKI TEMUDUGA PROFESIONAL TAHUN 2018

Berikut adalah senarai calon yang layak untuk menduduki Temuduga Profesional bagi tahun 2017.

Mengikut Undang-Undang Kecil IEM, Seksyen 3.8, nama-nama seperti tersenarai berikut diterbitkan sebagai calon-calon yang layak untuk menjadi Ahli Institusi, dengan syarat bahawa mereka lulus Temuduga Profesional tahun 2018.

Sekiranya terdapat Ahli Korporat yang mempunyai bantahan terhadap mana-mana calon yang didapati tidak sesuai untuk menduduki Temuduga Profesional, surat bantahan boleh dikemukakan kepada Setiausaha Kehormat, IEM. Surat bantahan hendaklah dikemukakan sebulan dari tarikh penerbitan dikeluarkan.

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Setiausaha Kehormat, IEM

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WAN MOHAMMAD BIN SALLEH @ WAN SALLEH	BE HONS (UTM) (MACHINERY, 1994)
NOR NINA NATASHA BINTI NOR AZIZAN	BE HONS (UTHM) (MECHANICAL, 2006)
SHARIFAH DZAIN BINTI SYED YUSOF	BE HONS (UTM) (MECHANICAL, 2006)
SREE RAM A/L APANA @ APANA NARAYANAN	BE HONS (MMU) (MECHANICAL, 2007)
AZAHAR BIN MOHD	BE HONS (MALAYA) (MECHANICAL, 1998)
MAHADI BIN MOHAMAD SHAFIE	BE HONS (UKM) (MECHANICAL & MATERIAL, 1998)
MOHAMAD HAFEZ BIN KHAIRAN	BE HONS (UiTM) (MECHANICAL, 2007)
MOHD FAIZ BIN ADAM	BE HONS (MONASH) (MECHANICAL, 2009)
AMISAH BINTI IDRIS	BE HONS (UNITEN) (MECHANICAL, 2003)
ZAHROL BIN PONIRAN	BE HONS (UNITEN) (MECHANICAL, 2007)
JAN MOHAMMED ZAIN BIN BRAHIM	ADV. DIP. (UiTM) (MECHANICAL, 1995)
SAMRAA BINTI AHMAD	BE HONS (UiTM) (MECHANICAL, 2009)
SAFWAN BIN DON	BE HONS (MALAYA) (MECHANICAL, 2010)
AHMAD JALIL BIN JAAFAR	BSc HONS (TRI-STATE) (MECHANICAL, 1991)
MOHD HAFIFI BIN ISNAN	BE HONS (UTHM) (MECHANICAL, 2007)
MOHD YUSOF AIZAD BIN MUKHTAR	BE HONS (UiTM) (MECHANICAL, 2010)
HII WEE SIAN	BE HONS (USM) (MECHANICAL, 2009)
LIM RUEY FWU	BE HONS (INTI UNIVERSITY) (MECHANICAL, 2013) ME (BRADFORD) (MECHANICAL, 2013)
HASIBULLAH BIN DERIS	BE HONS (UiTM) (MECHANICAL, 2008) ME (UiTM) (ENGINEERING MANAGEMENT, 2008)
MOHD RODZI BIN RAMLI	BE HONS (UiTM) (MECHANICAL, 2008)
MOHD SYAHMAN BIN MOHD RUSLAN	BE HONS (MALAYA) (MECHANICAL, 2008)
MOHD FAIRUZ BIN MOHD RASHID	BE HONS (UTeM) (MECHANICAL-MANUFACTURING, 2006)

KEJURUTERAAN KOMUNIKASI

DORAISAMY A/L SEENAIYAH	BE HONS (UKM) (COMMUNICATION & COMPUTER, 2005) ME (UNITEN) (ENGINEERING MANAGEMENT, 2014)

PERPINDAHAN AHLI

No. Ahli	Nama	Kelayakan
KEJURUTERAAN AWAM		
19340	TAKSIAH BINTI A. MAJID	BE (MIDDLESEX POLYTCHNIC) (CIVIL, 1990) MSc (LIVERPOOL) (1991) PhD (LIVERPOOL) (1996)
20911	LAU TZE LIANG	BE HONS (USM) (CIVIL, 1999) MSc (USM) (STRUCTURAL, 2001)
44715	MATHILDA TUPANG MONTEGRAI	BE HONS (SWINBURNE) (CIVIL, 2012)
38580	FARIDZUL BIN MOHAMMAD FADZIL	BE HONS (UTM) (CIVIL, 2010)
35930	THONG CHU JIN	BE HONS (UTM) (CIVIL, 2010)
30532	SAMSURI BIN MOHD SALLEH	BE HONS (UTM) (CIVIL, 2000) MSc (USM) (BUILDING TECHNOLOGY, 2013)
36288	TAY JOO KING	BE HONS (CIVIL & ENVIRONMENTAL, 2007)
96017	CHEN CHUANG LOOM	BE HONS (UNIMAS) (CIVIL, 2013)
41227	TAN CHEE MING	BE HONS (TASMANIA) (CIVIL, 2006)
45371	MOHD SHUKRI BIN ISMAIL	BE HONS (UMS) (CIVIL, 2008)
44544	JENNI ALLIVIANA SUALLIH	BE HONS (UKM) (CIVIL & ENVIRONMENTAL, 2007)
42218	MONALIZA BINTI DAHLAN	BE HONS (UTHM) (CIVIL, 2011)
44746	ADAM BIN AHMAD ZAKI YUDDIN	BE HONS (UTP) (CIVIL, 2011) ME (UTM) (CIVIL-STRUCTURE, 2014)
29620	MOHD NORDIN BIN MUSTAPHA	BE HONS (UTM) (CIVIL, 2003)
28919	PONG VUI WEI	BE HONS (MALAYA) (CIVIL, 2007)
41270	PANG PING YEN	BE HONS (UTM) (CIVIL, 2009)
51719	TAY BOON LONG	BE HONS (UNITEN) (CIVIL, 2010)
29357	TAN WEE CHEN	BE HONS (UPM) (CIVIL, 2010)
43285	SAMANTHA LAU ZHILING	BE HONS (UMS) (CIVIL, 2012)
90890	TAN CHIN LENG	BE HONS (UNITEN) (CIVIL, 2010)
25626	ADRIANA BT ABD AZIZ	BE HONS (UPM) (CIVIL, 2000)
72438	MUHAMAD RIZWAN BIN ZULKARNAINI	BE HONS (UTHM) (CIVIL, 2014)
58050	NORSHAFIK BIN SHAHAR	BE HONS (UTM) (CIVIL, 2011) MSc (UTM) (CONSTRUCTION MANAGEMENT, 2014)
30652	SURAYYA BINTI AHMAD SOFIAN	BE HONS (UTHM) (CIVIL, 2006)
28819	MOHAMAD ALI BIN PAILING	BE HONS (UM) (CIVIL, 2006)
24209	JAMILAH BINTI TUKANG	BE HONS (UPM) (CIVIL, 2002)
27059	NUR HIDAYAH BINTI ANUAR	BE HONS (UiTM) (CIVIL, 2006) MSc (SALFORD) (BUILDING INFORMATION MODELLING & INTEGRATED DESIGN, 2016)
15621	KAMARUL AZIAN BINTI HASHIM	ADV. DIP. (ITM) (CIVIL, 1993)
78454	ZAINORIZUAN BIN MOHD JAINI	BE HONS (KUiTTHO) (CIVIL, 2006) MSc (SWANSEA) (COMPUTER MODELLING & FEM IN ENGINEERING MECHANICS, 2009) PhD (SWANSEA) (2013)
70219	YONG JYH GIIN	ME (SWANSEA) (CIVIL, 2008)
21228	TAN CHOON TUAN	BE HONS (RMIT) (CIVIL, 1996)
49408	SEE KEAN THYE	BE HONS (UTM) (CIVIL, 2007)
60054	LOW SHEUE LIH	BE HONS (UNITEN) (CIVIL, 2007)
23751	SAIFUL BASRI BIN SA'ADON ZUBIR	BE HONS (UiTM) (CIVIL, 2005)
33754	SITI KHADIJAH BINTI CHE OSMI	BE HONS (UiTM) (CIVIL, 2008) MSc (SURREY) (BRIDGE ENGINEERING, 2009)
34846	HIDAYAH BINTI BASRI	BE HONS (UNITEN) (CIVIL, 2006)
32868	LIM KIM ONG	BE HONS (UNIMAS) (CIVIL, 2010) ME (UTM) (CIVIL-GEOTECHNIC, 2013)
28416	MOHD KHALIS BIN BAHAROM	BE HONS (MALAYA) (CIVIL, 2007)
33820	FERDOLIN F. EBIK	BE HONS (MALAYA) (CIVIL, 2005)
19071	EMILIAWATI BINTI MAT LAZIM	BE HONS (USM) (CIVIL, 2007)
51337	AZDZHARULNIZZAM BIN ALWI	BE HONS (UNISEL) (CIVIL, 2007) ME (UPM) (WATER, 2014)
87695	FOONG KOK LI	BE HONS (UTM) (CIVIL, 2005) MSc (UTM) (CONSTRUCTION MANAGEMENT, 2006)
64144	HIROMI LEE CHIEW YUN	BE HONS (UTHM) (CIVIL, 2008)
66682	LI CHING FUI	BSc (MONTANA STATE) (CIVIL, 1985)
12920	AHMAD FERUZ BIN IZHARUDDIN	ADV. DIP. (ITM) (CIVIL, 1991)
56604	SHARMEELEE A/P SUBRAMANIAM	BE HONS (MANGALORE) (CIVIL, 1998) ME (SINGAPORE) (GEOTECHNICAL, 2004)
49620	LIM DIXON AMANDO	ME (SWANSEA) (CIVIL, 2010)
25747	CHAI SOO MIN	BE HONS (UPM) (CIVIL, 2000)
57075	TAN KOK FAN	BE HONS (UNITEN) (CIVIL, 2007)
09399	AW JOON CHING	BSc HONS (NEW ENGLAND) (CIVIL, 1986)
51735	AFIQ MAOLENIN BIN RAZALI	BE HONS (MALAYA) (CIVIL, 2008)
33643	MOHD AMRIZAL BIN ADNAN	BE HONS (UiTM) (CIVIL, 2008)
41172	MARIEO PARILLA EDINTE ANAK JIKEN	BE HONS (UiTM) (CIVIL, 2008)
28923	THAM CHIN HORNG	BE HONS (UPM) (CIVIL, 2007)
53730	LO SIE CHIEH	BE HONS (WALES) (CIVIL, 2004)
45840	MOHD ASHA'ARI BIN MASROM	BE HONS (UiTM) (CIVIL, 2009) ME (UiTM) (STRUCTURAL, 2010)
64795	TOI AI YIN	BE HONS (UPM) (CIVIL, 2011)
KEJURUTERAAN ELEKTRIKAL		
22079	WONG JENN KIN	BE HONS (UNITEN) (ELECTRICAL POWER, 2008)
81310	KOW WEI YEANG	BE HONS (UMS) (COMPUTER, 2009) ME (UMS) (ELECTRICAL & ELECTRONIC, 2013)
64531	WONG YIEW CHONG	BSc HONS (OHIO STATE) (ELECTRICAL & COMPUTER, 2009)
55872	TEE PING HONG	BE HONS (UTP) (ELECTRICAL & ELECTRONICS, 2011)
61911	YU YONG KOK	BSc HONS (WESTERN MICHIGAN) (ELECTRICAL, 2000)
90076	TEE WEI MENG	BE HONS (UKM) (ELECTRICAL & ELECTRONIC, 2012) BSc (DUISBERG-ESSEN) (ELECTRICAL & ELECTRONIC, 2012)
64600	MOHD NAJIB BIN HASHIM	BE HONS (UNITEN) (ELECTRICAL POWER, 2012)
73020	TAN BOON KAI	BE HONS (UCSI) (ELECTRICAL & ELECTRONIC, 2012) ME (UNITEN) (ELECTRICAL, 2014)
28984	LEE CHEE SING	BE HONS (MMU) (ELECTRICAL, 2004)
58683	NORHAZIRAH BINTI JAAFAR	BE HONS (UTeM) (POWER ELECTRONIC & DRIVE, 2011)
90143	NURHIDAYAH BINTI IBRAHIM	BE HONS (UMS) (ELECTRICAL & ELECTRONICS, 2012)
53707	SOO CHUNG MIN	BE HONS (UTHM) (ELECTRICAL, 2011)
29804	MOHD ZAKI BIN ZAKARIA	BE HONS (UTM) (ELECTRICAL, 2005)
59110	MOHD JOHARI BIN ABU BAKAR	BE HONS (UTM) (ELECTRICAL, 2001)
56520	IKHWAN BIN SULAIMAN	BE HONS (UNITEN) (ELECTRICAL POWER, 2009)
52783	KHAIRUL NA'IM BIN ABDUL HALIM	BE HONS (UMP) (ELECTRICAL-POWER SYSTEM, 2012)
93817	SAIFUL ISHAM BIN ISMAIL	BE HONS (UNITEN) (ELECTRICAL POWER, 2011)
27978	MANIMARAN RAMIYA	BE HONS (UTM) (ELECTRICAL, 2003)
26397	NOOR AZMAN BIN MOHD RUAH	BE HONS (UTM) (ELECTRICAL, 2002)
87342	ALBERT MARCUS	BE HONS (UMS) (ELECTRICAL & ELECTRONIC, 2009)
34063	MOHD ANUAR BIN HASNAN	BE HONS (UiTM) (ELECTRICAL, 2009)
72449	PHOON JEEN YOW	BE HONS (UTM) (ELECTRICAL-INSTRUMENTATION & CONTROL, 2006)
56491	GOPI A/L SUBRAMANIAM	BE HONS (UNITEN) (ELECTRICAL POWER, 2009)
49724	RADEN EMIYANTI RADIN A. OTHMAN	BE HONS (UTHM) (ELECTRICAL, 2012)
66683	OOI WOEI SONG	BE HONS (UKM) (ELECTRICAL & ELECTRONIC, 2012)
78070	MOHD HEZRI BIN FAZALUL RAHIMIN	BE HONS (UTM) (INSTRUMENTATION & CONTROL, 2001) ME (UTM) (ELECTRICAL, 2002) PhD (UiTM) (2009)
37833	CHAN JOY LEE	BE HONS (UNITEN) (ELECTRIAL & ELECTRONICS, 2010) MSc (GLAMORGAN) (SUSTAINABLE POWER TECHNOLOGY, 2011)
94672	NAZLAN AZIZI BIN ABD AZIZ	BE HONS (UiTM) (ELECTRICAL, 2009)
78077	MURALI A/L HARIPALAN	BE HONS (MMU) (ELECTRONIC-TELECOMMUNICATION, 2007)
71539	YEOH KIAN LEE	BE HONS (UPM) (ELECTRICAL & ELECTRONIC, 2013)
26944	YAP CHUNG KEIN	BE HONS (SHEFFIELD) (ELECTRICAL, 2004)
26406	LOW WENG KIN	BE HONS (UTM) (ELECTRICAL, 2002)
22364	WONG SEAK WAI	BE HONS (UMS) (ELECTRICAL & ELECTRONIC, 2000)
61129	PRATAP A/L CHILAPPAN	BE HONS (UniMAP) (ELECTRICAL SYSTEM, 2010)
28751	SURIAMURNI BINTI KHABOLLAH	BE HONS (UTHM) (ELECTRICAL, 2009)

66054	FAIZAL AZIZ BIN MOHAMED FAROOK	BE HONS (UNITEN) (ELECTRICAL & ELECTRONICS, 2006) ME (UNITEN) (ELECTRICAL, 2012)

KEJURUTERAAN ELEKTRONIK

36271	HO NYUK SHIONG	BE HONS (PLYMOUTH) (ELECTRICAL & ELECTRONIC, 2000)
75384	SHAHRANI BINTI SHAHBUDIN	BE HONS (MALAYA) (ELECTRICAL, 1999) ME (UKM) (COMMUNICATION & COMPUTER, 2005) PhD (UKM) (2014)
39170	ANAS SHAIDI BIN JOHARI	BE HONS (UTM) (ELECTRICAL-ELECTRONIC, 2005)
64741	MOHD YUSAIRY BIN MOHD YUSRI	BE HONS (UTM) (COMPUTER, 2009)
25290	SAFIDAH BINTI MOHD ARIFF	BE HONS (UiTM) (ELECTRICAL, 2002)
34577	NORHAZIMI BINTI HAMZAH	BE HONS (UTP) (ELECTRICAL & ELECTRONICS, 2002) ME (UTM) (ELECTRICAL-MECHATRONICS & AUTOMATIC CONTROL, 2007) PhD (UTM) (2015)
58090	NURUL HUDA BINTI ABD RAHMAN	ME (SURREY) (ELECTRONIC, 2008) PhD (UKM) (2015)
54561	AHMAD ZURIYADI BIN PAWZI	BE HONS (UTM) (ELECTRICAL-ELECTRONIC, 2009)
79367	SHAFINAZ SOBIHANA SHARIFFUDIN	BE HONS (UKM) (MICROELECTRONICS, 2002) MSc (UKM) (MICROELECTRONICS, 2003) PhD (UiTM) (2016)
96883	ALHAN FARHANAH BINTI ABD RAHIM	BE HONS (SOUTHAMPTON) (ELECTRONIC, 1998) MSc (USM) (PHYSICS, 2003) PhD (USM) (2014)
92337	SHAMINI A/P P. JANASEKARAN	BE HONS (USM) (ELECTRONICS, 2006) ME (MALAYA) (ENGINEERING, 2012) PhD (UM) (2017)

KEJURUTERAAN STRUKTUR

43823	LEE HENG GIAP	BE HONS (UTM) (CIVIL, 2007)
43628	HENG CEAH HOOI	BE HONS (MALAYA) (CIVIL, 2006)

KEJURUTERAAN PEMBUATAN

88291	MOHD IZHAM BIN ABDUL LATIFF	BE HONS (UIA) (MANUFACTURING, 2004)

KEJURUTERAAN KIMIA

26979	NOORUL AMEEN BIN HASSAN MOHAMED	BE HONS (UTM) (CHEMICAL, 2001) MSc (USM) (CHEMICAL, 2005)
94141	MOHD FADZLEE BIN MOHD OTHMAN	BE HONS (UTP) (CHEMICAL, 2008)
53778	NG CHAI BENG	BE HONS (ADELAIDE) (CHEMICAL, 2001)
19559	TAN PUE YOKE	BE HONS (UTM) (CHEMICAL, 2004)
42833	MUHAMMAD FADZLI BIN MASNAN	BE HONS (UiTM) (CHEMICAL, 2011)
58044	FRANCIS WONG MING WEI	BE HONS (CURTIN) (CHEMICAL, 2007)

KEJURUTERAAN MEKANIKAL

93672	ANUARY BIN HASHIM	BE HONS (UiTM) (MECHANICAL, 2010)
75392	FOONG CHEE SOON	BE HONS (MALAYA) (MECHANICAL, 2011)
20636	KONG YONG MENG	BE HONS (UPM) (MECHANICAL, 2004)
39272	TUAN MOHD NORIDHAM BIN TUAN LAH	BE HONS (UiTM) (MECHANICAL, 2013)
30995	SUNDARA MORTHI A/L RAMA NADOO	BE HONS (UTM) (MECHANICAL-AERONAUTICAL, 2008)
57590	MOHD AFIAN BIN MOHD IZHAR	BE HONS (UNITEN) (MECHANICAL, 2001)
45365	MOHD NIZAM BIN AHMAD	BE HONS (USM) (MECHANICAL, 2001) MSc (USM) (MECHANICAL, 2005)
58069	MOHD TAUFIK BIN ARSHAD	ME (LONDON) (MECHANICAL, 2008)
66105	IZZAT ZUMAIRI BIN CHE HARUN	BE HONS (UNITEN) (MECHANICAL, 2003)
61120	ZULFADLI BIN MOHD JAIS	BE HONS (NIIGATA) (MECHANICAL & PRODUCTION, 2010)
78063	KANAGAPRAKASAM A/L RASARETNAM	BE HONS (UTM) (MECHANICAL, MARINE TECHNOLOGY, 2000)
26983	LIEW YI PERNG	BE HONS (NANYANG) (MECHANICAL & PRODUCTION, 2005)
77573	KHOO CHUN YONG	BE HONS (UTM) (MECHANICAL, 2006) ME (UTM) (MECHANICAL, 2010)
94307	ABU DHAHIR BIN SAIFUDDIN	BE HONS (UNITEN) (MECHANICAL, 2010)
79353	NG CHEE CHUNG	ADV. DIPL. (UTAR) (MECHANICAL & MANUFACTURING, 2007) BE HONS (SHEFFIELD HALLAM) (MECHANICAL & MANUFACTURING SYSTEMS, 2007)
62041	TAN BENG CHIAT	BE HONS (UTM) (MECHANICAL, 2012)
66810	THAM YI EEI	BE HONS (UTHM) (MECHANICAL, 2010)

PERMOHONAN BARU/PEMINDAHAN MENJADI AHLI KORPORAT

No. Ahli	Nama	Kelayakan
KEJURUTERAAN KIMIA		
54232	ZURAIMI BIN ALIAS	BE HONS (UiTM) (CHEMICAL, 2008) ME (UPM) (PROCESS SAFETY & LOSS PREVENTION, 2017)

CONTINUATION MEMBERSHIP LIST AS OF FEBRUARY JURUTERA ISSUE 2018

PERMOHONAN MENJADI AHLI KORPORAT

Nama	Kelayakan
KEJURUTERAAN AWAM	
ALLIM BIN ABDULLAH	BE HONS (UiTM) (CIVIL, 2011) MSc (UiTM) (STRUCTURAL, 2016)
CHANDRA MOHAN A/L MUTHUSAMY	BE HONS (USM) (CIIVL, 2000)
FAIZAL BIN MAHAMUD	BE HONS (UKM) (CIVIL & STRUCTURAL, 1993) MSC (UKM) (CIVIL & STRUCTURAL, 2003)
IZMAL BIN IBRAHIM	BE HONS (UNIMAS) (CIVIL, 2000)
MARIA BINTI MARCUS	ME (KATHOLIEKE LEUVEN) (CIVIL, 1993)
MOHAMAD RAZALI BIN JUSOH	BE HONS (USM) (CIVIL, 1996)
MOHAMMAD HIRIDDIN BIN HISHAM	BE HONS (UiTM) (CIVIL, 2006)
MOHD AZHAR BIN ABD HAMID	BE HONS (UiTM) (CIVIL, 2004) MEM (UiTM) (2013)
MOHD AZIMUDDIN BIN YUNUS	BE HONS (UTM) (CIVIL, 2006)
MOHD FAXRUROZI BIN PAKRUDIN	BE HONS (UiTM) (CIVIL, 2011)
MOHD KHAIRULNIZAM BIN MOHMMED HAASAN	BE HONS (UiTM) (CIVIL, 2007)
MUHAMMAD SYAHREEN BIN SA'ADON	BE HONS (UiTM) (CIVIL, 2005) MSc (UiTM0 (CIVIL, 2008)
ONG SHIOU TING	BE HONS (UTP) (CIVIL, 2010)
RAFIDAH BINTI MOHAMED RADZI	BE HONS (UKM) (CIVIL & ENVIRONMENTAL, 2001)
REDZUAN BIN JAAFAR	BE HONS (SUNDERLAND) (CIVIL, 1997)
KEJURUTERAAN ELEKTRIKAL	
AHMAD TARMIZI BIN AHMAD TAUFEK	BE HONS (UiTM) (ELECTRICAL, 2007)
BONIFACE CHIA HUNG KWANG	BE HONS (MULTIMEDIA) (ELECTRICAL, 2002) MESc (MULTIMEDIA) (2005)
HAZEER @ OZY BIN HASHIM	BE HONS (UTM) (ELECTRICAL, 2007)
LAU WING KEE	BSc (SOUTH DAKOTA) (ELECTRICAL, 1989) ME (UNITEN) (ELECTRICAL, 2006)
MOHAMAD NAJIB BIN ALI	BE HONS (UTM) (ELECTRICAL, 2011)
MOHD AIZZUDDIN BIN MD MUHSIN	BE HONS (UTM) (ELECTRICAL, 2008)
MOHD AL IMRAN BIN MOHD HARUN	BE HONS (UTM) (ELECTRICAL, 2010)
MOHD ARIEF ZAKI BIN TOGIN	BE HONS (UTM) (ELECTRICAL, 2008)
MUHAMAD ZIKRI HAKIM BIN MOHD RASHID	BE HONS (UNITEN) (ELECTRICAL POWER, 2012)
MUHAMMAD AZMUN AMIN BIN AZIZ	BE HONS (UiTM) (ELECTRICAL, 2006)
MUHAMMAD HASSANUDDIN BIN HUSSEN	BE HONS (UiTM) (ELECTRICAL, 2008)
QAWIZAMSHAH BIN MOHAMMAD	BE HONS (UNITEN) (ELECTRICAL, 2008)
SARAVANAN SUBRAMANIAM	BE HONS (UNISEL) (ELECTRICAL, 2007) ME (UM) (ELECTRICAL ENERGY & POWER SYSTEM, 2011)
SHAMSUL AZHAM BIN MOHD ISA	BSc (TENNESSEE) (ELECTRICAL, 1994)
SHEIKH MUZAFAR SYAHDY BIN MUSTAFAH	BE HONS (UTM) (ELECTRICAL-MECHATRONICS, 2006)
KEJURUTERAAN ELEKTRONIK	
AHMAD FAIZUL BIN HAWARY	BE HONS (UTM) (MECHATRONIC, 1999) MSc (SALFORD) (ROBOTICS & AUTOMATION, 2008) PhD (SOUTHAMPTON) (2016)
AHMAD NIZAM BIN ISA	BE (STEVENS INSTITUTE OF TECH.) (ELECTRICAL, 2008)

KEJURUTERAAN KAWALAN & INSTRUMENTASI

MOHD NIZAM BIN ABU SEMAN	BE HONS (UTEM) (CONTROL, INSTRUMENTATION & AUTOMATION, 2007)

KEJURUTERAAN KIMIA

LAI HON KUAN	BE HONS (USM) (CHEMICAL, 2002)

KEJURUTERAAN MEKANIKAL

AHMAD RAIZAL BIN MD ROZALI @ ZAKARIA	BE HONS (VANDEBILT) (MECHANICAL, 2008)
KHAIRUL AZLAN BIN WAN CHIK	BE HONS (UTP) (MECHANICAL, 2007)
MOHD AZWAN BIN AZIZ	BE HONS (APPLIED SCIENCES) (MECHANICAL, 2009)
MOHD HAFZI BIN MD ISA	BE HONS (MINNESOTA) (MECHANICAL, 2007)
MOHD MAARIF BIN ABDUL MALIK	BE HONS (UTHM) (MECHANICAL, 2006)
MUHAMAD IRWAN BIN ABDUL HAMID	BE HONS (UiTM) (MECHANICAL, 2008)
NOR AZMI BIN MOHD JAMAL	BE HONS (UTM) (MECHANICAL, 1996) ME (UTM) (ASSET & FACILITIES, 2011)

PERMOHONAN MENJADI AHLI 'COMPANION'

Nama	Kelayakan
KEJURUTERAAN AWAM	
ALLIM BIN ABDULLAH	BE HONS (UiTM) (CIVIL, 2011) MSc (UiTM) (STRUCTURAL, 2016)

PERMOHONAN MENJADI AHLI 'COMPANION'

No. Ahli	Nama	Kelayakan
KEJURUTERAAN AWAM		
95828	RIDZUAN BIN ZAINAL ABIDIN	B.E.HONS.(MALAYA)(CIVIL, 2005)
95829	FAIZ FAHMI BIN HASHIM	B.E.HONS.(UITM)(CIVIL, 2009)
95824	MOHD FADHIL BIN HASSAN KARIM	B.E.HONS.(UITM)(CIVIL, 2009)
94304	SASHIKALA JAYAPALAN	B.E.HONS.(UNISEL)(CIVIL, 2008)
94632	LIM MA HONG	B.E.HONS.(UTM) (CIVIL, 1999) MBA.(UNI. OF BATH)(1994)
95826	CHUA MIN HUA	B.E.HONS.(UTM)(CIVIL, 2005)
KEJURUTERAAN ELEKTRIKAL		
94300	AHMAD REZA BIN MOHD ESA	B.E.HONS.(UPM) (ELECTRICAL & ELECTRONIC, 2005)
95823	MUHAMMAD NORAZRI BIN AHMAD	B.E.HONS.(UTHM) (ELECTRICAL, 2007)
KEJURUTERAAN ELEKTRONIK		
95827	DR. SITI NORAINI BINTI SULAIMAN	B.E.HONS.(USM) (ELECTRICAL & ELECTRONIC, 2000) M.SC.(USM)(ELECTRICAL & ELECTRONIC, 2003) PHD.(USM)(IMAGING, 2012)
95825	SYAMSUL BAHREEN BIN MOHD SATAR	B.E.HONS.(UTM) (ELECTRICAL-ELECTRONIC, 2006)
95830	NORSAHJATULNIZAM BIN JOHAN	B.SC.(UNI. OF MISSOURI) (ELECTRICAL, 1998)
KEJURUTERAAN KIMIA		
94305	DR ANIS SUHAILA BINTI SHUIB	B.E.HONS.(UNI. OF LEEDS)(CHEMICAL, 1998) M.E.(UNI. OF AUCKLAND) (CHEMICAL & MATERIALS ENGINEERING, 2002) PHD.(UNI. OF EDINBURGH) (ENGINEERING, 2012)
94631	ABD RAHIM BIN MAHMUD	B.E.HONS.(UTM) (CHEMICAL, 2002)
94303	NORHAYATI BINTI MOHD NOOR	B.E.HONS.(UTP) (CHEMICAL, 2009)
KEJURUTERAAN MEKANIKAL		
94302	BOEY ONN JIN	B.E.HONS.(NOTTINGHAM TRENT UNI.) (MECHANICAL, 1996)
94299	AHMAD BIN DAENG	B.E.HONS.(UTM) (MECHANICAL-MANUFACTURING, 2004)
94301	WONG AIK CHEE	B.SC.(MICHIGAN TECHNOLOGICAL UNIVERSITY) (MECHANICAL, 1994)

PEMINDAHAN KEPADA AHLI SISWAZAH

No. Ahli	Nama	Kelayakan
KEJURUTERAAN AWAM		
65798	MUHAMMAD HAZMI BIN ILIAS	B.E.HONS(UITM)(CIVIL, 2014)
50811	LING JOU JHENG	B.E.HONS.(CURTIN UNI. OF TECH.)(CIVIL & CONSTRUCTION, 2015)
52287	DORINE D'CRUZ A/P SARLAS D'CRUZ	B.E.HONS.(IUKL)(CIVIL, 2013)
59784	MOHD ZAKRY BIN JUNEH	B.E.HONS.(IUKL)(CIVIL, 2014)
66300	TARA DAHRSHANI A/P RAJA GOPAL	B.E.HONS.(IUKL)(CIVIL, 2015)
81380	SING CHOON ANN ADMOND	B.E.HONS.(IUKL)(CIVIL, 2016)
85532	TIE TZER SHENG	B.E.HONS.(IUKL)(CIVIL, 2017)
21690	GUEE KEOK JIM	B.E.HONS.(MALAYA)(CIVIL, 2002)
84747	TAY WEI SONG	B.E.HONS.(MALAYA)(CIVIL, 2016)
54157	CHUA YUAN HAW	B.E.HONS.(SWINBURNE UNI. OF TECH.)(CIVIL, 2013)
51613	HO WENG KWEN	B.E.HONS.(SWINBURNE UNI. OF TECH.)(CIVIL, 2014)
79210	LAW SIE HUNG, EDRIC	B.E.HONS.(SWINBURNE UNI. OF TECH.)(CIVIL, 2016)
27790	MOHD IZHAR BIN SAIBIN	B.E.HONS.(UITM)(CIVIL, 2007)
28332	SAFRINA BINTI MOHD AZIZ	B.E.HONS.(UITM) (CIVIL, 2007) M.SC.(UITM)(CIVIL-ENVIRONMENTAL, 2010)
48346	FARID HAKEM BIN NOZLAN	B.E.HONS.(UITM)(CIVIL, 2013)
69080	MUHAMMAD SYAMIM HILMI B. MOHD KAMSHAH	B.E.HONS.(UITM)(CIVIL, 2016)
69145	NORSYAHIDA BINTI HUSIN	B.E.HONS.(UITM)(CIVIL, 2016)
77497	MOHAMAD ALIF BIN BAHARUN	B.E.HONS.(UITM)(CIVIL, 2017)
81608	TIONG KUNG YEN, JESSIE	B.E.HONS.(UMP)(CIVIL, 2016)
88918	LEE ZHE YI	B.E.HONS.(UMS)(CIVIL, 2016)
58439	CHIN KUIT SHONG	B.E.HONS.(UNIMAS)(CIVIL, 2016)
22161	SUHAILA BINTI SUBOH	B.E.HONS.(UPM)(CIVIL, 2004)
28255	SYAFIQ BIN ALIAS	B.E.HONS.(USM)(CIVIL, 2009)
50961	CHONG TECK NAN	B.E.HONS.(USM)(CIVIL, 2014)
50957	NUR 'IZZATI BINTI MOHD RADZI	B.E.HONS.(USM)(CIVIL, 2015)
47949	CHIEW YI ZHONG	B.E.HONS.(UTAR)(CIVIL, 2011)
55068	YAP HONG EIT	B.E.HONS.(UTHM)(CIVIL, 2016)
70968	KHAIRULANWAR BIN MOHAMAD	B.E.HONS.(UTM)(CIVIL, 2015)
73064	SUAHAIMI BIN MATUSIN	B.E.HONS.(UTM)(CIVIL, 2017)
68674	ABU HALIM BIN MUSA	B.E.HONS.(UTM)(CIVIL, 2017)
71061	YEO CHUI PING	B.E.HONS.(UTP)(CIVIL, 2016)
87166	DR MOHAMMAD PANJEHPOUR	B.SC.(KHAJEH NASIR TOOSI UNI. OF TECH.)(CIVIL-WATER RESOURCES, 2000) M.SC.(KHAJEH NASIR TOOSI UNI. OF TECH.) (CIVIL-STRUCTURE, 2004) PHD.(UPM)(2014)
45114	CHAI WAI SENG	M.E.HONS.(UNI. OF NOTTINGHAM)(CIVIL, 2012)
75241	LIM CHUN YAN	M.E.HONS.(UNI. OF NOTTINGHAM)(CIVIL, 2017)
KEJURUTERAAN BAHAN		
72026	MUHAMMAD FAKHRUDDIN BIN GHAZALI	M.E.HONS.(ICL) (MATERIALS SCIENCE & ENGINEERING, 2017)
KEJURUTERAAN ELEKTRIKAL		
73887	FONG YEEP HWA	B.E.HONS.(MMU) (ELECTRICAL, 2016)
49704	HEE JEE HONG	B.E.HONS.(UCSI) (ELECTRICAL & ELECTRONIC, 2012)

Note: *Remaining list would be published in the April Issue 2018. For the list of approved "ADMISSION TO THE GRADE OF STUDENT", please refer to IEM web portal at http://www.myiem.org.my.*

Pengumuman yang ke-113

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2	18355	ABAS BIN ABDULLAH
3	03455	ABDULLAH SANI BIN ABDUL KARIM
4	74322	ABHIRAM PRATIBHAYANAND GOPINATH
5	38286	ADENAN BIN RASHID
6	19186	ADRIAN NORBERT LEE
7	44107	AHMAD AFZAINIZAM BIN MOKHTAR

8	21881	AHMAD NAZRY BIN SARNI
9	29101	AMIR BIN MUSTAFA
10	30253	ANUAR BIN ADNAN
11	04812	ARIFFIN LEE BIN ABDULLAH @ LEE KIM SENG, FRANCIS
12	22410	AZALI BIN ARDY @ AZALI AH SIONG
13	07579	AZIZAN BIN MD. SAAD
14	56625	AZIZUL HAFSYAM BIN ISHAK
15	11425	AZMAN BIN AHMAD
16	10801	BOEY WEI LUN
17	33874	BURHANUUDDIN BIN HJ OTHMAN
18	11158	CHAN KIM LIANG
19	09450	CHE ABDULLAH FAUZI BIN HAJI OTHMAN
20	03838	CHEAH BOON HWA
21	06197	CHENG CHEE CHAI
22	14181	CHENG KEE HAUT
23	06100	CHEONG THIAM FOOK
24	26480	CHEONG TZUU SHYI
25	02911	CHEW GIM CHENG
26	08592	CHIEW HUEY SHENG
27	14115	CHIN CHEE KHEONG
28	25804	CHING CHEE KENG
29	20955	CHOK CHING HUAT
30	15356	CHOW CHEE HENG
31	02761	CHU KUM YUAN
32	13505	CHUA BOON HWEE
33	03650	CHUA LEE BOON
34	25634	DAVID ROBERT PARKS
35	19592	FATHULLAH RAZZAQ BIN GHAZALI
36	11047	GOH KAE WAN
37	38039	GOH KHENG WEE
38	46865	GOH SU KIN
39	20197	HANI ZAIDA BINTI ISMAIL
40	17363	HAROLD MUDI
41	15433	HASSAN BIN AHMAD
42	05683	HEW YOON LEONG
43	34413	HOW YOU CHUAN
44	16069	HUSAINI BIN HUSIN
45	25187	HUSSIN BIN MAMAT
46	07691	IDRIS BIN MOHAMED @ MAMAT
47	38343	IRHAN BIN AMRAN
48	27465	ISMAIL BIN HASSAN
49	41192	JAMAIATUL LAILAH BINTI MOHD JAIS
50	80584	JAMALUDDIN BIN MAHMUD
51	19278	JAUHAR BIN MOHAMED
52	28969	JOHARI BIN MATSAH @ SYLVESTER MICHAEL
53	08701	JOHN SELVIN S/O HENRY SAMUEL
54	22641	KAMALENDRAN A/L N. RAJASVARAN
55	32672	KAMARULLAFFIE BIN HJ AHMAD
56	05636	KHALILUR RAHMAN BIN IBRAHIM
57	03110	KONG KIN PONG
58	09988	KOSHY NAINAN A/L T. K. NAINAN
59	05931	KUNASINGAM S/O V. SITTAMPALAM
60	15288	LAI KUAN PIN, DONNY
61	07480	LAI TA LEE
62	05685	LAU KIN SWA
63	07205	LAU KOK LOONG
64	07826	LAU LEE YENG
65	26936	LAU YING LEE
66	24718	LAW HUI KIUK
67	11008	LEE CHEE HOONG
68	09834	LEE CHIN CHAI
69	23881	LEE SHING SHYANG
70	12626	LEONG MUN YEAN
71	16258	LIEW AUN LEONG, DAVID
72	06765	LIEW YAN SIN
73	04727	LIM CHENG LIONG
74	18707	LIM WEI JIN
75	02374	LIM YEN CHUNG
76	22093	LIONG SIN WEY
77	11314	LOH BAK KIM @ YEAP BAK KIM
78	09147	LOKE KAH KHOOI
79	14647	LOW KIAN HENG
80	12375	MAHMOOD AZMY BIN MUHAMMAD SHUKRI
81	11280	MANSOR BIN AB. SHUKOR
82	93534	MASYMUL AZAM BIN ISHAK
83	25258	MOHAMAD FAIZAL BIN SANI
84	13475	MOHAMAD SHARIF BIN MOK SOM
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87	46788	MOHD ADLI BIN ADANAN
88	31733	MOHD AZMI BIN JUSOH
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98	07943	MUHAMMAD BUSHRO BIN MAT JOHOR
99	29154	MUHD ABDAI RATHOMY BIN ROMELI
100	28270	MUHD HAKIM BIN ABDUL RAHMAN
101	33877	MULIADY BIN CHE HAMAT
102	11301	MUSA BIN HAJI MUSTAKIM
103	16339	NAZRI BIN HARUN
104	11733	NORASHIDAH BINTI MD. DIN
105	16805	NORAZLINA BT ABDULLAH
106	51277	NORLY FARHAN ISA
107	57548	NURUL AZWANI BINTI MAHBOB
108	12544	ONG BOON HAI
109	61194	ONG KIN BEING
110	38759	OOI JI REH
111	07431	OTHMAN BIN ABDUL KADIR
112	23886	PALANISAMY A/L THANJAGOUNDAN
113	21471	PANG WENG KOK
114	25681	PHANG SIN YEN
115	02319	PU JANG HAI
116	47546	RAJA AZRIN BIN RAJA AZWAN
117	56822	RAJASELVAM A/L GOVINDARAJU
118	03462	RAMU S/O ANDY
119	25463	RAMZANUL AZHIM BIN BORHAN
120	00661	RASATHURAI CHELLIAH
121	05722	RAZALI BIN MUDA
122	45817	ROHAN BIN AHMAT
123	15114	ROSLAN BIN OMAR
124	27138	ROSMADI BIN ZAMRI
125	26970	S. VEERAKUMAR A/L S. SUBRAMANIAM
126	03895	SANDRASEGARAN S/O KARUPAIAH
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128	89704	SHAFISHUHAZA BINTI SAHLAN
129	26932	SHAFULRIZAL BIN ZAINOL
130	08915	SHAIKH ABDULLAH BIN CHE HUSSAIN
131	14580	SIA TUNG KIONG
132	57518	SIM GUO JONG @ TAN GUO JONG
133	66770	SOH KWONG CHEAN
134	45798	SUBRAMANIAM A/L ANPUALAGAN
135	09817	SULAIMAN BIN MOHAMAD TAIB
136	80577	SURENDRAN KANDASAMY
137	56821	SYED ZULKARNAIN SHAH BIN SYED AHMAD KAMAL
138	08165	TAI FONG NG
139	21296	TAN HUA CHUN
140	12274	TAN KIM TIANG
141	29731	TAN MAU CHIN
142	09122	TAN SENG THIAN
143	05727	TAN SIEW KHENG
144	25271	TAN SOON LIANG
145	59874	TAN WEI KEAT
146	05824	TAN YEAN GUAN
147	16194	TAY KU WAH
148	05327	TEH PIAW NGI
149	13453	TEOH KENG ENG
150	17519	THAM CHEE MENG
151	09624	TIU JON HUI
152	24833	WAN AZHAR BIN SULAIMAN
153	95805	WAN FADLI BIN WAN MOHAMAD
154	36835	WAN MOHD FAUZI BIN WAN SULAIMAN
155	32678	WAN SALLEHUDDIN BIN WAN ZAKIUDDIN
156	12051	WONG MOK FAR
157	02893	YAHYA BIN MOHAMED YATIM
158	50125	YAP JIUNN JYE
159	16342	YAP KIM HONG
160	39193	YEOH YAP ZHENG
161	02946	YOON KOK ONN
162	19403	YU CHING LIN, AGATHA
163	40025	ZAINAL ABIDIN BIN ABDUL HAMID
164	78454	ZAINORIZUAN BIN MOHD JAINI
165	07719	ZULKEPLY BIN ABD. WAHID
166	28982	ZUNAIDI BIN CHE HASSAN

ECOBUILD SEA Seminar

(27th – 29th MARCH 2018)
KUALA LUMPUR CONVENTION CENTRE

FREE ADMISSION

CPD : APPLYING

Tuesday, 27th March 2018

TITLE : OPERATION & MAINTENANCE
ELECTRICAL ENGINEERING TECHNICAL DIVISION, IEM
Ir. NG WIN SIAU
ROOM : QUALITY & SAFETY, ROOM 3
TIME : 2.00pm – 3.00pm

Wednesday, 28th March 2018

TITLE : KEEPING UP WITH TECHNOLOGIES FOR SUSTAINABILITY
PROJECT MANAGEMENT TECHNICAL DIVISION, IEM
Ir. DR. NOR AZHAR MOHD ARIF
ROOM : ENVIRONMENTAL SUSTAINABILITY, ROOM 2
TIME : 2.00pm – 3.00pm

TITLE : CONVERGENCE IN CONSTRUCTION INDUSTRY
WOMEN ENGINEERS SECTION, IEM
Ir. MAH SIEW KIEN
ROOM : ENVIRONMENTAL SUSTAINABILITY, ROOM 2
TIME : 3.10pm – 4.10pm

TITLE : HOW TO IMPLEMENT BIM SUCCESSFULLY IN YOUR COMPANY... IN ORDER TO SECURE FUTURE LARGE SCALE PROJECTS
CONSULTING ENGINEERING SPECIAL INTERST GROUP, IEM
Ir. VIGNESWARAN
ROOM : PRODUCTIVITY, ROOM 1
TIME : 4.20pm – 5.20pm

TITLE : MALAYSIA'S WATER RESOURCE SUISTANABILITY – QUANTITY & QUALITY
WATER RESOURCES TECHNICAL DIVISION, IEM
Ir. ELLIAS SAIDIN
ROOM : ENVIRONMENTAL SUSTAINABILITY, ROOM 2
TIME : 4.20pm – 5.20pm

TITLE : SAFETY STANDARDS FOR LIFTS
MECHANICAL ENGINEERING TECHNICAL DIVISION, IEM
MR. RAGHIB FASIH AZMI. GRAD IEM
ROOM : QUALITY & SAFETY, ROOM 3
TIME : 2.00pm - 3.00pm

TITLE : CONSTRUCTION INDUSTRY PRODUCTIVITY CHALLENGES AND IMPROVEMENT STRATEGIES
WOMEN ENGINEERS SECTION, IEM
Dr. HABIBAH @ NOREHAN HARON
ROOM : ENVIRONMENTAL SUSTAINABILITY, ROOM 2
TIME : 3.10pm – 4.10pm

TITLE : CONSTRUCTION IN FUTURE AND NANOTECHNOLOGY
CONSULTING ENGINEERING SPECIAL INTEREST GROUP, IEM
Ir. KESAVAN
ROOM : PRODUCTIVITY, ROOM 1
TIME : 4.20pm – 5.20pm

Thursday, 29th March 2018

TITLE : CONSTRUCTION 4.0
THE INSTITUTION OF ENGINEERS, MALAYSIA (IEM)
Ir. DR. TAN CHEE FAI & Ir. PROF. DR. LEONG WAI YIE
ROOM : PRODUCTIVITY, ROOM 1
TIME : 12.10pm – 1.10pm

TITLE : REUSE OF POLYETHYLENE SCRAP AS BUILDING MATERIAL FOR PLASTIC WASTE MINIMIZATION
MARINE & NAVAL ARCHITECTURE TECHNICAL DIVISION, IEM
Ir. DR. CHING YERM CHEE
ROOM : ENVIRONMENTAL SUSTAINABILITY, ROOM 2
TIME : 2.00pm – 3.00pm

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