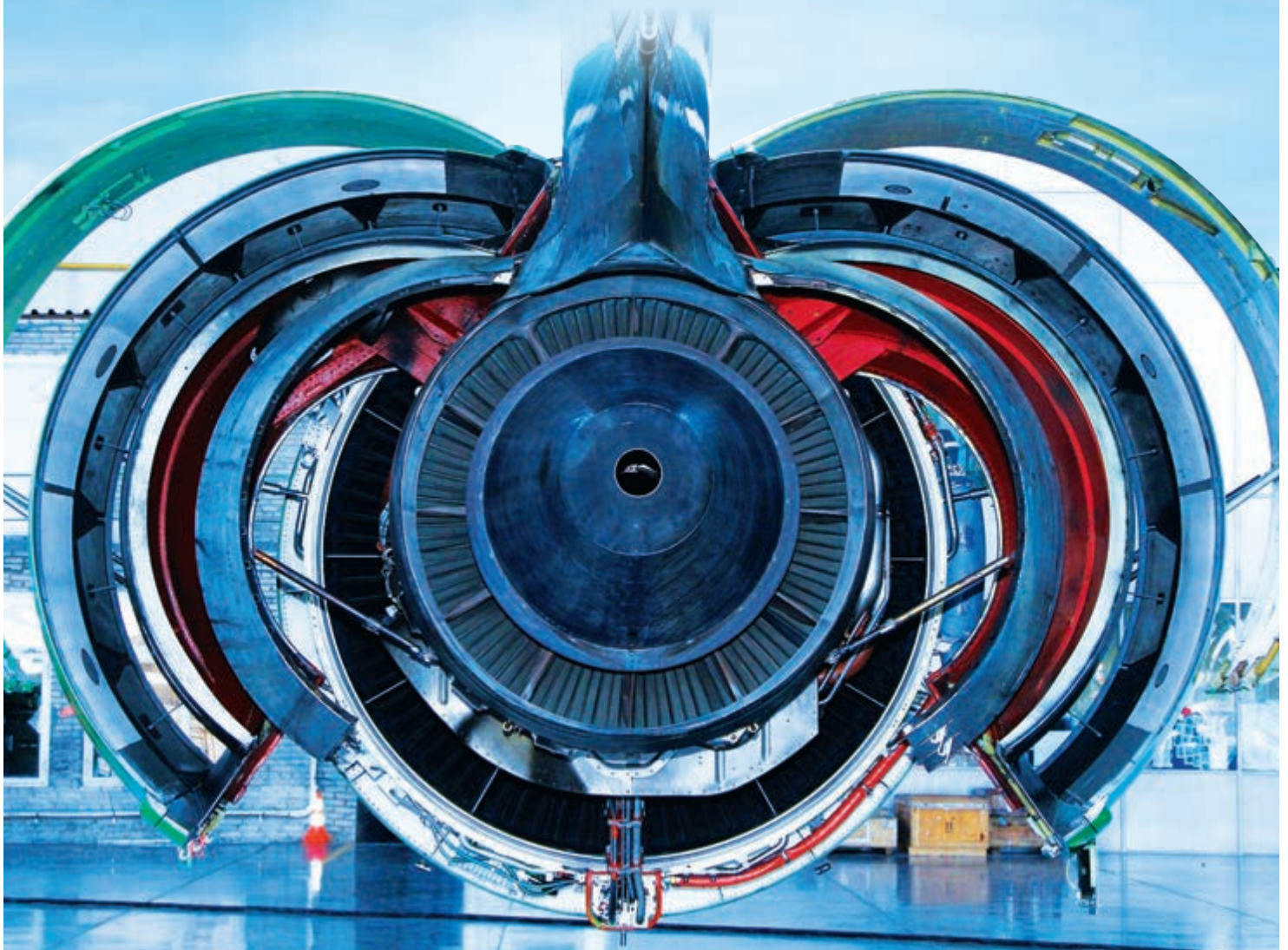


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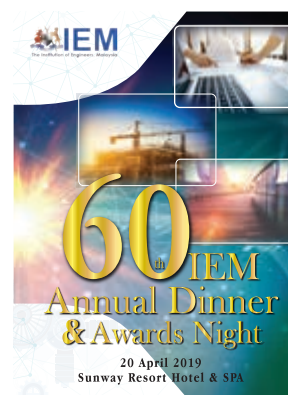
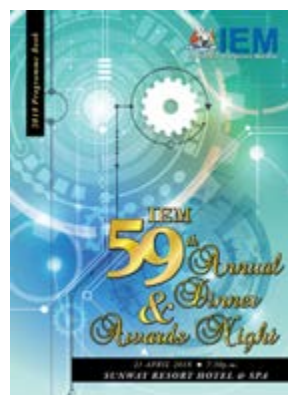
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# COVER NOTE

## FOCUS ON AEROSPACE INDUSTRY

by *Ir. Syed Neguib bin Syed Mohamed*

*Chairman, Mechanical Engineering Technical Division*



For most people, the Malaysian airline industry means four national carrier, Malaysia Airlines, the pilots, the crew and associated services which have existed for the past few decades. But the airline has grown to what it is today only because there is strong support from the well-established engineering and maintenance services.

Indeed, the aerospace industry will be one of the main drivers for economic growth in the country in the next decade, especially the manufacturing, maintenance, repair and overhaul sectors, as reflected in the government's National Aerospace Industry Blueprint 2030, formulated under the 11th Malaysia Plan. The aim is for the country to become the leading aerospace nation in South-East Asia.

In this issue of *JURUTERA*, Ts. Shamsul Kamar Abu Samah, Head of the National Aerospace Industry Coordinating office, Ir. Tajul Ariffin bin Mohamed Noriand and Ts. Yap Sheng Lin discuss strategies, policies, future prospects and safety aspects in the aerospace industry. ■

# EDITOR'S NOTE

by *Ir. Dr Bhuvendhraa Rudrusamy*

*Bulletin Editor*



This month's bulletin offers us an interesting perspective on Malaysia's journey in the aerospace and aviation industries. For most of us, our aviation knowledge is limited to air travel experiences, so *JURUTERA* is providing the outlook behind air commute.

Unbeknownst to many of us, the Malaysia Aerospace Industry Blueprint 2030 has envisioned aerospace space industry as part of our national growth. The 4IR also penetrates this industry, enriching both provider and user experiences, such as self-check-in boarding pass, which changes the whole landscape of how things have been done before and is now moving towards sustainable technologies.

Albert Einstein once said: "Intellectual growth should commence at birth and cease only at death." This is a reminder for us to keep abreast of time with continuous professional development. ■



# AIMING TO SOAR HIGHER IN AEROSPACE INDUSTRY

**Prof. Ts. Shamsul Kamar Abu Samah, head of the National Aerospace Industry Coordinating Office (NAICO), talks about the performance, strategies and future prospects of Malaysia's aerospace industry.**

Our aerospace industry has continued to grow since the implementation of the Malaysian Aerospace Industry Blueprint 2030 (MAIB 2030) in 2015. This was the result of the Government's recognition of the industry as one of the country's main engines of growth in the next decade.

Spearheading the implementation of MAIB 2030 is the National Aerospace Industry Coordinating Office (NAICO) which was established the same year under the umbrella of the Ministry of International Trade & Industry (MITI). It is governed by the Malaysia Aerospace Council (MAC) and chaired by the Minister of International Trade & Industry.

NAICO steers, co-ordinates and monitors the implementation of strategies and key initiatives as contained in the blueprint. Action plans were formulated under the 11th Malaysia Plan (11MP), with details of the country's industrialisation and technological development programmes.

Since the launch of MAIB 2030, NAICO has embarked on numerous activities involving strategised development of the aerospace industry. MITI, through NAICO and in collaboration with





the involvement and growth of these companies, including small-and-medium-sized enterprises (SMEs) in the global supply chain in the aerospace industry. In carrying out its roles, NAICO collaborates closely with MIDA, MATRADE and SME Corporation Malaysia, as well as other relevant agencies such as Malaysian Industry-Government Group for High Technology (MIGHT), Technology Depository Agency (TDA) and Aerospace Malaysia Innovation Centre (AMIC). Others include the Ministry of Defence (MINDEF), Ministry of Transport, Ministry of Human Resources (MOHR), Ministry of Education (MOE), Jabatan Pembangunan Kemahiran (JPK – Department of Skills Development under MOHR), Civil Aviation Authority of Malaysia (CAAM) and Malaysia Space Agency (MySA).

### UPWARD PERFORMANCE TREND

Head of NAICO Prof. Ts. Shamsul Kamar Abu Samah says one of its key achievements is accelerating the development of the local aerospace industry which has resulted in higher revenues.

"In 2018, we achieved RM14.4 billion in revenue, the highest so far in the history of our aerospace industry. In 2014, revenue was RM11.8 billion, which increased by 6.8% to RM12.6 billion in 2015 when NAICO was formed. Continuous promotion has contributed to the increasing revenue generated by the industry," he says, adding that the industry's export value has also been on the upward trend, from RM2.88 billion in 2014 to RM8.48 billion in 2018, the highest ever achieved. This was a result of continuous efforts by MATRADE and NAICO in promoting Malaysia in the global arena, such as international air shows and AEROMART (aerospace business meetings).

Working hand in hand with MIDA, 11 new investment projects worth RM816.3 million were approved in



*Prof. Ts. Shamsul Kamar Abu Samah graduated from University of Portsmouth in 1998 in electronic and electrical engineering. He is head of the National Aerospace Industry Coordinating Office, under MITI. Previously, he was CEO of Aerospace Malaysia Innovation Centre. He is also Honorary Professor of the Department of Mechanical, Materials & Manufacturing Engineering, University of Nottingham Malaysia.*

2018, of which domestic investments accounted for 59% or RM478 million. The remaining 41% or RM338 million came from foreign investments (including companies in Japan, Russia, Ukraine, Turkey, China and Italy). Prof. Ts. Shamsul says Malaysia has been acknowledged by global players as a regional key market for the next 15 years.

Both foreign and local investments have helped keep the industry robust and, at the same time, created 2,442 job opportunities in the same year. The figure is expected to surge if the implementation of MAIB 2030 is on course according to the targets. Prof. Ts. Shamsul is undaunted by the ambitious targets to achieve RM55.2 billion in revenue and to create a whopping 32,000 jobs by 2030. Currently, the industry employs 24,500 highly-skilled workers, 7,500 less than the target in MAIB 2030.

Malaysian Investment Development Authority (MIDA) and Malaysia External Trade Development Corporation (MATRADE), is behind the commercial segment of the internationally acclaimed event, Langkawi International Maritime & Aerospace Exhibition (LIMA). During LIMA, NAICO collaborates with MIDA, MATRADE, various government agencies, local authorities and private sector companies, to organise business-related programmes as part of major efforts to focus the world's attention on the capabilities of Malaysian aerospace industry players in producing and delivering high-tech aerospace products and services on par with international requirements.

Dynamic development and the promotion of the industry pave the way for more companies to enter the playing field. NAICO facilitates



Prof. Ts. Shamsul (centre) with IEM's Mechanical Engineering Technical Division representatives, Deputy Chairman Ir. Dr. Aidil Chee Tahir (right) and committee member Dr. Lim Chin Seong (left)

"MAIB 2030 aims high, that is for Malaysia to be the No. 1 aerospace nation in South-East Asia. This is in terms of being an integral part of the global market as well as in supplying a competent workforce for the industry through education and training," says Prof. Ts. Shamsul.

### FOCUS ON 5+1 SUB-SECTORS

MAIB 2030 covers five sub-sectors: Maintenance, repair and overhaul (MRO), aero manufacturing, system integration, engineering and design services as well as education and training. While NAICO will continue to promote these five sectors, Prof. Ts. Shamsul says there is another crucial sub-sector – Research and Technology which plays a vital role in sustaining Malaysia's competitiveness at global level.

"I believe research and technology will be the backbone to drive the industry higher. So NAICO now promotes the 5+1 sub-sectors of the aerospace industry," he says.

He says that in the last three years, of the five established sub-sectors, aero manufacturing had been the industry's highest revenue contributor. Of the total of RM14.4 billion in revenue in 2018, 48% came from aerospace manufacturing, followed by MRO, which contributed 46%.

"I envisage that MRO will pick up quickly and become the No. 1 contributor in future. Today, Malaysia can be considered as having among the largest fleet of aircrafts in the world, with AirAsia buying and bringing in

a high number of A320 aircrafts. In addition, Airbus also established MRO subsidiaries here – Airbus Helicopter Malaysia in Subang and Sepang Aircraft Engineering in Sepang. Our capability in MRO is world renowned," he says, adding that another aircraft OEM, Boeing, has a 50:50 joint-venture company, Aerospace Composites Malaysia Sdn. Bhd. (ACM), which supplies composite products and sub-assembly services to the global aerospace industry.

"In 2037, it is expected that 4,000 new aircraft will be delivered to South-East Asia, especially for low cost carriers. The direct effect will be on manufacturing and MRO, boosting further these two sub-sectors. Boeing and Airbus parts, from tooling to flying parts, are produced in Malaysia. Anything affecting an aircraft, from design to stress analysis, testing, manufacturing and assembly, can be done in the country," he says.

Made-in-Malaysia aerospace products include A400M vertical and horizontal tail plane, A320 spoiler panel and leading edge panel, A350 J nose and fan cowl, B787 fixed leading edge and fan cowl, various engine casings and numerous other aerospace parts and components.

**MAIB 2030 aims high, that is for Malaysia to be the No. 1 aerospace nation in South-East Asia. This is in terms of being an integral part of the global market as well as in supplying competent workforce for the industry through education and training.**

### AEROSPACE SUPPLY CHAINS

Malaysia's aerospace manufacturing supply chain comprises both local and foreign companies which produce aerospace parts and components for the global market. Along the supply chain are:

- Tier 1 companies in the fields of aero-structures, avionics, engines and airframe equipment.
- Tier 2 companies – aero-structures, avionics, engines, interiors, landing gear, actuators sub-system and sub-assembly.
- Tier 3 companies – components and parts suppliers.
- Tier 4 companies – special processing shops, raw material suppliers/stockists, and jigs and tooling suppliers.
- Engineering design services suppliers which support the entire supply chains.
- Research organisations supporting research and technology developments.

The MRO supply chain in Malaysia covers the whole spectrum of activities, from airframe, engine and component repair to modifications and engineering services.

### STRATEGIES FOR FUTURE ADVANCEMENTS

As the two sub-sectors of aero manufacturing and MRO continue to make significantly high contributions to the industry, Prof. Ts. Shamsul has now set his eyes on implementing MAIB 2030's six-prong strategies for the future advancement of our aerospace industry. Set to move the industry forward, these strategies are:

#### 1. Quality Investment

To bring in quality investments that will not only create jobs and business opportunities but will also speed up technology adaptation and transfer as well as boost revenue. Areas of focus are manufacturing (aero-structure, aero engine, airframe equipment, avionics, interior and





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aircraft assembly), MRO (aero engine and components) and Aero clusters in Selangor (Sepang, Serendah and Subang), Negeri Sembilan Aero Valley, Kedah Aerotropolis, Kota Kinabalu Aero Hub and Senai Airport.

## 2. Supply Chain

The development of the supply chain will involve competency development encompassing certification and qualification of local companies by Original Equipment Manufacturers (OEMs)/Tier 1 Companies and the integration of SMEs into the global supply chain. In addition, Centres of Excellence for AS9100 Certification Body, Component Testing, Inspection and Equipment Calibration will be set up.

## 3. Human Capital

Talent or people development will be done through a structured talent development programme, train the trainers programme and professional training aimed at developing a workforce that is marketable worldwide. Continuous professional development initiatives will lead local talents to become recognised aerospace professionals such as professional engineer, professional technologist and certified technician.

## 4. Research and Technology

There are three areas of focus: High Value Manufacturing (process advancement, modernisation, automation and Augmented Reality & Virtual Reality, Sustainable Aviation (bio jet fuel and bio materials) & Indigenous Products (unmanned aerial vehicle, drones, satellites – nano and cube among others).

## 5. Technology Adaptation

Strategies include Industry 4.0 adaptation of new technologies (smart manufacturing, smart hangar and disruptive technology), Space 4.0 or also known as New Space Economy (spaceport, mission control centre, High Altitude Lighter Than Air or HALTA system, zero gravity and launch pad) and technology transfer through Industrial Collaboration Programme (ICP).

## 6. Market Access

Accessibility to markets will be expanded via more intensive promotion (regional and global events), local outsourcing (securing complex work packages, bidding through SMEs/local consortium), collaboration (international partnership) and development of local contents (strategic acquisition by government and support of local products).

“

**Malaysia wants to attract leading MRO tech players to invest in Malaysia. This involves human capital development with Industry 4.0 element in aerospace that can expedite efforts to develop marketable workforce.**

”

Elaborating on these strategies, Prof. Ts. Shamsul says MAIB 2030 aims to achieve a 5-7% annual increase in revenue right up to 2030. This will be accelerated through quality investments which will spur the development of local aerospace ecosystem.

“We want to attract leading MRO tech players to invest in Malaysia. This involves human capital development with Industry 4.0 element in aerospace which can expedite efforts to develop a marketable workforce such as aerospace engineers, licensed aircraft engineers and technicians, pilots and cabin crew. Many of those trained in Malaysia are now working in the Middle East and other regions. We should concentrate on this. Through research and technology adaptation, we want to bring quality technology to Malaysia so as to elevate our capability to be on par with, if not better than Japan, Korea,

Turkey, Singapore and other countries in this region. As for New Space Economy initiative, NAICO and MIDA are promoting smart partnerships and collaborations between local companies and European leaders which will elevate the quality of life of Malaysians,” he says.

## ADAPTATION OF NEW TECHNOLOGIES

Prof. Ts. Shamsul is particularly passionate about Malaysia's pursuit to advance in technologies and innovations following the wave of Industry 4.0.

“The aerospace industry has set the motion to adapt the latest digital technologies, such as data analytics, drone inspection, smart hangar and robotics. The most exciting part, for me, was the hard fight through NAICO to convince relevant stakeholders to bring in advanced composites technology, namely automated fibre placement (AFP) technology which involves the use of robots to do carbon fibre layout,” he says.

He explains that more than half of the A350 aircraft structure is composite and that Airbus has switched from manual to fully automated production for A350 wings panels. The wing covers – the skin that sits on top of the inner structure of the wings – was previously laid up by hand but, with AFP technology, the task of building wing covers, which are made up of a series of layers of tapes with carbon fibres arranged side by side and impregnated with resin, now involves robotics.

## DEVELOPMENT OF COMPETENT WORKFORCE

A personal achievement which Prof. Ts. Shamsul regards as fulfilling was when he was appointed Honorary Professor in the Department of Mechanical, Materials & Manufacturing Engineering by University of Nottingham Malaysia (UNMC) in August 2016. He conducts talks in universities and schools to expose students to the aerospace industry and career opportunities.



"We definitely need to prepare the next generation workforce to serve and build this industry. To achieve high-income status, we must develop highly skilled human capital. We engage with the

Ministry of Education (MOE) and one of our collaborations is under the Malaysia Laboratories for Academia-Business Collaboration (MyLAB) grant scheme which allows us to evaluate the sort of products to be developed and commercialised. We also work with Jabatan Pembangunan Kemahiran (JPK) as the industry lead body for the aerospace industry to review and develop a training syllabus in line with new technology adaptation so that the workforce is suitably trained with new and advanced skills as required by the industry," he says.

He adds that NAICO's engagement with MOE, JPK, MARA and other relevant agencies is important in order to determine how the country can further develop aerospace training and education so as to raise interest among students and to entice them to choose a career in engineering, particularly aerospace.

In terms of professional development, NAICO works closely with the Malaysia Board of Technologists (MBOT) and Technological Association Malaysia (TAM) to develop Continuous Professional Development programmes as well as to promote registration for aerospace professional technologist and certified technician.

Prof. Ts. Shamsul regards the engagement between NAICO and IEM as crucial. "NAICO requires professional advice from industry experts within IEM. This helps to push and consolidate efforts to collate information and knowledge that is useful in charting the future direction of the aerospace industry for its long-term sustainability," he explains.

"On a personal level, I never dreamt of heading a body like NAICO. We are now operating with a limited number of staff, to move and

**NAICO requires professional advice from the industry experts within IEM. It helps in pushing and consolidating efforts to collate information and knowledge that is useful in charting the future direction of the aerospace industry for its long-term sustainability.**

implement our numerous activities. It was not easy but we managed to facilitate all planned activities and to carry out our roles. I feel proud to lead NAICO and to contribute to the nation and the people in terms of opening up employment opportunities in the aerospace industry.

"I would like to increase the number of our employees. NAICO's target is to recruit 20-30 people for positions in industry development, industry and market intelligence, marketing development and developing a comprehensive aerospace industry database to have the right resources to play a leading role in the aerospace industry. Furthermore, competition is out there in the rest of the world, not here in Malaysia. With a good structured organisation, we hope to promote our industry more effectively."

According to a report in the New Straits Times, Malaysia is second to Singapore in its aerospace industry development in this region. We appear to be quite ahead of other countries but we still need to work hard to ensure that we stay ahead of the competition; we also need to find our competitive advantage so that we will be able to achieve our targets early. The other competitors – Thailand, Vietnam, The Philippines and Indonesia – each have their

own market positioning advantages. Malaysia offers a lower cost base for all segments of the MRO sector. As such, in 2016, RUAG Aviation from Switzerland opened a regional MRO facility at the International Aerospace Centre in Subang. Asahi Kinzoku Kogyo Inc., a leading Japanese aerospace parts maker, also opened a surface treatment facility in Klang. Asia Aerospace City in Subang was also developed to bring together university research with the Aerospace Malaysian Innovation Centre and MARA Aerospace & Technologies. (1,2)

## TOWARDS THE FUTURE

What is in store beyond 2030? Prof. Ts. Shamsul says that in his personal and professional view, system integration and sustainable aviation will be the key to developing new advanced products such as super drones, launch vehicles, bio-jet fuel and hydrogen fuel cell and to implement digital transformation within the local aerospace ecosystem.

"Malaysia can develop many structures but the system within the structures must be effectively integrated. Beyond 2030, I believe we will have the experts to do this. By then 6G to 7G connectivity should be ready and we have the MAIB 2030 and the 11MP to base on. Although I may not be around in 2030, I foresee that Malaysia will continue to be at the forefront of activities in the aerospace value chain," he says.

While MAIB 2030 charts new milestones for the future of Malaysian aerospace industry in the next decade, its completion will spur further efforts with new sets of targets to ensure the industry will soar to greater heights. ■

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# TIME TO HAND OVER THE BATON



*FEIAP Exco Meeting on 21 November 2019 in Melbourne*

In the blink of an eye, it is already 2020 and I will be finishing my term as IEM President in a couple of months. The last two years have been an eventful journey for me, one that is both challenging and memorable.

In my last article as President of IEM, I would like to reflect on my ideas and aspirations as laid out two years ago. At the time, I posed a question to my colleagues and IEM members: "Are we quintessential engineers?"

I had defined a "quintessential engineer" as one with a long-term, systemic approach to decision-making, one who is guided by ethics, justice, integrity, equality and compassion and who has a holistic understanding that goes beyond his or her own field of specialisation, one who is acceptable globally.

In my two sessions as IEM President, I have worked to meet these traits and I hope my efforts have helped IEM achieve its vision "to be the premier professional organisation pivotal to Malaysia achieving Vision 2020".

As can be seen in my previous reports under President's Corner, I have visited and engaged with all IEM branches to strengthen the bond between them and IEM HQ. This interaction had brought forth tremendous achievements, such as the revival of IEM Terengganu Branch, which had been dormant

for as long as 5 years. We also saw the purchase of a bigger premise by IEM Penang Branch to cater to the growing membership and increased activities. Our youngest branch in Miri had also purchased its own office premise. Efforts have also been put in place to assist all branches to have a consistent accounting system; all these are for the betterment of the Institution which will, in turn, be able to better serve the members.

It is also re-assuring that after negotiations spanning three Presidents, we have finally closed the issue of the sub-lease for the KKIP Training Centre in Sabah at the end of October 2019. With this, Sabah Branch will now have an anchor tenant for the building that will provide a steady income to the Branch for the next 25 years.

We have introduced the IEM Loyalty Programme to provide more benefits for members. Although it's still in its infancy, steps are being pursued by the Standing Committee on Welfare & Member Services to expand the list of participating merchants and to acquire more benefits for our members. We have negotiated a very good programme with dealers for Mercedes Benz, BMW, NAZA, Renault and Proton as well as for spectacles, health and fitness centres and food outlets. I hope members would make use of these merchant discounts.

Check the IEM website for more information.

One of my pledges was to build interest in STEM education. I am happy to report that IEM has participated in many initiatives, both by the government and private sectors, to increase awareness and interest among school children in STEM education. Our STEM Committee visited schools across the nation to organise talks and exciting games in its effort to impart knowledge on science and mathematics. We also participated in the annual Kuala Lumpur Engineering Science Fair (KLESF) and set up booths to create more interest in science and mathematics.

I led a delegation to the Ministry of Education to discuss working with them under its Education Performance & Delivery Unit (PADU) to promote science and mathematics. PADU has been very supportive and we hope the synergy created will be beneficial to the country.

The IEM Digital Maker Space was officially set up at Wisma IEM on 5 October 2019, the result of a partnership agreement signed between IEM and Malaysia Digital Economy Corporation (MDeC) on 31 January 2019. Maker Space will serve as a digital maker hub, a multi-purpose resource room for



conducting digital activities for IEM members and the public. It will also be a collaboration platform for industries to develop digital solutions with the support/participation of IEM members but more importantly, it will allow IEM members to exchange digital knowledge, ideas and solutions while nurturing entrepreneurship.

I hope IEM members will make use of the space and contribute to the digital maker hub, whether in cash or in kind as well as offer their expertise to share knowledge with other members or the public. The ICTSIG has been organising Digital classes for adults and children in physical computing (arduino, raspberry PI, robotics etc), software development (python programming, web development, app development, etc), creative media (scratch programming, music/video/image editing, animation/illustration/publication design) and engineering & design (3D modelling, sculpturing & printing etc).

Activities continue to be the main contributor towards the professional development of members and, with the able leadership of our Vice President, the Standing Committee on Activities has managed to register IEM with HRDF (Human Resources Development Fund). The effort to obtain HRDF certification has been tough, so we are pleased that it has finally produced the desired result. Over the years, we have provided members with many opportunities to improve their knowledge for career advancement and, with HRDF certification, we hope employers will be encouraged to send their engineers for training programmes by IEM.



Meeting with PADU



Launching of ICT Digital Maker Space at Wisma IEM

Towards the end of 2019, IEM made a giant leap with the launching of the inaugural IEM Convention, the brainchild of IEM President-Elect, Ir. Ong Ching Loon. Now engineers will finally have a national convention that will truly focus and reflect on all disciplines of engineering. Since its inception 60 years ago, IEM had organised numerous exhibitions and conferences, both national and international, but each time, the focus was always on one discipline of engineering, mainly the more established disciplines of Civil, Electrical, Mechanical and Geotechnical.

With the IEM Convention, which will be jointly organised with CIS Network Sdn. Bhd., we intend to bring all disciplines together to showcase a truly engineering event. Scheduled for 23-26 September 2020 at Kuala Lumpur Convention Centre, it will comprise an exhibition titled "Engineer" as well as several symposiums and conferences, including IEM's very own ASEAN Electrotechnical Symposium which will be held for the fifth time.

At the soft launch of this first engineering exhibition on 12 December 2019 at the KL Convention Centre, CIS Network and IEM, as strategic partners, inked a Letter of Collaboration (LoC), to provide a platform to showcase the growing engineering industries. This superb opportunity, pursued fervently by Ir. Ong Ching Loon, will offer IEM 10% of the gross sales or RM200,000 (whichever is higher) per year from the sales of exhibition booths by CIS. This will greatly boost our finances and I thank Ir. Ong for his remarkable efforts.

I have also focused on IEM's collaboration with various government agencies and Ministries to ensure that engineers have a voice in decision-making on government policies.

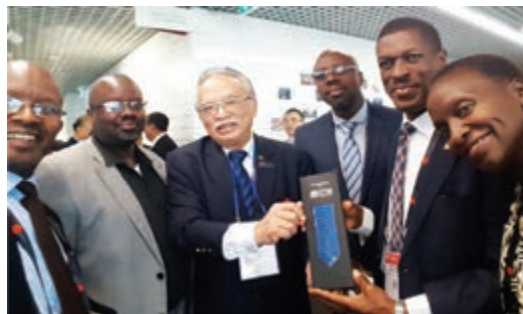
In the last two years, IEM was honoured with the presence of Prime Minister Tun Mahathir Mohamad at CAFE036 in Singapore to receive the AFEO Distinguished Honorary Patron as IEM nominee and the presence of Minister of Works Tuan Baru Bian at CAFE037 in Jakarta to receive



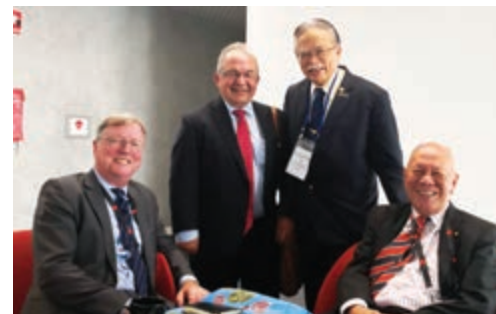
FEIIC General Assembly 2-6 November 2019, Makkah, Saudi Arabia



Soft launch of Engineer 2020 on 12 December 2019 at Kuala Lumpur Convention Centre



African delegates at WFEO General Assembly in Melbourne



CEC meeting in Melbourne in November 2019

the AFEO Distinguished Honorary Fellow, also on nomination by IEM. The reception accorded on both occasions demonstrated the high esteem that other professional bodies in ASEAN have for IEM.

Recognition by other professional bodies in the region can also be seen when their representatives call on IEM to learn more about IEM as well as its administration/workings. Last year, we received visitors from American Society of Civil Engineers (ASCE), Engineers Australia (EA), CAST (China Association for Science and Technology), Persatuan Insinyur Indonesia (Padang Branch) which brought a delegation of 40 members, Taoyuan City Government Republic of China (Taiwan) with a delegation of 17 members and many more.

IEM will continue to promote Malaysian engineering services abroad through collaboration with MATRADE. The IEM Pavilion was held successfully for the second time in

Jakarta in September 2019. We hope IEM members who are interested to export their services to ASEAN will participate in this annual exhibition where your expenses can be financed and subsidised by MATRADE.

In December last year, IEM was also given recognition by Malaysia Standard & Accreditation Council (MSDAM) for the first time to host their last meeting for the year at Wisma IEM. In conjunction with the meeting, I, as IEM President, was given the honour to present the AFEO Honorary Fellow to IEM's nominee, Y.Bhg. Datuk Fadilah Baharin, Director-General of Standards Malaysia.

The same award was also presented to Dato' Seri Ir. Mohammad Nizar Jamaluddin, EXCO of Perak and Datuk Ir. Ahmad Asri Abdul Hamid, Chief Executive of CIDB at CAFE037 in Jakarta, Indonesia. Our nomination for the conferment of the AFEO Distinguished Honorary Fellow to Y.B. Puan Yeo Bee Yin, Minister of Energy,

Science, Technology, Environment & Climate Change, has also been approved by the AFEO Governing Board in 2019; we will be seeking an opportunity to present the award to her.

IEM has been working hard to find ways and means to benefit its members. I hope members in turn, will continue to support IEM. I would also like to express my greatest appreciation to all Past Presidents, Council Members and members for their help and guidance during my tenure and I hope they will continue to extend the same support to the President-Elect.

Finally, I would like to announce that, since we have reached 2020, IEM has a new vision: "Engineers Towards Shared Prosperity Vision 2030, Wawasan Kemakmuran Bersama 2030". This is in line with the Government's call as an extension to the Prime Minister's Vision 2020. ■



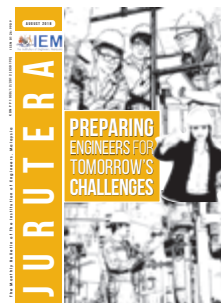
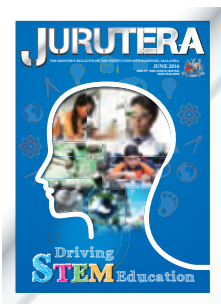
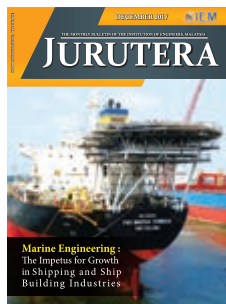
MoU signing with MGTC, witnessed by Puan Yeo Bee Yin, Minister of MESTEC



CAFE037, 12-15 September 2019 in Jakarta, Indonesia



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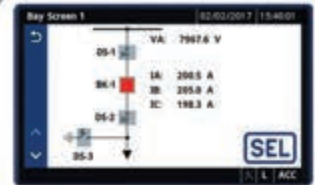
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# AIRCRAFT ENGINEERING & MAINTENANCE PROFESSIONALISM



by Ts. Ricky Liew

According to the International Civil Aviation Organisation (ICAO) annex 1, chapter 4.2, aircraft engineering encompasses characteristics and applications of the materials of aircraft construction, including principles of construction and functioning of aircraft structures, fastening techniques, engines and their associated systems, mechanical, fluid, electrical and electronic power sources, aircraft instrument and display systems, aircraft control systems and airborne navigation and communication systems.

Aircraft maintenance encompasses tasks required to ensure the continuing airworthiness of an aircraft, including methods and procedures for overhaul, repair, inspection, replacement, modification or defect rectification of aircraft structures, components and systems in accordance with the methods prescribed in the relevant maintenance manuals and the applicable standards of airworthiness.

## LICENCED AIRCRAFT MAINTENANCE ENGINEER (LAE)

An LAE has fulfilled the rigorous training/education, examination and experience requirements which, under state airworthiness licensure laws, permit the appropriately aircraft type rated LAE to perform aircraft airworthiness certification upon completion of maintenance task. Although engineering licensure laws vary from nation to nation, Part 66 Aircraft Maintenance License system is practiced in Malaysia. This is similar to the UK Part 66 Aircraft Maintenance Licence system.

## WHAT AN LAE DOES

An LAE performs airworthiness certification after maintenance has been completed to ensure that an aircraft and its systems are within the design and operational specifications while complying with the requirements of aircraft manufacturers and aviation authorities.

## ATTRIBUTES REQUIRED

A well-trained LAE applies the principles of natural science, mathematics, aircraft engineering fundamentals and specialisation in the job. Modern aircrafts are complex machines made up of complex mechanical and avionics sub-systems integrated with each other. With the aircraft operating in harsh environmental conditions, it is quite common for an LAE to encounter system faults which can be classified as complex problems. The manufacturer manuals are available but more often than not, an LAE must be able to carry out system fault analysis, synthesise information, perform data interpretation, conduct schematics and systems research, review system literature from various sources to come to valid conclusions on how to resolve such faults. Strong investigation skills capability, especially for intermittent systems fault, is required and at times there is a need to design or develop solutions in the form of practical processes which meet specific needs within regulatory requirements with consideration for airworthiness, safety, public and environmental aspects.

## DIFFERENCE BETWEEN AIRCRAFT ENGINEER (LAE) AND AERONAUTICAL ENGINEER

Generally, aeronautical engineers work within the sphere of initial airworthiness. They are involved, primarily, in designing aircraft and propulsion systems involving aerodynamic performance and construction material. They usually perform their duties primarily at the manufacturing or design companies but a handful of aeronautical engineers are being employed at the airlines or MRO.

Aircraft engineers work within the sphere of continuous airworthiness. This sphere is related to the airworthiness certification of an aircraft and its systems after it leaves the manufacturing plant. Aircraft engineers usually perform their duties at operational levels, such as in the airlines,

aircraft operator or Maintenance, Repair and Overhaul (MRO) facilities.

Both aeronautical engineers and aircraft engineers are equally important and each have his/her own critical roles to ensure that an aircraft is safe for the public to fly.

## TYPES OF AIRCRAFT MAINTENANCE LICENCE CATEGORIES

Broadly, there are category B1 (Mechanical) or B2 (Avionics) licences without type rating. The licence holder is NOT entitled to have any airworthiness certification privileges.

There is category B1 (Mechanical) or B2 (Avionics) with aircraft type rating such as B737, B747, Airbus A320, A330, Bombardier Challenger 350, Global 5000, Gulfstream 550 etc., usually working in the line maintenance or respective individual smaller zones or systems of an aircraft. This licence holder is entitled to airworthiness certification privileges for the respective maintenance task performed.

There is category C with type rating, also known as Base Maintenance Certifying Engineer who, in addition to having category B1 or B2 aircraft type rating, also has additional experience and management competencies with the primary responsibility to certify a complete aircraft as airworthy after scheduled base maintenance checks. In the hangar production line, they are the equivalent of Chief Engineer (Maintenance Production Management Engineer) and category B1, B2 engineers and technicians report to them.

It should be noted that there is also category A aircraft technician licence (also known as mechanic licence) to certify minor maintenance task.

## RECOGNITION OF AIRCRAFT MAINTENANCE LICENCE QUALIFICATIONS

In the United Kingdom, the Engineering Council (EC UK), through learned societies such as Royal Aeronautical Society, has strict guidelines and assessment procedures which enable a Civil Aviation Authority UK (CAA UK) Part 66 B1/B2/C licence holder to be recognised as a professional. Individuals may document their qualifications and experience for their professional competencies to be assessed as Engineering Technician, Incorporated Engineer (IEng) or Chartered Engineer (CEng) accordingly. This process has been in the UK systems for quite some time.

The Board of Engineers Malaysia (BEM) had also conducted a thorough study on our local CAAM Part 66 B1/B2/C qualifications and accepted the Part 66 B1/B2/C licence as a qualification for registration at the BEM accordingly. This is similar to the EC UK recognition of the Part 66 aircraft maintenance licence qualification.

It is interesting to note that EC UK has identified safety-critical areas such as aircraft maintenance and acknowledged that specialist registers exist which EC UK supports. This indicates that Part 66 licence holder issued (registered) by the CAA UK is recognised and supported

by EC UK. In addition, EC UK stated that "engineer" is taken to mean anyone who is in some way associated with engineering, including design, manufacturing, maintenance or operation of a technical product or system. This definition enhances the broader professionals of the engineering fraternity and in particular the aircraft engineering and maintenance industry. ■

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## Author's Biodata

**Ts. Ricky Liew** a committee member of METD, has 31 years of aircraft engineering and maintenance experience. He is head of engineering at SR Aviation Sdn. Bhd.

## UPCOMING ACTIVITIES

### 1-Day Course on "Understanding and Managing Turnkey/ Design & Build Contracts"

Date	: 7 March 2020 (Saturday)
Time	: 9.00 a.m. – 5.30 p.m.
Venue	: Wisma IEM
Approved CPD	: 6.0
Speaker	: Ir. Harbans Singh K.S

### 1-Day Course on "Technical Report Writing – Guidelines for PI Submission"

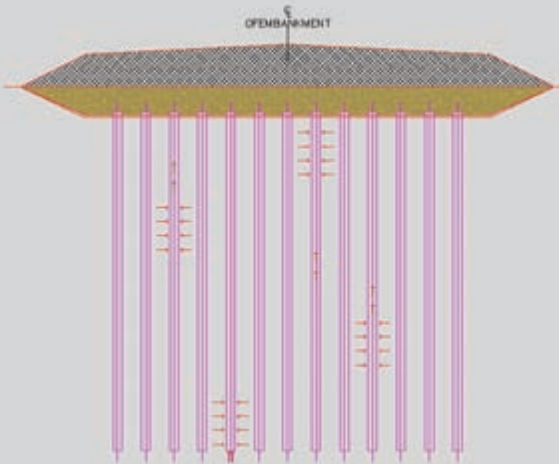
Date	: 11 March 2020 (Wednesday)
Time	: 9.00 a.m. to 5.30 p.m.
Venue	: Wisma IEM
Approved CPD	: 6.0
Speaker	: First Admiral Dato' Ir. Hj. Ahmad Murad bin Hj. Omar (Rtd)





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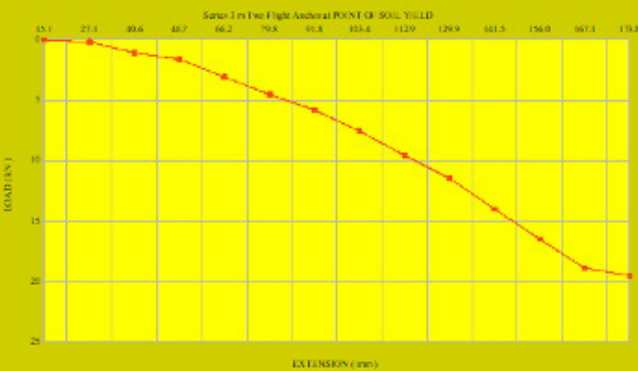
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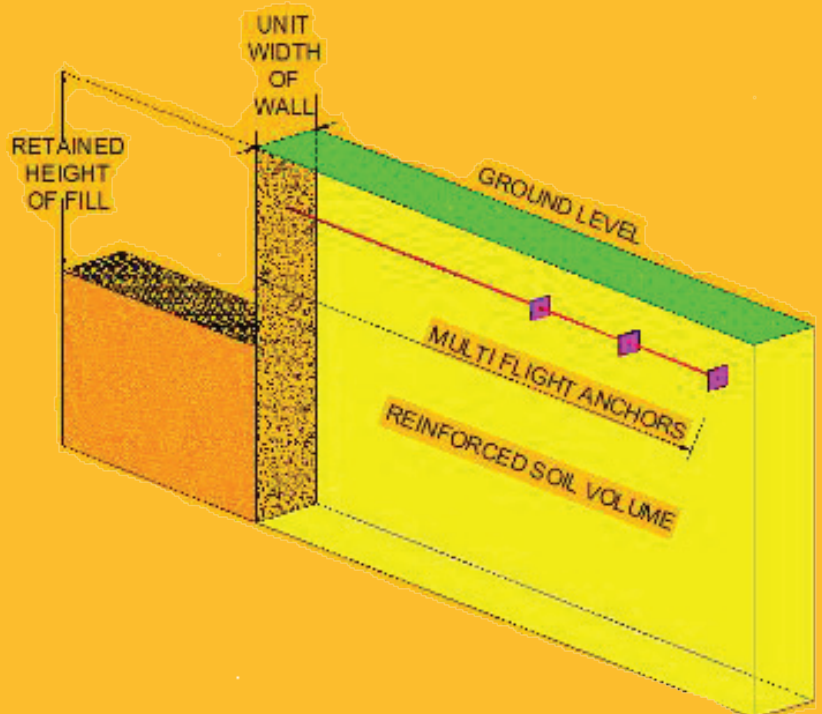
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# AERODROME SAFETY & HEALTH ISSUES IN AIRPORT OPERATION INDUSTRY



**Ir. Tajul Ariffin bin  
Mohamed Nori**

**E**nsuring safety and health at the aerodrome is not exclusive to the operators but should also be of paramount importance to all other support staff including contractors, suppliers, service providers and any other person who might be affected by airport operations. In this article, we outline several accident cases in Malaysian airports which have been reported to the Department of Occupational Safety and Health (DOSH). Most involved near-miss incidents but in some cases, not only was the safety and health of the workers compromised but there was serious body injury and even fatalities.

## CASE 1: COLLISION ON THE RUNWAY

In March 2019, a private aircraft collided with an airport engineering ground service vehicle on the runway. The worker who was supervising maintenance work on the runway at the time, was critically injured and passed away



*Part of the crashed vehicle on the left of the aircraft wing.  
– Picture courtesy of New Straits Times*

after two days of intensive medical care at the hospital. However, none of the passengers and the cabin crew of the aircraft was injured. The initial finding showed that the service vehicle remained static on the runway and was in conflict with the landing aircraft. This case was further investigated by the Civil Aviation Authority of Malaysia (CAAM). Such runway incursions can be avoided if all measures as specified in Airport Standards Directive 106 (ASD 106) by CAAM, are fully adhered to.

## CASE 2: GROUND SUPPORT EQUIPMENT – FATALITY CASE

In 2017, a senior technician was caught between equipment and its chassis frame while carrying out authorised repair work on a breakdown belt loader. The deceased had over 15 years of work experience. The mishap happened because he neglected to use the vertical stand support which could have prevented the fall of the loader conveyor during the hydraulic plunger repair work. Investigations revealed that the conveyor was raised using an overhead crane in the workshop to allow him to go underneath to do the repairs. However, when the task was completed, the victim cut the cargo-belt that was holding up the conveyor and sling hook while still standing inside the equipment. The heavy loader immediately pushed his head and chest downwards to the chassis frame. It was found that there was no risk assessment of the work and that the technician was not made aware that the support component was the key safeguard to prevent entrapment under the conveyor. It should be reminded that risk management control should always be considered as a precaution and the use of safety equipment in any work activity should always be emphasised. Sound design, operation and operator training will prevent future occurrences.





The belt loader is essential for the transferring of luggage.  
Image courtesy of pixabay.com

### CASE 3: ENVIRONMENTAL HAZARDS

Lightning occurrence is unpredictable and can be a serious potential hazard for those who work in open environments. In 2017, an airport landscape contractor was struck and killed by lightning while on the job. The supervisor who witnessed the event, stated that the contractor was aware of the changing weather conditions and that there were signs of a thunderstorm. Unfortunately, lightning struck even as the workers were moving to a safe area. In this incident, rather than just an administrative reminder to the workers, prevention measures could be taken to avoid such mishaps. The landscape manager or supervisor should check the weather forecast before carrying out planned work activities. Similarly, airport safety managers should consider such measures for all ground personnel working in the airfield.



Airport landscaping workers have a high risk of being struck by lightning.  
Image courtesy of pixabay.com

### CASE 4: HIT BY TARMAC TRUCK ON TAXIWAY

In 2018, a worker died after he was hit by a tarmac truck in the aircraft taxiway area when carrying out surface maintenance work near the airport terminal. He was

cleaning up spilled gravel premix at the scene when the tarmac tipper truck at the pavement area suddenly pulled back and crushed the victim. However, despite being given immediate treatment at the hospital, he died of serious injuries.

In this incident, it was learnt that no risk assessments and its associated hazards were conducted. Deficiencies in the procedure can be improved if proper site coordination and supervision are not taken for granted.



Working around construction machinery is a hazard on the airport runway.  
Image courtesy of pixabay.com

### CASE 5: ACCIDENTS INVOLVING TOWING TRACTORS

Towing tractors or tugs are commonly used to tow dollies such as baggage unit loaders, courier items, mail bags, carton boxes, flight cargo units, luggage etc., between the aircrafts and the terminal or cargo sorting area.

There were many incidences reported involving tugs from 2016 to 2018. In most cases, loss of tug control and crashing into concrete barriers resulted in workers suffering serious leg injuries. Operator competency is required for



The main threat when handling a towing tractor is the load it carries.  
Image courtesy of pixabay.com

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the safe handling of such powered machinery to avoid such incidences. The tug operator should note that pulling or towing a larger number of dollies would require a greater stopping distance. Special precautions on vehicle speed control must be considered when handling the tug in the ramp or gradient area. Training and competency on defensive driving should be made mandatory for these operators to prevent such incidents.

## CONCLUSION

The above cases are but just a few of such accidents. There have been many more occurrences in airports around the country and these significantly impact the effectiveness of airport management in relation to the welfare, safety and health of workers.

Other occupational health issues related to aircraft maintenance personnel have also been frequently reported, especially when in compensation claims for workers. Such accidents should be prevented proactively.

Unknown to many, airport safety managers are liable for work-related accidents at the airport, even if the workers involved are not under their supervision. Therefore, airport safety managers should take accountability on the duty of care and safety of their employees and the aerodrome operators.

On the other hand, airport subsidiaries or contractors should consider providing training on occupational safety and health as well as risk management for workers. Risk assessment for every work activity to mitigate and control any residual risk associated is crucial and work should not proceed if safety measures taken are inadequate.

Airport safety assurance can also be achieved through the effectiveness of Safety Management System (SMS) programmes such as self-auditing, external auditing or safety oversight.

Besides, adoption of the new standard on Occupational Health & Safety (OH&S) management system ISO 45001:2018 broadens the perspective on risk management as compared to the previous OH&S management system, OHSAS 18001:2007.

The new framework no longer has optional but organisational obligatory requirements which prevent the occurrence of work-related accidents, especially for those involved in aerodromes such as workers, the management team, contractors, suppliers, customers, community consumers, authority, special interest group and legislation. ■

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## Author's Biodata

**Ir. Tajul Ariffin bin Mohamed Nori**, a co-opt member of Mechanical Engineering Technical Division, IEM, is a Factory and Machinery Inspector at the Department of Occupational Safety & Health Malaysia.



# TRANQUIL ENCHANTMENT OF KOKURA CASTLE



**Ir. Dr David Chuah  
Joon Huang**

*Ir. Dr David Chuah Joon Huang is an IEM Council Member, Vice Chairman of Standing Committee on Information & Publications and the Principal Journal Editor. He lectures at the Department of Electrical Engineering, University of Malaya.*



Initially constructed in 1602 at the beginning of the Edo period, Kokura Castle was built with a pivotal role: To control Kokura town in Kitakyushu which was an important hub for land and sea traffic, even in the old days.

It embedded the Karazukuri architecture style where the top floor was larger than the floor below. It was from

this magnificent structure that the Strait of Shimonoseki, between the Japanese main islands of Honshu and Kyushu, was guarded. Severely destroyed by fire during a war between the Kokura and Choshu clans in 1866, the 5-storey castle was reconstructed with ferro-concrete in 1959 to reclaim its grandeur. ■



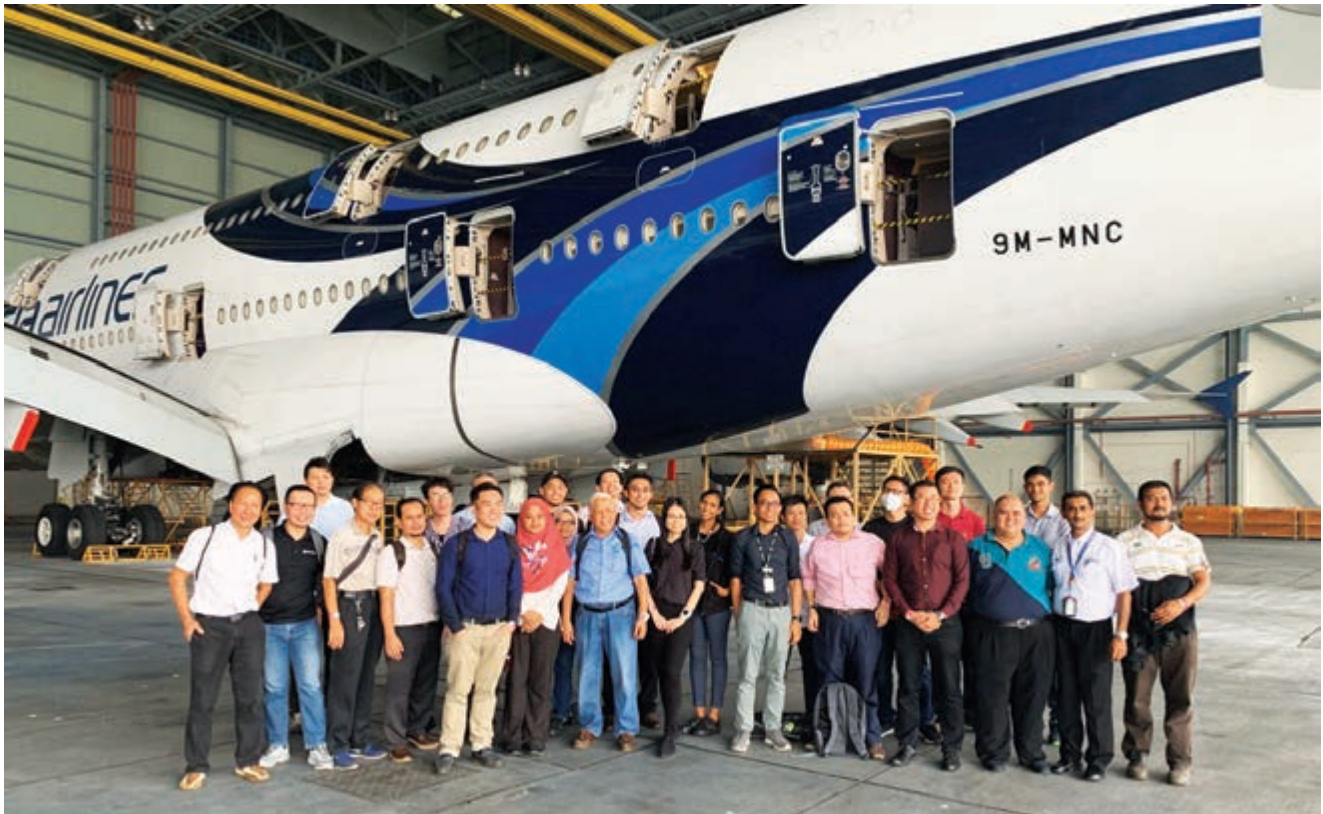
# TECHNICAL VISIT TO MALAYSIA AIRLINES BERHAD (ENGINEERING DIVISION)



by Nor Azilan Jaafar



Ramesh Sabapathy



Members of METD and staff members of MAS Engineering Division posing in front of an A380-800

On 18 September 2019, the Mechanical Engineering Technical Division (METD) of IEM organised a visit to the engineering division of Malaysia Airlines Berhad.

Our group, comprising 31 members, was welcomed by Encik Helmi Mokhtar, manager of MAS Engineering Training Department (EETD) who gave an introduction slide presentation on the background of MAS and safety procedures.

## MAS Background

Malaysia Airlines Berhad owns two subsidiary airlines: Firefly and MASWings. Firefly operates scheduled flights from its two home bases, Penang International Airport and Subang International Airport. It focuses on tertiary cities such as Alor Setar while MASwings focuses on inter-Borneo flights. A sister company, MASKargo, manages freighter flights and aircraft cargo-hold capacity for all Malaysia Airlines' passenger flights.





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The Malaysia Airlines fleet comprises 5 types of airplanes: A350-900, A330-300, A330-200, B737-800 and A380-800. Its biggest airplane is A380-800, which has 2 decks divided into First, Business and Economy classes. MASWings has 2 types of airplanes: 10 units of ATR72-500 and 6 units of DH-6 Twin Otter Series 400. Firefly has 12 units of ATR72-500 and MASKargo has 3 units of A330-200F.

After the briefing, we visited the MAS Engineering Division facilities. Encik Afnan and Encik Azhan from the EETD Division together with En. Ramesh from BMW Division (also a member of METD) accompanied us to the engine workshop at Hangar 5 and Hangar 6.

### Engine Workshop and Hangars 5/6

Maintenance activities are carried out at the hangars for Airbus and Boeing aircrafts. The engine workshop is also located here. We were allowed to touch the engine fan blades and examine the turbine engine closely. The fan blades are made from titanium. We also saw a few Rolls Royce engines in the storage room.

Then we proceeded to Hangars 5/6 to see the facilities. During our visit, we saw maintenance work being carried out on the Boeing B737-800, A380-800 and A330-300. Encik Afnan gave us a short briefing on the differences between the Airbus and Boeing, especially the wheels and brakes. After the briefing, we were divided into groups and allowed to step into the Airbus A380-800 as well as the cockpit where Encik Azhan talked about the cockpit consoles, control panels and control buttons.

We also checked out the business suite area. There are 8 seats for First Class, 66 seats for Business Class and 412 seats for Economy Class, making a total of 486 seats.

### Wheels & Brakes Workshop

Next, we visited the Wheel & Brakes workshop located nearby. Airplanes belonging to Malaysia Airlines are sent here for tyre replacements. The workshop uses the Lean Layout application to reduce wastage. The wheel hubs are washed and checked through visual inspection and details are checked with Non-Destructive Test (NDT) equipment before they are assembled and mounted.

Tyres are filled with nitrogen gas and tested for leaks and with pressure up to 36 hours. This is a standard procedure at MAS Engineering. An aircraft tyre is designed to withstand extremely heavy loads for short durations. The number of tyres required for an aircraft increases with the weight of the aircraft, as the weight of the airplane needs to be distributed more evenly. Aircraft tyre thread patterns are designed to facilitate stability in high crosswind conditions, to channel water away to prevent hydroplaning and for effective braking. Aircraft tyres are usually inflated with nitrogen to minimise expansion and contraction from extreme changes in ambient temperature and pressure experienced during flight. Dry nitrogen expands at the same rate as other dry atmospheric gases (normal air is about 80% nitrogen), but common compressed air sources may contain moisture which will increase the expansion rate with temperature. Using an inert gas for tyre inflation will eliminate the possibility of an explosion.

There is a station for wheel balancing, the process of balancing the weight of a tyre and wheel assembly so that it travels evenly at high speed.

For the last leg of the visit, we were brought to the Brake Installation Station. The visit ended at 2.00 p.m. We would like to thank the staff members and management of MAS for their hospitality. ■



# INDUSTRY 4.0 IN AVIATION INDUSTRY & FUTURE WORKFORCE



by Ts. Yap Sheng Lin

The term Industry 4.0 was started as a high-tech strategy project by the German government to encourage computerisation of manufacturing in order to strengthen the manufacturing industry.

At the Hannover Fair in 2011, the German Federal Government presented Industry 4.0 as a new, emerging structure in which manufacturing and logistics systems in the form of Cyber-Physical Production Systems (CPPS), intensively use the globally available information and communications network for an extensive automated exchange of information and in which production and business processes are matched.

Industrial Revolution 4.0 (4IR) refers to the integration of breakthrough technologies such as advanced robotics and automation, Artificial Intelligence (AI), the Internet of Things (IoT), Virtual Reality (VR), Augmented Reality (AR) and Big Data with the physical world that is transforming production processes and business models across different industries, including the aerospace and aviation industry in Malaysia.

In 2018, the Malaysian aerospace and aviation industry recorded a total revenue of RM14.4 billion with a 24,500-strong highly skilled workforce. The number is forecasted to increase further with the Malaysian Aerospace Industry Blueprint 2030 as the vision is for the country to be the number one aerospace nation in South-East Asia (SEA) and to be an integral part of the global market with an annual revenue of RM55.2 billion as well as to create over 32,000 high income jobs by 2030.

To achieve this target, 7 strategies and 41 key initiatives have been developed which involve Maintenance, Repair & Overhaul (MRO), Aero Manufacturing, Systems Integration, Engineering and Design Services as well as Education and Training.

The aerospace and aviation industry is important due to its complex and advanced technologies which can benefit the nation and other industries in the long run. However, the industry is tightly regulated with international

and local laws in order to ensure the safety and efficiency of flight services for the public.

Aircraft maintenance and engineering involve work such as task scheduling, productivity planning, parts inventory, reliability programme, defect monitoring & analysis and the actual maintenance tasks carried out on the aircraft which require skilled personnel.

A conventional approach may cause airlines to suffer from the high volume of aircrafts on the ground waiting for maintenance and the unnecessary removal of expensive parts. Thanks to 4IR innovative technologies, condition monitoring and predictive maintenance programme, coupled with digital platforms that perform analytics of enormous data captured by aircraft and parts sensors in real time, will help eliminate this situation. It enables aircraft maintenance teams to gain new insight into aircraft operations behaviour in real time as well as to understand what is happening, why it happens and to predict the outcome of the occurrence which means they will be ready in advance to make rectifications.

Advanced MRO facilities such as a smart hangar have been touted to become the "smart factory" for the aviation industry, especially for aircrafts to undergo scheduled maintenance. The smart hangar incorporates state-of-the-art technologies such as automated planning and streamlining of maintenance tasks, drone inspection, real time tools and parts tracking, AR & VR troubleshooting assistance and full range sensors for security and environment control.

Flight operations were also constantly overwhelmed by the vast amounts of data and information for route planning, weather forecast, fuel prediction and management while ground staff and handlers had to cope with passenger enquiries, complaints and missing baggage. All such routine and continuous tasks required a huge amount of resources. Fortunately, with 4IR technologies, automation can be deployed for passengers to self-check-in, baggage handling and customer services through AI and


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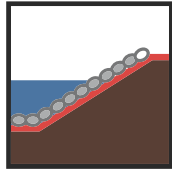
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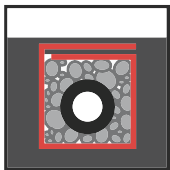
Road Construction



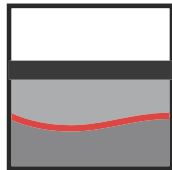
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VR on the digital platform. Flight operations are also relatively safer with optimum decision making based on the right information at the right time, generated by big data analytics gathered from various sources from within and outside the organisation.

With automation, there may be a temporary downside as new technologies displace and create new jobs at the same time. Disruptions introduced by 4IR technologies mentioned above, required employees to adapt and equip themselves with new and required skillsets. There is no room for those who resist change as current skills and knowledge become obsolete while new skillsets are required. Thus, in future, human capital development must focus on ICT, STEM, technical and vocational training to ensure a highly-skilled workforce is available for industry sustainability.

In fact, the impact of 4IR is already being felt in all industries, either directly or indirectly, as technology becomes part and parcel of our daily routine. While 4IR does offer both opportunities and threats, it will be wise to look at the advantages and mitigate the risks at the same time in order to reap the full reward in the future. ■

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#### UPCOMING ACTIVITIES

##### 1-Day Course on "Emergency Response Preparedness"

Date : 11 March 2020 (Wednesday)  
Time : 9.00 a.m. – 5.30 p.m.  
Venue : Wisma IEM  
Approved CPD : 6.0  
Speaker : Ir. Gary Lim Eng Hwa

##### 1-Day Seminar on "Latest Major Updates on Low Voltage Electrical Installations Design and Installations to Regulatory and IEC 60364 (BS 7671) Requirements"

Date : 17 March 2020 (Wednesday)  
Time : 9.00 a.m. to 5.30 p.m.  
Venue : Wisma IEM  
Approved CPD : 6.0  
Speaker : Mr. Lim Kim Ten





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# ANG KOON MENG (UCSI) WINS FYP 2019



by Ir. Dr Wang Hong Kok

**2**019 is the 3rd year for the Tan Sri Ir. Yusoff Best Final Year Project (FYP) Competition. Initiated by the IEM Education Fund, it is jointly conducted by IEM and The Institution of Engineering and Technology (IET).

The objective is to encourage engineering undergraduates to produce better quality FYPs. This competition is open to all universities and institutions of higher learning (IHL) with accredited engineering programmes. In the first 2 years, each university or IHL could only nominate the best FYP for submission.

This year, however, each university/IHL could submit only one nomination for each discipline and a total of 45 projects were received. They were 2 levels of assessment. Round 1, mainly on the project findings, contributed 80% of the total marks. In Round 2, students were assessed on presentation skills.

The organising committee members representing IEM, comprised Honorary Secretary Ir. Mohd Khir and Ir. Dr Wang Hong Kok. Representing IET were Associate Prof. Dr Lai Weng Kin and Mr. Indiran Nadarajan.

It was a privilege to have the following judges and we would like to extend to them our gratitude and thanks for their support.

Name	Faculty/Department
Dr Idris Ismail @ UTP	Computing & Information Technology
Dr John Tan @ SilTerra Malaysia	Electrical & Electronic Engineering
Mr. Pang Jia Yew @ Heriot Watt Malaysia	Electrical & Electronic Engineering
Ir. Dr Khor Jeen Ghee @ Plexus Manufacturing	Electrical & Electronic Engineering
Dr Lim Li Li @ TARUC	Electrical & Electronic Engineering

Dr Tiang Tow Leong @ UniMAP	Electrical & Electronic Engineering
Prof. Dr Esah Hamzah @ UTM	Material & Manufacturing
Assoc. Prof. Dr Astuty Amrin @ UTM	Material & Manufacturing
Ir. Dr Ng Soon Ching @ Sepakat Setia Perunding	Civil Engineering
Ir. Dr Lee Yun Fook @ Sepakat Setia Perunding	Civil Engineering
Dr Rizal Effendy @ UiTM	Mechanical Engineering
Dr Roslan Abdul Rahman @ UTM	Mechanical Engineering
Prof. Ir. Dr Wan Khairuddin @ UTM	Mechatronic Engineering
Dr Chong Chien Hwa @ Heriot Watt Malaysia	Chemical Engineering
Prof. Ir. Dr Rozita Binti Yusoff @ UM	Chemical Engineering
Dr Tee Tiam Ting @ UTAR	Chemical Engineering
Ir. Dr David Chuah Joon Huang @ UM	Electrical & Electronic Engineering
Ir. Dr Mohamad Syaiful Ashrul Ishak @ UniMAP	Mechanical, Material & Manufacturing
Prof. Dr Nazri Jaafar @ UTM	Mechanical, Material & Manufacturing
Dr Ang Kiang Loong	Mechanical Engineering
Ir. Elias Bin Saidin	Civil Engineering
Prof. Dr Rahmat Bin Mohsin @ UTM	Petroleum Engineering
Dr Dzeti Farhah Mohshim @ UTP	Petroleum Engineering



**Winner for 2019 FYP: RM 1000 + Certificate**

Name:	Ang Koon Meng
University:	UCSI
FYP Title:	Development of Improved Particle Swarm Optimisation Algorithm for Constrained Optimisation.
Discipline:	Mechatronic Engineering

**Consolation Prize : RM 400 + Certificate**

1. Name:	Lee Wei Qin
University:	Curtin University Malaysia
FYP Title:	Cracks Identification in Building Structure
Discipline:	Electrical Power Engineering
2. Name:	Heng Yen Fern
University:	University of Nottingham Malaysia
FYP Title:	Investigation of Jet Mixing in Swirl Co-Flow
Discipline:	Mechanical, Material & Manufacturing
3. Name:	Tee Zhen Wei
University:	TAR University College
FYP Title:	Numerical Analysis on Vibro-Acoustic Characterisation of Honeycomb Structure with Flor Permeability
Discipline:	Mechanical Engineering
4. Name:	Tan Jun Yan
University:	UTAR
FYP Title:	Study of Combined Effect of Concentrated Solar Power (CSP) and Phase Change Material (PCM) in Solar Desalination
Discipline:	Mechanical Engineering
5. Name:	Lee Chong Hoe
University:	Universiti Malaysia Pahang (UMP)
FYP Title:	Diversity of Stress Ranges in Cables of Cable-Stayed Bridge Due to Traffic Loads and Far-Field Seismic Excitation
Discipline:	Civil Engineering
6. Name:	Tay Sze Yee
University:	Heriot-Watt University Malaysia
FYP Title:	A Renewable Polysaccharide-Based Bio-Sorbent Functionalised with Calcium Chloride For Renewable of Azo Dye Methyl Orange
Discipline:	Chemical Engineering

This year we received participations from the faculties/ departments of Computing, Electronic Engineering, Electrical & Electronic Engineering, Civil Engineering, Mechanical Engineering, Petroleum Engineering, Mechatronic, Materials & Manufacturing, Agricultural & Biosystems Engineering, Biomedical and Chemical Engineering. We hope more students will be inspired to take part in the FYP competition next year. ■



*Standing (l-r): Ang Koon Meng (winner of FYP 2019) and his supervisor Dr Lim Wei Hong from UCSI University.  
Seated (l-r): Judges representing IEM, Dr Amran Ayob and Ir. Dr Wang Hong Kok and judges representing IET, Dr Lai Weng Kin and Mr. Indiran Nadarajan*



*Finalists and their supervisors*

# THE WAY FORWARD FOR SMI/SMES IN INDUSTRY 4.0

## PART 1: INDUSTRY 4.0 IN GERMANY & MALAYSIA



by Assoc. Prof. Ts. Dr Lee Wah Pheng

A joint project promoted by Urban Engineering Development Special Interest Group (UEDSIG) and Mechanical Engineering Technical Division (METD).

Is Industry 4.0 just an abstract term for industries in Malaysia? What should we benchmark and how should we move forward? Industry 4.0 is not just connecting manufacturing automation (vertical integration) to streamline operations management, but also planning for recovery of product value due to inefficiencies from manufacturing processes and logistics. The strategies should include both recovery and creating product values in its value stream and building a sustainable competitive advantage through supply chain optimisation [1] to increase the market share locally and globally.

As a reference, Germany's Industry 4.0 strategic initiative [2] comprises both strategies. Germany recovers product values by promoting the connected manufacturing automation in the distributed manufacturing supply chain which is linked by the multiple SMI/SMEs and led by the global market leaders in their segment. They create product value by building software frameworks for manufacturing chain integration (horizontal integration) which are able to organise and control the entire value stream across product lifecycle, focuses on increasingly personalised customer wishes and extend from the concept to the order, development, production and shipping of a product to the end customers.

The integrated manufacturing chain is also able to provide a cross-border marketing channel for SMI/SMES to trade for better product pricing after it creates product value through the process of identifying and digitising the product and processing unique features as the tradable digitised assets. The insights of digitised assets can shorten the new product and feature development,

improve quality and provide better services. Hence, successfully implemented Industry 4.0 will not only improve competitiveness through the competitive pricing strategy but will also be able to digitally transform the business model to include differentiation and/or focus strategy for higher revenue that can justify for investment in Industry 4.0.

There are four important milestones in Germany's Industry 4.0 roadmap since 2013. The first was the setting up of Plattform Industrie 4.0 [3] at the Hannover Messe in April 2013. A platform for the Federal Minister of Economics and Federal Research Minister to lead together with its alliance consists of companies, academia, associations and trade unions on the development of strategies and technical solution approaches mainly focus on the manufacturing chain integration.

The second milestone was the publication of German Standardisation Roadmap Industrie 4.0 [4] by DIN German Institute for Standardisation and DKE German Commission for Electrical, Electronic & Information Technologies in November 2013. This was subsequently updated to versions 2 and 3 in January 2016 and March 2018 [4] respectively. Each version of this document provides an overview of activities currently underway in the field of standardisation and contains recommendations and specifications of relevance to Industrie 4.0 topics.

The third milestone was introducing the Reference Architectural Model Industrie 4.0 (RAMI 4.0) [5] in June 2015. RAMI 4.0 is a three-dimensional map showing how to approach the issues of Industry 4.0 by stakeholders to build the ecosystem together in a structured manner. It is the grand unifying theory of manufacturing industries to merge the vertical integration, horizontal integration and product lifecycle in the value stream into a single model.

The fourth milestone was forming the International Data Space Association (IDSA) in January 2016. IDSA published the Industrial Data Space (IDS) Reference



Architecture Model [6], a standard for data sovereignty and indispensable element of data ecosystems. IDS ensures digital sovereignty for asset owners, making asset data available for exchange or to be shared with asset consumers.

So what is the implication of Germany's four milestones in Industry 4.0? Industry 4.0 is a continuous long-term process to build a sustainable ecosystem through the integration of connected manufacturing processes and distributed manufacturing chain integration of a country's business segment. The factor of scale in this ecosystem is large which requires the government and its alliance to plan the roadmap, coining the reference architectures and governance models for data belonging to the tradable digitised assets for the SMI/SMEs to implement Industry 4.0 in a fair, reasonable and affordable way.

Many traditional SMI/SMEs in the Malaysian manufacturing supply chain are still focused on pricing strategy within the local market. Their businesses will face many challenges ahead such as increasing bilateral trade from China, especially with its high-volume product manufacturers and rapid growth in the aviation industry which reduces logistics and transportation cost, thus enhancing China's cross-border e-commerce in the next few years [7]. Furthermore, the slow population growth, high labour cost and talent shortage in Malaysia may not favour business growth as the market size may be too small and limited. So what are our initiatives in Industry 4.0 to support SMI/SMEs to face the inevitable challenges of business globalisation?

In Malaysia, the first and second milestones were achieved after the Ministry of International Trade & Industry (MITI) launched Industry4WRD in October 2018, followed by the announcement of the Industry4WRD National Policy on Industry 4.0 [8]. The moving forward strategic enablers F.I.R.S.T comprise national strategies on funding (F), infrastructure (I), regulations (R), skills and Talent (T) and technology (T). An Industry4WRD council, consisting of members from ministries, agencies and industry leaders, was set up to govern and oversee the propelling of Industry 4.0 transformation.

After the launch of Industry4WRD, the immediate activity was focusing on the assessment of SMI/SME's Industry 4.0 readiness level [9] and to select some for participation in intervention projects funded by the government and industry partners to provide diverse Industry 4.0 technological solutions and platforms. However, the diversification of technological solutions, platforms and interoperability challenges may not favour the SMI/SMEs to build together a scalable and sustainable Industry 4.0 ecosystem.

Since the networking infrastructure (software and hardware) is the building block of the Industry 4.0 ecosystem, national infrastructure strategies are focused on the deploying of converged networks, accelerating digitisation and integration of processes, joint development with service providers through the collaborative platforms. These actions plans and programmes are essential but seem unstructured and there is a lack of the reference architecture models to build the Industry 4.0 ecosystem similar to Germany's Industry 4.0 strategies mentioned in the third and fourth milestones. [To be continued...] ■

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## APPRECIATION

to Bulletin Editor  
Ir. Razak Yakob

The Editorial Board would like to thank Bulletin Editor Ir. Razak Yakob for his excellent work and dedicated contribution for 2 terms and wishes him all the best in his future endeavors.



# FOURTH QUARTER OF 2019 ACTIVITY SUMMARY



by Ir. Ahmad Nazari Ashari

This is a summary of IEM Terengganu branch activities from October to December 2019. Our objective is to promote continuous professional development for both IEM members and non-members in the state. IEM Terengganu branch also provides an interactive platform for members to widen both professional and social networks, such as getting acquainted with engineers of other disciplines and contributing to community-based projects.

## TALK ON ELECTRICAL COMPETENCY CERTIFICATION

On the 29th of October, IEM Terengganu branch conducted a talk to Electrical Engineers from PETRONAS Gas Bhd. at Kelab Golf & Rekreasi Petronas, Kerteh. About 20 engineers attended this talk. The objective of the talk is to provide guidance for electrical engineers who are undertaking the Certificate of Competency (COC) qualification by Suruhanjaya Tenaga Malaysia. The prerequisite for COC is the candidate must be a registered Professional Engineer (P.Eng). Electrical Engineers with a Certificate of Competency (COC) can then be appointed as Responsible Persons in supervising electrical power installations in Malaysia.



Participants who attended the talk

## EXCOMM MEETINGS

IEM Terengganu branch held 3 Executive Committee (Excomm) meetings during this fourth quarter period. At the meeting on 31 October, Tuan Hj. Abd. Karim, a Principal Electrical Engineer at PETRONAS Gas Bhd. in Kerteh, was welcomed to the committee as a Kerteh representative. A few hundred engineers live in Kerteh, so IEM feels such representation is crucial to ensure its members from this area are well represented in the branch.



The IEM Terengganu branch Excomm meeting.  
Tuan Hj. Karim is second from the left

## WATER TREATMENT TECHNOLOGY & WATER TREATMENT PLANT MANAGEMENT

Ir. Hj. Abdul Aziz bin Abdullah conducted a series of technical talks on water treatment technology and management on 21 November and 11 December 2019 for 15 and 20 participants respectively. He talked about the purpose of water treatment and the fundamentals to obtain adequate domestic water supply within a specified period of time while meeting the budget and water quality standards. He stressed that the technical design must provide for the treatment plant to be modified, retrofitted and rehabilitated to improve efficiency.

## DONATIONS TO ASRAMA DARUL FALAH ORPHANAGE

On 23 December, IEM Terengganu branch donated two automatic washing machines and 10 kg of detergent and





*IEM Terengganu branch Chairman Ir. Hj. Abdullah Zawawi bin Hj. Mohd Noor with participants at the first talk*



*Participants at the second talk*

fabric softener to Asrama Anak Yatim Darul Falah in Bukit Payung, Terengganu. The orphanage is home to 74 children aged 9 to 17 years.

The orphanage head, Puan Norina Mohamad, gave a welcome speech, followed by another by the secretary, Tuan Haji Sidek bin Hussim. IEM Terengganu branch chairman Ir. Hj. Abdullah Zawawi bin Hj. Mohd Noor was then invited to give a speech. The branch extends its deepest gratitude to members who have contributed towards the cost of the washing machines. ■



*IEM Terengganu branch Excomm with officials of Asrama Darul Falah*

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# ASEAN ENGINEERS MOBILITY PROGRAMME: SOCIAL INNOVATION TOWARDS SOCIETY 5.0



by Illy Alia binti Mohd Azizan

The Second International Colloquium on Asean Engineers Mobility Programme: Social Innovation Towards Society 5.0 on 22-27 August, 2019, was organised by IEM@FKE Student Chapter at UiTM Shah Alam.

The aim was to nurture student engagement and critical thinking via project-based problem-solving techniques and strategies. There were 5 participants from Delta's University of Perpetual Help System (UPHSD), The Philippines and 12 participants from UiTM Shah Alam for this international mobility programme towards UiTM's

efforts of "1 Student 1 Passport".

One highlight of the colloquium was Opportunity for Improvement and Corporate Social Responsibility mission for Sitio Riverside Barangay Paciano Calamba City, Laguna. Participants discussed issues such as toilet facilities, sewage and garbage management, access to clean water and unemployment as well as came up with proposals for possible solutions. Besides exposure to the latest research and innovations, the colloquium also helped broaden the scope of students' engagement and collaborative activities with UPHSD. ■



Group photo with Dr Alfonso H. Loreto (school Headmaster), Assoc. Prof. Lorena Ilagan and Engr. Marcelo Santos at University of Perpetual Help System Delta, Las Pinas, The Philippines.



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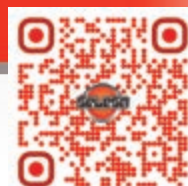
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Updated May 2018



# STOPOVER TOUR OF ALMATY



*Ir. Lau Tai Onn*

*Ir. Lau Tai Onn is a retired civil & structural engineer who is also secretary of the IEM Standing Committee on Information and Publications, a post he has held continuously since 2007.*



*Ascension Cathedral*



*Cathedral Interior*

**M**y wife and I joined a 10D/7N tour to Turkey in late October, 2019, using Air Astana, the flag carrier of the Republic of Kazakhstan. For the flight from KL to Istanbul, we had a one-hour transit at the airport in Almaty where the airline is based and another 16-hour transit (6.00 a.m. to 10.00 p.m.) in Almaty for the return flight from Istanbul to K.L.

For the 16-hour transit, Air Astana provided breakfast and hotel accommodation at no additional cost as part of the Stopover Paid By Carrier (STPC) service.

All but two of our tour group of 25 members opted to join a half-day city tour (US\$100 per person) of Almaty during the 16-hour transit; it was arranged by the tour leader and we were provided with a Kazakh local tour guide.

Almaty is the largest city in Kazakhstan and it served as the capital from 1929 to 1997. The capital was relocated in 1997 to Astana, renamed as Nur-Sultan from 23 March, 2019, after long-term president Nursultan Nazarbayev resigned after having been in office since 1990. Kazakhstan was the last Soviet republic to declare independence prior to the dissolution

of the Soviet Union in 1991.

The first place we visited was Kok-Tobe hill which is a popular recreation area with amusement parks on top of a hill 1100 meters above sea level. From the sightseeing platform, we could enjoy the panoramic views of Almaty city.

Then we visited the Central State Museum of Kazakhstan which is acclaimed to be one of the largest museums in Central Asia. It displays collections of Kazakh historical, archaeological, modern cultural and political artifacts. There were interesting exhibitions of equipment of a warrior of the 13th-14th centuries, the Great Silk Road's trade, import items and others.

Next was the Panfilov Park which is one of central Almaty's most popular strolling and hangout places for all ages. The park is named after the Soviet general Ivan Panfilov with a memorial of his 28 soldiers of an Almaty infantry unit who died fighting off Nazi tanks in a village outside Moscow during the World War II in 1941.

The most impressive sight-seeing spot is the Ascension Cathedral, also known as Zenkov Cathedral, located at the heart of the Panfilov Park.

The Ascension Cathedral is a Russian Orthodox cathedral constructed between 1904 and 1907. It is a five-domed and three-aisled structure with a built-in bell tower. The uniqueness of this church building is that it was completely made out of wood and without any nails. It is 56 meters tall and is among the top 8 tallest wooden buildings of the world.

An interesting story about the cathedral is that it survived a magnitude 7.7 earthquake in 1911 with minimal damage, while almost all buildings in the area were damaged. Some bishops attributed it to divine intervention, while others believed that it was due to the construction technology of "anti-seismic basket" invented or employed by the architect, Andrei Pavlovich Zenkov. Wooden beams were fastened with rolling brackets and during the earthquake shake the walls were moving smoothly that provided stability to the building.

Historically, the church faced hardship during the Soviet rule and was forced to be closed in 1927. Then it was robbed, all bells thrown down and the library partially destroyed. It was used to house the Central State Museum until 1994. Finally the Russian Orthodox Church was given back the cathedral's control in 1995 and after undergoing some restoration works, it was reopened for religious service in 1997. Since then and up to now, the cathedral is a sanctuary for hundreds of Christians and a popular attraction for tourists.

The city tour of Almaty was actually not in our original Turkey package tour itinerary, but it turned out to be an eye-opening and enjoyable trip that should be considered a desirable destination by holidaymakers. ■

# TEMUDUGA PROFESIONAL

Tarikh: 13 Januari 2020

Kepada Semua Ahli,

## SENARAI CALON-CALON YANG LAYAK MENDUDUKI TEMUDUGA PROFESIONAL TAHUN 2019

Berikut adalah senarai calon yang layak untuk menduduki Temuduga Profesional bagi tahun 2020.

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 2019.

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.

**Ir. Mohd Khir bin Muhammad FIEM, PEng**  
Setiausaha Kehormat, IEM

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54190	CHUNG YEE YONG	BE HONS (UTAR) (MECHANICAL, 2016)
34479	HILMI SAFUAN BIN JAPAR	BE HONS (UTeM) (MECHANICAL (THERMAL-FLUIDS), 2010)
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KEJURUTERAAN STRUKTUR		
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90325	AZHAN BIN RAHMAT	BE HONS (UITM) (CIVIL, 2011)
43516	MOHAMAD KHUSAIRY BIN HJ AHMAD	BE HONS (UPM) (CIVIL, 2000)
77472	NIK ANIS ADLIN BIN ZAFRI	BE HONS (UITM) (CIVIL (INFRASTRUCTURE), 2013)
<b>KEJURUTERAAN KIMIA</b>		
92326	MOHAMAD HAFIZI BIN ZAKRIA	BE HONS (UTP) (CHEMICAL, 2012)
<b>KEJURUTERAAN ELEKTRONIK</b>		
61159	HUM YAN CHAI	BE HONS (UTM) (BIO-MEDICAL, 2010)

## UPCOMING ACTIVITIES

### 1-Day Seminar on "Active Transportation - Pathways to Healthy Living"

Date	: 18 March 2020 (Wednesday)
Time	: 9.00 a.m. – 5.30 p.m.
Venue	: Wisma IEM
Approved CPD	: 7.0
Speaker	: Multiple Speakers

### 1 Day Training on "IBS Professional Training 2020"

Date	: 24 – 26 March 2020 (Tuesday to Thursday)
Time	: 9.00 a.m. – 5.00 p.m.
Venue	: Applying
Approved CPD	: 5.5
Speaker	: Ir. Gunasagaran Kristnan

### Workshop on "Managing Engineering Competency Development (ECD) Log Book"

Date	: 28 March 2020 (Saturday)
Time	: 9.00 a.m. – 4.30 p.m.
Venue	: Wisma IEM
Approved CPD	: 5.5
Speaker	: Ir. Al-Khairi Mohd Daud, Ir. KT Lim, Ir. Han Seng Kong

## UPCOMING ANNUAL GENERAL MEETINGS – TECHNICAL DIVISION

DATE	TECHNICAL DIVISION	CPD
14 March	22nd AGM – Information and Communications Technology, Special Interest Group (ICTSIG)	2

For further details on the various events, please visit our website at [www.myiem.org.my](http://www.myiem.org.my) or call IEM Secretariat at 03-7968 4001



Pengumuman  
yang ke-136SENARAI PENDERMA KEPADA WISMA  
DANA BANGUNAN IEM

Institusi mengucapkan terima kasih kepada semua yang telah memberikan sumbangan kepada tabung Bangunan Wisma IEM. Ahli-ahli IEM dan pembaca yang ingin memberikan sumbangan boleh berbuat demikian dengan memuat turun borang di laman web IEM <http://www.iem.org.my> atau menghubungi sekretariat di +603-7968 4001 / 5518 untuk maklumat lanjut. Senarai penyumbang untuk bulan Disember 2019 adalah seperti jadual di bawah:

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1	15831	MR. TAN KAI BOON
2	34351	MR. FAUZI BIN AHMAD
3	07839	IR. BENEDICT INDRAN RATNASINGAM
4	43823	MR. LEE HENG GIAP
5	25514	MR. SHIN CHIAN CHEOW
6	19275	IR. YAH KEM CHUI
7	26932	SDR. SHAFULRIZAL BIN ZAINOL
8	33778	MR. CHUA KOK LIANG @ HENRY CHUA
9	49945	MR. SUHAIMI BIN JALAUDDIN
10	54115	MR. RAZALI BIN DAMAN
11	20933	MR. ROZMAN BIN KASMANI
12	13662	MR. ZULKIFLI BIN OTHMAN
13	15086	IR. WAN THIAM HUAT
14	06603	IR. KONG NENG CHING
15	17129	DR. BADHRULHISHAM BIN ABDUL AZIZ
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17	10801	MR. BOEY WEI LUN
18	11572	IR. ABD. MUTHALIB BIN ABD. RAHMAN
19	45430	MR. PATHMAPRASAD A/L RAMACHANDIRAN
20	15570	IR. SHAFUL SUKRI BIN ISMAIL
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23	37979	MR. TAN TEE GIAP
24	16870	IR. SAW WOOI KOON
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27	92354	MR. OMAR A. MOHSEN M.
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30	14955	IR. TENGKU HAZIAN BIN TENGKU AB. HAMID
31	38714	IR. MOHD NASHARUDDIN BIN HASHIM
32	33876	IR. DR KENNETH A/L SUNDARAJ
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34	03016	IR. ANG LEE HUAT
35	27491	MR. LIEW GUAN DUT
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37	03452	IR. ABD. RAHIM BIN SHAMSUDIN
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39	07096	MR. AHMAD SUHAILI BIN IDRUS
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41	64855	IR. SHAHARIN BIN HAMID
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44	56819	MR. LIM CHEE KIANG
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50	21296	MR. TAN HUA CHUN
51	16194	IR. TAY KU WAH
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58	105202	MR. MOHD FAIZ BIN ABDUL AZIZ
59	24947	MR. YEE SIEW HUAT
60	14181	IR. CHENG KEE HAUT

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62	24391	MR. LEE TOH HOCK
63	13108	MS. RUZITAH BINTI SUPINYEY
64	12373	IR. ARUL HISHAM BIN ABDUL RAHIM
65	27628	MR. MITHIRENDRA MANIAM
66	104166	MR. MUHAMMAD FAIRUZ BIN ABDUL JALAL
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69	22421	MR. AMIRUDDIN BIN SAAD
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73	19629	IR. DR WAHID BIN OMAR
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79	10908	MS. CHANG CHOOI FOONG
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102	06397	IR. NG KOK HWA
103	05821	IR. DR CHIAM TOU PING, ANDY

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2020PERMOHONAN MENJADI  
AHLI KORPORAT

KEJURUTERAAN ELEKTRIKAL	
MUSTAPHA BIN ABDUL GHANI	BE HONS (UNITEN) (ELECTRICAL POWER, 2007)
NANDAN GANESH A/L JEYABALAN	BE HONS (MMU) (ELECTRICAL, 2007)
NORNIKMAN BIN RAHIMIN	BE HONS (UTeM) (INDUSTRIAL POWER, 2006) ME (UTM) (ELECTRICAL-POWER, 2016)
NUR KHAIRUNNISA BTE NOORAHIM	BE HONS (UNITEN) (ELECTRICAL POWER, 2013)
SHARIZAL BIN BARI	BE HONS (UNITEN) (ELECTRICAL POWER, 2003)
W. AMIRUL HAFIZ BIN W. MD. YUSOF	BE HONS (UTM) (ELECTRICAL, 2008)
WAN HANIZA BINTI WAN ZAINUDDIN	BE HONS (UNITEN) (ELECTRICAL & ELECTRONICS, 2006)
WANG HOCK LAI, ANDREW	BE (MONASH) (ELECTRICAL, 1985)
YOGENDRA BALASUBRAMANIAM	BE HONS (UNITEN) (ELECTRICAL & ELECTRONICS, 2009)
KEJURUTERAAN ELEKTRONIK	
AHMAD ZAHARAN BIN TAMBY CHIK	BE HONS (UKM) (ELECTRICAL, ELECTRONIC & SYSTEM, 2002)
GOH CHIN HOCK	BE HONS (UNITEN) (ELECTRICAL & ELECTRONICS, 2004) ME (UNITEN) (ELECTRICAL, 2008) PhD (UNITEN) (2012)
HASNIDA BINTI SAAD	BE HONS (UITM) (ELECTRICAL, 2003) ME (UKM) (COMMUNICATION & COMPUTER, 2006)
MAHADHIR BIN A. RAHMAN	BE HONS (UTM) (COMPUTER, 2002)
MOHD HANIFF BIN A. HAMID	BE HONS (UITM) (ELECTRICAL, 2010)
MUSA BIN MOHAMED ZAHIDI	BSc (IBARAKI, JAPAN) (ELECTRICAL & ELECTRONIC, 2005) ME (UITM) (ELECTRICAL, 2012)

NOR AYU @ NOR ZALINA BINTI ZAKARIA	BE HONS (UNIMAS) (ELECTRONIC & TELECOMMUNICATIONS, 2000) MSc (SURREY) (MOBILE & SATELLITE COMMUNICATIONS, 2003)
NORASHIKIN BINTI M. THAMRIN	BE HONS (UTM) (ELECTRICAL-ELECTRONICS, 2005)
NORAZAM BIN MANSOR	BE HONS (SHEFFIELD) (ELECTRONIC-COMMUNICATIONS, 1999)
NORAZIZAH MOHD ARIPIIN	BE HONS (UKM) (COMMUNICATION & COMPUTER, 2001) ME (UKM) (COMPUTER & COMMUNICATION ENGINEERING, 2005) PhD (UTM) (ELECTRICAL, 2012)
WAN MOHD NOORIMAN BIN WAN YAHYA	BE HONS (UTM) (ELECTRICAL-MECHANICS, 2006)

## KEJURUTERAAN GEOTEKNIK

MOHD ASHRAF BIN MOHAMAD ISMAIL	BE HONS (USM) (CIVIL, 2004) ME (GADJAH MADA) (GEOLOGICAL, 2006) PhD (KYOTO) (GEOTECHNICAL, 2010)
--------------------------------	--

## KEJURUTERAAN KAWALAN &amp; INSTRUMENTASI

KANAKARAJAH A/L KULASEHARAN	BE HONS (UNITEN) (ELECTRICAL & ELECTRONICS, 2012)
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## KEJURUTERAAN MEKANIKAL

ABDUL RAHMAN BIN ABDULLAH	BE HONS (UNITEN) (MECHANICAL, 2007)
ABDULLAH BIN AHMAD	BE HONS (UTM) (MECHANICAL, 2014)
BOO TAU KUAN	BE HONS (GLAMORGAN) (MECHANICAL, 1995)
CHONG CHEW FUAI	BE HONS (UM) (MECHANICAL, 2006)
HARIZAL BIN OMAR	BE HONS (UITM) (MECHANICAL, 2006)
HO CHEE SIANG	BE HONS (SWINBURNE) (MECHANICAL, 2012)
IN WEN AUN, LARRY	BE (MONASH) (MECHANICAL, 2006)
KU MOHD FAISOL BIN KU BAKAR	BE HONS (UTM) (MECHANICAL, 2008)
MOHAMAD FITRIE BIN SABIRAN	BE HONS (UTM) (MECHANICAL, 2008)
MOHD ASLAM BIN JUSOH	BE HONS (UMP) (MECHANICAL - MANUFACTURING, 2008)
MOHD AZAM BIN SAAT	BE HONS (UTM) (MECHANICAL, 2003)
MOHD HAFIZAL BIN MATON	BE HONS (UNITEN) (MECHANICAL, 2006)
MOHD KHAIRUL HAMZI BIN MHD JAMIN	BE HONS (UTM) (MECHANICAL, 2008)
MOHD RODZI BIN RAMLI	BE HONS (UITM) (MECHANICAL, 2008)
MUHAMMAD FAIRUZ BIN ABDUL JALAL	MSc (RAVENSBERG-WEINGARTEN, GERMANY) (MECHANICAL, 2010)
NURRULHAFAZ BIN SABU	BE HONS (MALAYA) (MECHANICAL, 2008)
NURUL AINN BINTI MD YASA	BE HONS (UTM) (MECHANICAL, 2011)
ROONIE PROTASIU	BE HONS (UTM) (MECHANICAL, 2003) ME (JMS) (MECHANICAL, 2016)
ROY PETRUS NGAU	BE HONS (UNIMAS) (MECHANICAL, 2009)
SHAHIRMAN BIN ABU BAKAR	BE (MIE UNIVERSITY) (MECHANICAL, 1997) ME (MIE UNIVERSITY) (MECHANICAL, 2006)
SIDEK BIN RASHID	BE HONS (UPM) (MECHANICAL/SYSTEM, 1996)
WAN MOHD ZAKI BIN WAN MANSOR	BE HONS (UTM) (MECHANICAL, 1992)
ZULKIFLI BIN AHMAD	BE HONS (UTM) (MECHANICAL, 2007)

## KEJURUTERAAN PEMBINAAN

NURHIDAYAH BINTI AZMI	BSc HONS (IOWA STATE) (CIVIL, 2012) MSc (UTM) (CONSTRUCTION, 2007)
-----------------------	--

## KEJURUTERAAN SUMBER AIR

SANDRA ANAK LIGONG	BE HONS (UKM) (CIVIL & STRUCTURAL, 2005)
--------------------	--

## KEJURUTERAAN TELEKOMUKASI

DORAISAMY A/L SEENAIYAH	BE HONS (UKM) (COMMUNICATION & COMPUTER, 2005) ME (UNITEN) (ENGINEERING MANAGEMENT, 2014)
MUHAMMAD FARRIS BIN KHYASUDEEN	BE HONS (MALAYA) (TELECOMMUNICATION, 2009)

PERMOHONAN MENJADI AHLI (MELALUI  
PEPERIKSAAN PENILAIAN PROFESIONAL)

## KEJURUTERAAN KIMIA

SYED SYAKIRIN BIN SYED ABDUL RAHMAN	BE HONS (UTP) (CHEMICAL, 2003)
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**Note:** Continuation of the Transfer Graduate, Graduate, Incorporated, Affiliate and Associate would be published in March 2020. For the list of approved "ADMISSION TO THE GRADE OF STUDENT", please refer to IEM web portal at <http://www.myiem.org.my>.

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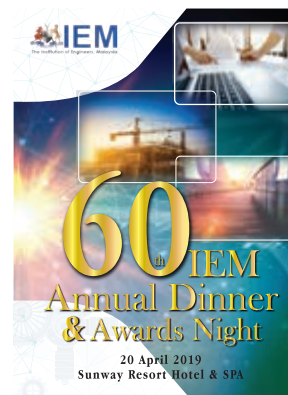
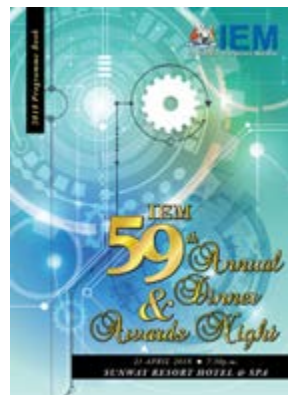
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# IEM 61<sup>st</sup> Annual Dinner and Awards Night 2020 Programme Book



We are pleased to inform that IEM will be holding the 61st Annual Dinner and Awards Night 2020 on **18 April, 2020**. 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 **One World Hotel, 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 2020/2021. 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 **20 March 2020**.

<b>Book Size</b>	: 210mm(W) x 285mm(H). Please provide extra 6mm for bleed area on all 4 sides
<b>Printing Specifications</b>	: 230gsm art card (Cover), 105gsm art paper (Text), 4C + 4C, Staple binding, UV varnish on Cover
<b>Quantity</b>	: 1,200 copies
<b>Advertisement Format</b>	: High resolution PDF file, with crop marks, bleed area, text being outlined
<b>Deadlines</b>	: <b>20 March 2020 (Fri)</b> (Ad Booking) : <b>27 March 2020 (Fri)</b> (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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Facing Inside Back Cover	2,800	(   )	
Facing Past Presidents List	3,000	(   )	
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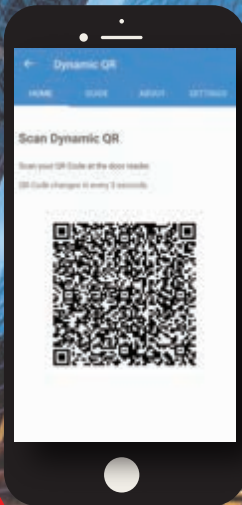
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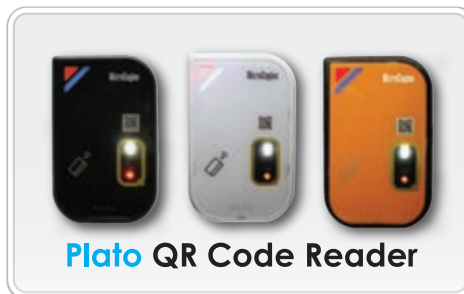
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