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General Manager SHIRLEY THAM shirley@dimensionpublishing.com

Head of Marketing & Business Development JOSEPH HOW joseph@dimensionpublishing.com

Editor TAN BEE HONG bee@dimensionpublishing.com

Contributing Writers PUTRI ZANINA & ZOE PHOON putri@dimensionpublishing.com zoe@dimensionpublishing.com

Senior Graphic Designer SUMATHI MANOKARAN sumathi@dimensionpublishina.com

Graphic Designer NABEELA AHMAD beela@dimensionpublishing.com

Advertising Consultants THAM CHOON KIT ckit@dimensionpublishing.com

Accounts cum Admin Executive YEN YIN yenyin@dimensionpublishing.com

For advertisement placements and subscriptions, please contact:

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## cover note

#### **Engineering the World**



by Ir. Dr Ng Kok Chiang Chairman, Consulting Engineering Special Interest Group (CESIG)

ngineering consultancy has changed over the decades to meet industry, peer and stakeholder requirements. Today, it requires not only a strong engineering foundation but also forward thinking capabilities. The industry is not without challenges, such as attracting talents, the high cost of research & innovation and players in other countries who can work at lower rates.

In this issue, JKR Director-General Dato' Sri Ir. Dr Roslan bin Md. Taha, shares his views on the progression and challenges of the engineering profession in Malaysia.

Consulting engineers must constantly be able to improve and innovate but if challenges are handled well, the business will prove rewarding and gratifying.



editor's note

by Ir. Razak Yakob

Salam & Hello All IEMers (ai-ee-em-mers),

Firstly, I would like to thank the Standing Committee on Information & Publications for entrusting me with the role of Bulletin Editor. It is an honour that comes with enormous responsibility. This is a role that is not easily filled as the

previous editor, Ir. Mohd Khir bin Muhammad (who is our newly elected Honorary Secretary; CONGRATULATIONS!) has done an amazing job in the last 4 years.

This is not the only change we are seeing. In recent weeks, we have seen major changes in the country's political landscape. At IEM, our new President, Ir. David Lai Kong Phooi, took office at the AGM held on 21 April, 2018. Heraclitus, the pre-Socractic Greek philosopher, said that "Change is the only constant in life". We must not be afraid of change; we need to be able to adapt to change.

From January this year, there is a new section in Jurutera: Engineer's Lens. We welcome entries from all IEMers. All you have to do is to send in one or two pictures and a paragraph that describes the pictures. We will continue to welcome all article contributions too.

Lastly, I'd like to wish all Muslim IEMers a wonderful Ramadan and a merry Aidil Fitri.

# ENERGY EFFICIENCY MEASURES FOR BUILDING SECTOR

One of the most challenging issues the world faces today is climate change, caused largely by increased carbon dioxide (CO<sub>2</sub>) and other human-made emissions into the atmosphere.

ccording to *climate.nasa.gov*, the planet's average surface temperature has risen about 1.1° Celsius since the late 19th century, with 16 of the 17 warmest years on record since 2001. The evidence for rapid climate change is compelling and includes not only an increase in global temperature but also warming oceans, shrinking ice sheets and glacial retreat. These have given rise to global concerns on climate variability and the need for carbon footprint management.

Such concerns have also reached our shores and Malaysia's commitment to the global fight against climate change is expounded through its commitment to reduce 40% carbon emission per capita by 2020 from the 2005 level as announced by the then Prime Minister at the Conference of the Parties (COP15) – United Nations Climate Change Conference, held in December 2009 in Copenhagen, Denmark. The anticipated reduction will come from the energy, building, transportation and waste management sectors. These are among the major sources of  $CO_2$  emissions.

Studies show that buildings consume about one third of the world's energy. It is therefore crucial that buildings are constructed, operated and maintained in a way that will reduce energy usage and achieve greater energy efficiency. The field of engineering is an important part of the building construction industry, so it also has major roles to play in the management of  $CO_2$  emissions.

Today, functional plans and techniques for the construction of buildings necessitate the inclusion of innovative green technology which will contribute towards reducing CO<sub>2</sub> emissions into the atmosphere.



#### Dato' Sri Ir. Dr Roslan

Md Taha is the Director General of the Public Works Department (Jabatan Kerja Raya - JKR), Malaysia with over 30 years of experience.

He is also the President of Board of Engineers, Malaysia. He holds various professional appointments such as President of the Malaysian Structural Steel Association (MSSA) and Chair of the

Network of Accreditation Bodies for Engineering Education in Asia (NABEEA) to name a few. He obtained his Ph.D from the University of Wales, Aberystwyth, United Kingdom.

The concept of "engineering the world" through innovative engineering practices is the key solution to constructing sustainable structures. For instance, engineering can, among other things, capture sunlight, manage thermal products to enhance comfort and utilise open spaces under the same roof. Such solutions are designed to respond to environmental challenges, while sustaining the quality of life for the people.

In Malaysia, the Public Works Department (Jabatan Kerja Raya or JKR) is the nation's leader in engineering and it plays key roles in helping the government deliver on its global commitments to carbon footprint management.

Since COP15, JKR has been leading sustainability measures in the building sector through its sustainable practices and formulation of guidelines. It has been focusing on building projects that can contribute to energy efficiency and savings as well as taken significant action to lead the government's implementation of sustainable projects using Green Building criteria to achieve sustainable building design.

#### GOVERNMENT AGENCY FOR ENERGY-EFFICIENT BUILDING PROJECTS

JKR is the government's largest technical agency. Established 146 years ago in 1872, it has a current strength of over 3,000 technical professionals and 18,000 enforcers. Leading JKR today is its Director-General, Dato' Sri Ir. Dr Roslan Md Taha, who is a professional engineer with 36 years of experience in the field.

He says JKR has key roles in Malaysia's efforts to achieve energy efficiency and savings in the building sector and is involved in several energy efficiency and green demonstration projects, such as Low Energy Office (LEO), Green Energy Office (GEO) and Energy Commission Building. The approach for the construction of new buildings includes the implementation of Energy Efficiency Programmes which places emphasis on the reduction of the use of energy from the stages of design, construction and retrofitting to operations and maintenance.

Singling out the LEO building project, Dato' Sri Ir. Dr Roslan says JKR was the lead implementation agency. This was a Danish-supported "demonstration project" with a focus on

## **COVER STORY**



Elevated stretch of Rawang Bypass

the development of Energy Efficient (EE) Building and was undertaken for the Ministry of Energy, Green Technology and Water (Kementerian Tenaga, Teknologi Hijau dan Air or KeTTHA).

"We set the Building Sector Energy Efficiency Project (BSEEP) guidelines and published some publications of active and passive designs. Then we distributed these guidelines to various ministries. Government departments and agencies use our guidelines and turn them into Terms of Reference (TOR) before undertaking building projects," he says.

Under the BSEEP study, energy efficiency audits were carried out for both the public and private sectors. The study also included some demonstration projects to be carried out, and this included retrofitting lights in the old JKR building block to get energy savings.

Through BSEEP, JKR also conducted the Training for Trainers programme to develop qualified energy auditors and managers. In addition to local expertise, the BSEEP study team also engaged a number of expatriates from Denmark, the USA, Australia and Croatia. It was a successful project funded and audited by the United Nations Development Project (UNDP) body. The project received an allocation of US\$5 million, which was utilised almost fully, with the remaining spent on energy efficiency training.

Elaborating further, Dato' Sri Ir. Dr Roslan says all aspects of sustainability are stated clearly in JKR's Standard Specifications 2014. These specifications are used for all projects implemented by JKR. They include the use of sustainable materials and products, execution of the Erosion and Sediment Control Plan (ESCP), measures ensuring the safety, health and welfare of workers on site, execution of a good waste management plan, encompassing construction waste, domestic waste and scheduled waste, preparation of environmental management plan (EMP) which includes all Environmental Protection Works (EPW) on site, passive and active design of an energy efficient building and Use of water efficient fixtures.

In addition to meeting the features in JKR's Standard Specifications, he says JKR designers also strive to incorporate green innovations if the work budget permits.

On the matter of the country's construction design drawings standards, of which a significant portion is not standardised, Dato' Sri Ir. Dr Roslan says JKR has produced guideline documentations to standardise the industries, such as JKR BIM Standard, JKR BIM Guideline, JKR BIM Work Process Manual and BIM Requirement for Design and Built Project.

"These guidelines have not been converted into standards, but efforts are under way to do this. We are collaborating with Standards Malaysia and SIRIM to develop standards as we are aware that in building construction, safety cannot be compromised," he says.

#### **OUTSTANDING CREDENTIALS**

While maintaining its traditional role in building infrastructure such as highways and bridges, JKR has also ventured into unconventional job scopes, such as the RM600 million Total Hospital Information System which was implemented 11 years ago. It was touted as the world's first comprehensive fully automated hospital operation with state-of-the-art technology.

Last year saw the RM1 billion Renewable Energy Solar Hybrid Project, which accorded JKR its first-mover



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**BUILDING TRUST** 

## COVER STORY \_

advantage in big scale renewable energy in remote areas. JKR also received the ASEAN Energy Award for Block F of the PWD's headquarters through 15% energy saving measures monitored online at zero cost. Another innovative project is the 9km Rawang Bypass, which has put Malaysia on the world engineering map. This is one of the most complex nature-guided infrastructure projects, featuring a 2.7km elevated stretch at a height of 58.2m, cutting across Taman Warisan Negeri Selangor (formerly Templer Park). Its construction, led by JKR, was aimed at minimising the impact on the environment while offering motorists a splendid view of the surrounds.

Another feather in its cap is the Centre of Excellence For Engineering & Technology (also JKR's research institute) in Alor Gajah, Melaka. The institute has established an innovative road construction technique — the rubberised pavement — which uses natural rubber as an additive to improve durability and stability of bituminous road surfaces.

JKR's credentials are aptly recognised in attaining four certified ISO Standards — the ISO 9001:2015 Quality Management Systems, ISO 14001:2015 Environmental Management System, OHSAS 18001:2007 Occupational Health and Safety Management Systems and ISO 50001:2011 Energy Management System. The certifications honour JKR as the only government agency in the country to receive multiple recognition. JKR was also awarded the Platinum Certified Green Building Index for its 37-storey skyscraper headquarters in Kuala Lumpur, dubbed Diamond in the City. It is the first high-rise building in the country to receive this highest category of green certification.

These are just some achievements which speak volumes of JKR's success in transforming itself from a conventional government entity to one with an innovative and progressive outlook. This encompasses JKR's role to further contribute towards the nation's sustainable development, particularly in energy efficiency and savings as well as carbon emission reduction. government buildings," he says, adding that the 11 buildings retrofitted with LED luminaires had recorded energy savings in terms of kilowatt hours of between 50% and 60% for lighting systems. The buildings involved in the retrofitting exercise were Blocks A & B of the Ministry of Works, which registered a cost saving of 7% in electricity bills.

Commenting on JKR's CAST (Environment & Energy Branch or Cawangan Alam Sekitar & Tenaga), the designated implementing agency for the UNDP-supported Building Sector Energy Efficiency Project (BSEEP) that was completed in mid-2017, Dato' Sri Ir. Dr Roslan says it has achieved the desired targets.

"At the beginning of BSEEP in 2012, a BEI target of 180 Kwhr/m2/year was fixed for the building sector energy usage using the average baseline of 200Kwhr/ m2/year. Buildings under JKR implementation can now achieve a BEI of 160 Kwhr/m2/year, a 20% reduction in electrical energy consumption," he says. He adds that the Energy Management Guidelines and a new Energy Efficiency Code of Practice for residential buildings were also completed and disseminated via seven training programmes nationwide.

In addition, JKR successfully organised a knowledgesharing event for industry players and stakeholders on BSEEP's achievements and the way forward for energy efficiency in the local building sector. Through BSEEP, JKR has proposed for the Building Sector Energy Efficiency Regulation to be formulated, while successfully implementing the Credit Guarantee Facility by the Malaysia Debt Venture (MDV), which is dedicated to Energy Service Companies (ESCOs) investment.

Currently, Dato' Sri Ir. Dr Roslan says KeTTHA is preparing the Terms of Reference (TOR) for the development of an Energy Efficiency and Conservation (EE&C) Law and it is expected to be gazetted by Parliament soon.

> JKR has direct control of projects it is assigned to desian and implement, based on the directive that all government projects are to be implemented by JKR. However, he adds, in the unlikely event that another agency implements a government project, the Economic Planning Unit (EPU) under the Prime Minister's Department, has already specified in its guideline, Garis Panduan Dan Peraturan Bagi Perancangan Bangunan Jawatankuasa by Standard dan Kos, Unit Perancana Ekonomi, Jabatan Perdana Menteri © 2015, where requirements of Energy Efficient designs and other sustainable elements are specified for all government buildings.

#### SUSTAINABILITY ACTION PLAN

Dato' Sri Ir. Dr Roslan says that, in line with the Government policy to have continuity of sustainable development, JKR has launched JKR Sustainability & Green Mission 2.0, in which part of the elements are energy efficiency and renewable energy.

"As part of our action plan, we have installed energy saving fittings, particularly LED luminaires in new projects. With grants allocated by KeTTHA, JKR has implemented several projects which involve retrofitting existing fittings with LED luminaires in Construction site in Kuala Lumpur

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## COVER STORY

"Whether a developer will opt for EE features boils down to the local government where the project is located. Not all local governments have adopted the EE guidelines but it is good for us to go for the development of low carbon cities, which can work through the enforcement of law. It must be 'bottom-up', so even the public can propose ideas to make things better but when it comes to enforcement, it must be 'top-down'. Unless and until all local governments enforce EE By-Laws or guidelines, we may not see a drastic change in safeguarding the environment in the interest of future generations. Positive attitude to contribute towards this must be there," he says.

Meanwhile, there are still many government-owned and leased facilities which have old and inefficient airconditioning chillers that may adversely impact the government's aim to reduce energy use and achieve emission reduction targets to cut down national carbon intensity. Dato' Sri Ir. Dr Roslan says that last year, JKR replaced six 20-year-old centrifugal chillers and 12 chilled and condenser water pumps at the Ministry of Works Building in Kuala Lumpur with highly efficient centrifugal chillers and pumps.

"The energy saving incurred from the new installation has been measured and verified to be 33% and the avoided carbon emission is 552 tonne of equivalent  $CO_2$ , which would have required 2,900 adult trees to absorb every year," he says.

On the adaptation of an EE culture to transition to the use of energy-efficient LED lighting, Dato' Sri Ir. Dr Roslan says JKR has developed electrical specification for LED luminaires and applied it to illumination designs for new projects. JKR has listed several brands of LED luminaires in JMAL, which is JKR's Electrical Material Approval List as a guide for procuring LED luminaires in projects.

"JKR supports the government's initiative in applying energy efficient road lighting luminaires and has implemented LED road lighting in some projects since 2012. However, the Return of Investment for LED luminaires is still high compared to HPSV lighting due to cheaper tariff on electricity bills for road lighting. This has discouraged more projects from adopting LED lighting on new roads," he says.

#### **ENERGY MANAGEMENT INITIATIVES**

Another cost-saving measure is the incorporation of the appropriate Building Management System (BMS) with energy management features.

"When JKR designs our building projects, we do so to a minimum of 3 stars as specified under our green rating tool called pH (Penerapan Hijau) JKR, in which we incorporate both the passive design and active design requirements.



Dato' Sri Ir. Dr Roslan Md Taha receiving a memento from Ir. Dr Ooi Teik Aun, Director of IEM Training Centre Sdn. Bhd. and IEM Academy Sdn. Bhd. With them are IEM committee members S. Vignaeswaran (left) and Ir. Lalchand Gulabrai (right).

The active design is more about how we can save energy by using double-glazed windows and energy-saving LED lightings as well as tapping as much sunlight as possible," says Dato' Sri Ir. Dr Roslan.

"JKR incorporates our guidelines on energy savings and green features and we also use the Malaysian Carbon Reduction Environmental Sustainability Tool (MyCREST) to calculate carbon emission. MyCREST is mandatory for all government projects costing over RM50 million. Below that amount, we apply the pH JKR tool. This is the law that we comply with."

The Local Government Department (Jabatan Kerajaan Tempatan or JKT), under the Ministry of Urban Wellbeing, Housing and Local Government, has also included By-laws 34A which makes it mandatory for new or renovated nonresidential buildings with air-conditioned space exceeding 4,000m2 to be designed according to the requirements of MS 1525 with regards to the Overall Thermal Transfer Value (OTTV) and Roof Thermal Transfer Value (RTTV) and provided with an Energy Management System. However, at the moment, only three states (Selangor, Penang and Terengganu) have gazetted By-Laws 34A.

On the extent to which JKR has adapted and is facilitating the government to achieve Low Carbon Cities Framework (LCCF) benefits in national infrastructure development, Dato' Sri Ir. Dr Roslan says through 72 projects involving the implementation of MyCREST and pH JKR in building and road projects, JKR has made a projection to achieve energy consumption reduction of ~ 69,202,203kWh; CO<sub>2</sub> emission reduction of ~ 51kTCO<sub>2</sub> eq' and CO<sub>2</sub> reduction in 20 years ~ 1,025kTCO<sub>2</sub> eq.

"These facilities are mainly in urban areas and therefore contribute to the LCCF aspirations. However, JKR does not plan townships. Our role is more in isolated individual design. When we plan for EE, we focus on government buildings, including public hospitals; almost all are undertaken by us. The Ministry of Health undertakes hospital maintenance as it does not have the expertise or capability to build hospitals," he says.

"We have started designing and incorporating Building Information Modelling (BIM) in hospital projects. I am proud that we have done 100% BIM design for Hospital Parit Buntar, which is the first public hospital to incorporate BIM design. By incorporating BIM, especially in hospital projects, we can minimise wastage and expedite the construction, which can get complicated in terms of electrical and mechanical disciplines."

Since 2010, JKR has been implementing several pilot projects using BIM. The Hospital Parit Buntar project is just one of them. Through these projects, JKR has created the need and opportunity for more people to be involved in projects using BIM methods and has set a standard applicable to the Malaysian working environment. This standard includes guidelines and best practices in implementing BIM in the lifecycle of a project.

Dato' Sri Ir. Dr Roslan is pleased that Hospital Parit Buntar was also the first project for which JKR issued the Letter of Award (LA) together with the contract document that allowed the contractor to start the construction immediately. To date, he says, JKR has succeeded to do so for 25 projects.

This is the new transformation that JKR has set to achieve from this year. He says 10% of JKR projects must achieve the issuance of the LA together with contract document to expedite construction work. Last year JKR's Key Performance Indicator (KPI) was for 50% of its projects to achieve 3-in-1 completion at one go, that the Certificate of Completion is issued once a project is completed, and the Built Drawing is also completed together with the Statement of Final Account. This is one of Dato' Sri Ir. Dr Roslan's aspirations which JKR has succeeded in achieving.

When asked about the use of BIM in the on-going construction of the Pan Borneo Highway, he says: "The use of BIM in infrastructure projects is still very new. As technical advisor for the project, JKR will get the experience and learn lessons to will develop standards and guidelines from its implementation. Although JKR has several projects that require the contractor to implement using BIM, it is not JKR's policy to choose only BIM-compliance contractors. However, in line with the government's aspiration, JKR encourages all contractors to use BIM for many of its benefits.

"We want more engineers to be BIM ready. We also have the In Building Solution (IBS) to produce less wastage in modular design and the government has made it a policy that government projects must achieve IBS score of 70% and above as compared to 50% obtained by the private sector currently. The government is playing the lead role, with the Construction Industry Development Board (CIDB) monitoring the industry."

#### **ENHANCING COMPETENCY**

Dato' Sri Ir. Dr Roslan is passionate about developing competency in the field of engineering and he begins by doing so within JKR. He says: My other aspiration is to see engineering professionals in Malaysia become highly qualified."

To date, Malaysia has almost 120,000 registered graduate engineers, of which 18,371 are professional engineers. As of 31 December, 2017, JKR has 3,488 professional engineers comprising 1,933 civil engineers, 373 electrical engineers, 409 mechanical engineers, 317 architects, 414 quantity surveyors and 42 building surveyors. However, the percentage of those who obtained professional qualifications only stood at 19.7% or 686. Dato' Sri Ir. Dr Roslan hopes to see the percentage increase to 25% of JKR professionals getting their accreditations in a year or two.

From last year, JKR made it mandatory for its professionals to obtain the Professional Engineer (PE) certification, which is the highest standard of engineering competence. Dato' Sri Ir. Dr Roslan says those who obtain PE will get 5% mark in their yearly assessment, the Laporan Nilaian Prestasi Tahunan (LNPT).

"With PE, they will also have better chances of being promoted. We apportion our marks as follows: LNPT 75%,

## COVER STORY

interview 20%, and PE 5%. Next year, which is the third year of implementation, we will increase the PE percentage to 10% as a further effort to beef up the number of professionals in JKR; this will also contribute to the country's total," he says.

Dato' Sri Ir. Dr Roslan notes that the Malaysian construction industry is evolving to be all about building with new approaches which are faster, better and more cost effective. There is, however, competition from overseas constructors which can also deliver these expectations. JKR therefore has to empower local contractors to be competent in BIM in order to compete with the international counterparts.

He says JKR plays its part by collaborating with CIDB to move the Construction Industry Transformation Programme (CITP), which will foster general awareness and understanding among local contractors as well as to ease the adoption and implementation of BIM and provide general and technical guidance on BIM implementation.

"JKR will also provide BIM technical advisory services to local contractors and design consultants involved in the implementation of BIM JKR projects, so that BIM's execution objectives can be achieved. However, contractors and design consultants should be open-minded and accept the improving work method when they implement BIM in their projects. Implementation will be affected if contractors or design consultants are unable to execute BIM effectively," he says.

JKR, he adds, has always been committed to and is involved in several BIM programmes organised by government agencies, professional bodies, universities and private agencies since 2010 in terms of sharing of experience and knowledge, discussions on current issues, competency improvement through training and best practice development.

So far, JKR has collaborated with CIDB, SIRIM, Universiti Malaysia Pahang (UMP), Royal Institution of Surveyors Malaysia (RISM), Polytechnic, Kolej Kemahiran Tinggi Mara, Community College, the Department of Survey and Mapping Malaysia (JUPEM), Brunsfield, The Institution of Engineers Malaysia (IEM), Persatuan Arkitek Malaysia (PAM) and others. He emphasises that this approach will help construction industry players to understand the JKR's adoption of BIM in government projects.

One of the quickest ways for local contractors to become competent in their undertakings is through joint ventures with international counterparts as the contractors are expected to gain from the transfer of knowledge. However, the disparity and widening of the gap between the transfer of knowledge and absorption of knowledge have generally been an issue in the joint international undertakings. About this concern, Dato' Sri Ir. Dr Roslan puts on his cap as President of the Board of Engineers Malaysia (BEM).

He says: "From BEM's point of view, I can say that the Board can only regulate registered professionals in the country, while foreign professionals must comply with the country's regulations to get jobs here. We have prepared and submitted some papers to the Minister of Works requesting the government to allocate 30% for local consultants' input in mega government projects rather than award 100% to foreign consultants except when we do not have local expertise available. If we have the expertise, why not give the opportunity to local consultants so that we can have a share of the cake and in the process, we may pick up new knowledge through transfer of technology?"

#### **MOVING FORWARD**

Dato' Sri Ir. Dr Roslan will continue to helm JKR in implementing the agenda to reduce the country's carbon emission by focusing on having new buildings constructed and guided by the various green and sustainability criteria it has put in place while at the same time remaining alert for global technological development in the field.

JKR will focus particularly in categories that include Energy Efficiency through Passive and Active Design, Sustainable Site Planning and Management towards complying Environmental Management System (EMS) JKR 14001: 2008 and Water Efficiency.

Dato' Sri Ir. Dr Roslan says there will be more concerted efforts in formulating action plans to further accelerate the nation's energy efficiency and green development agenda.

## 

#### Appreciation to Bulletin Editor Ir. Mohd Khir

The Editorial Board would like to thank Bulletin Editor Ir. Mohd Khir for his excellent work and dedicated contribution for 4 consecutive terms and wish him all the success in his next challenge as the newly elected IEM Honorary Secretary.





Y.A.B. Tun Dr. Mahathir Mohamad IEM Distinguished Honorary Fellow on his appointment as the 7<sup>th</sup> Prime Minister of Malaysia

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GE

Y.A.B. Tun Dr. Mahathir Mohamad was conferred the IEM Distinguished Honorary Fellow at the 45th IEM Annual Dinner in 2004.

> From: The President, the Council and members of The Institution of Engineers, Malaysia

## Artificial Intelligence in Engineering



hen we mention Artificial Intelligence (AI), technicolour images of the Terminator robots, Skynet and a post-apocalyptic world may be what comes to mind. Hollywood has certainly played a role in formulating our perception that the rise of intelligent machines can only end in the destruction of planet Earth. But is AI really that dangerous to humankind?

For a start, let us define AI. Borrowing from Wikipedia, the definition of AI is intelligence demonstrated by machines. Actually this term was first used at a conference in Dartmouth College in 1956, where John McCarthy defined it as "the study and design of science and engineering of making intelligent machines".

#### HOW AI IMPACTS ENGINEERING

Al used in engineering combines hardware and software components. Think of robots in a car assembly line and the software that controls them. They are, in themselves, quite impressive feats of engineering, but are they intelligent?

It can be a surprise to learn just how smart and sophisticated our use of AI in engineering has become. Smart production lines are definitely the way of the future; think Industry 4.0. But exactly how does AI make such a big difference to the engineering sector?

IN MANUFACTURING: AI gives us the ability to design, develop and build machines which are capable of performing extremely complicated tasks. Machines that are capable of learning and improving without human intervention are the ultimate goal and this will have significant and wide-ranging implications. Furthermore, in our pursuit to create more powerful Als, we are uncovering knowledge about how our own brains work and how we approach the learning process, both consciously and unconsciously.



Source: http://www.innomag.no/artificial-intelligence-infinity-beyond/

Perhaps the most notable example of AI being used in engineering is in car manufacturing. The combination of software and hardware on the manufacturing floor has grown progressively more advanced over the years. Initially, robots performed simple engineering tasks that involved relatively large components and movements. Today, they are capable of precision movements and of emulating the most intricate parts of the process.

IN PRODUCTION: A cement mill should provide a defined range of quality and optimal energy consumption. Based on sensor data and algorithms like boosted gradients and linear regression, the system provides advice on how to adjust the operational parameters. So a mill that cannot be supervised by an experienced engineer can still be controlled. From there, it is only a small step towards automatic controlling. The algorithm adjusts regularly based on incoming sensor data as machine parts wear down or parts of the process change.

**IN CONSTRUCTION:** Al is already impacting the construction industry. Here the definition of Al is in the simplest level of using machine learning (an Al technique) to solve problems and to execute tasks with greater speed and accuracy. Al has started to change the way buildings are designed, constructed and utilised upon completion.

Areas where AI is already having an impact in construction include alerts, wearable sensors for site safety, autonomous site machinery, construction site survey and building information modelling (BIM). The ability to inspect buildings using trained AI software, frees the engineer

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Source: https://www.ukconstructionmedia.co.uk/ features/rise-artificial-intelligence-constructionsector/

sector<sup>7</sup> regulation may play a role. However, automation frees the engineer from having to do mundane, boring, repetitive tasks and allows them to focus on higher level creative tasks instead. Al is opening new, exciting horizons and these opportunities should be embraced. It is important to realise that many of these advances will make a big difference to our ability to tackle the largest issues facing our civilisation.

from the mundane tasks of physically

that their jobs will soon be taken over by sufficiently advanced robots and automation. As our manufacturing

and design capabilities continue to expand, we are able to build machinery that is capable of replicating almost everything that humans can do on an

Their fears are not unfounded as automation has taken away jobs from people in a number of different

areas. Perhaps this is where policy and

**ON ENGINEERS:** Many engineers fear

doing the inspection.

assembly line.

In my perspective, the union of AI and Engineering is to produce AI Engineering which deals with invention, innovating, designing, building, maintaining, research, improving structures, machines, tools, systems, manufacturing processes, components, materials, processes, solutions and organisation.

Al definitely has a role to play in engineering our world and this change should embraced by the professional.

#### Author's Biodata

*Ir. Tejinder Singh* is as an electrical engineer with a major focusing on engineering advisory and consulting services, operating in a space that intersects energy efficiency, energy management, automation, artificial intelligence and cybersecurity.

#### IEM DIARY OF EVENTS

#### Title: 1-Day Course on HAZOP Training

#### 27 June 2018

Organised by: Oil, Gas & Mining Technical Division & Chemical EngineeringTechnical DivisionTime: 8.30 a.m. - 5.30 p.m.CPD/PDP: Applying

#### Title: 1-Day Workshop on Energy Management

#### 28 June 2018

Organised by: Electrical Engineering Technical Division Time : 8.30 a.m. - 5.30 p.m. CPD/PDP : Applying

#### Title: Pre AGM Talk on "My Dams"

#### 30 June 2018

Organised by: Water Resources Technical Division Time : 9.00 a.m. - 11.00 a.m. CPD/PDP : 2

#### Title: 31st AGM for Water Resources Technical Division

#### 30 June 2018

Organised by: Water Resources Technical Division Time : 11.00 a.m. - 1.00 p.m. CPD/PDP : 2

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





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FOR HDPE PIPE

## Industry 4.0: The Industrial Revolution in Manufacturing Industry



ith the fast development of Internet of Things (IoT) and the wave of smart manufacturing services, the German industry has clearly realised that future production methods will be smarter and become a standard which every country will refer to.



Figure 1: Intelligent networking

For the 4th Industrial Revolution (also commonly known as Industry 4.0) in manufacturing, Cyber Physical System (CPS) will be the main foundation, and this includes intelligent manufacturing, digital factory IoT and Internet of Services, through Information and Communication Technologies (ICT) to achieve integration between virtual technology and machine.

The smart factory will be built to connect the whole value chain of a product. Industry 4.0 will totally change human life. The First Industrial Revolution used water and steam power to mechanise production. The Second used electric power to create mass production. The Third used electronics & information technology to automate production. Now Industry 4.0 is building on the Third, the digital revolution that has been occurring since the middle of the last century. It is characterised by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres.

The core value of Industry 4.0 is the Cyber Physical System which interconnects all components in the supply chain, such as end user, supplier, smart factory, production line, machine and product. In principle, the intelligent network will cover cyber physical systems, communication facilities, intelligent control systems, sensors and embedded systems (see Figure 1).

Industry 4.0 will integrate IoT and services network into industry systems completely. In addition, the traditional production model will be transformed into highly customisable, intelligent and service oriented model.

In future, CPS will link human, machines and information. Industry 4.0 is the era of intelligent manufacturing. Physical and digital worlds will be integrated to become CPS. Traditional manufacturing will transform into services oriented manufacturing, and hybrid products will be manufactured to meet the needs of different customers.

Smart manufacturing is a complex engineering system such as manufacturing execution system (MES), CPS, robotic systems and highly intelligent manufacturing control systems. Figure 2 shows the smart manufacturing systems.



Figure 2: Smart Manufacturing Systems



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The business model of Industry 4.0 has features such as integration of cyber and physical manufacturing, manufacturing based on network, an autonomous and adaptable loaistics systems that is directly interconnected to IoT and the smart factory. Customers can also participate in full scale production process. The new business model of Industry 4.0 will affect the development of a traditional company. It will also restructure the whole value chain of the business network and impact the traditional company.

There is a 6C system (Cloud, Connection, Cyber, Community, Content and Customisation) related to big data and a 6M system (Material, Method, Machine, Measurement, Model and Maintenance) related to manufacturing. Combining both will enable the smart factory to be realised, integration of horizontal and vertical information as well as a seamless information link between the supply chain and the client.

The 6C Category

- 1. Cloud: Cloud computing and big data analytics will enable rapid response from company.
- 2. Connection: In the age of IoT, everything is interconnected via sensors and networks.
- 3. Cyber: The economies of scale generated in a virtual environment is larger than that of the physical world
- 4. Community: Through social networking and gathering of information from the social network, to predict the future trends.

- 5. Content: With real time and sufficient content as well as more transparent information.
- 6. Customisation: Improved customer satisfaction, flexible manufacturina and shorter production line.

The 6M category:

- 1. Material: Based on Material Reauirement Planning (MRP), to minimise material usage during production stage and optimisation based on smart supply chain systems.
- 2. Method: Automate and optimise the process for new products
- 3. Machine: Machine to Machine, connected via IoT, to improve efficiency and reduce time.
- 4. Measurement: implementation of Total Quality Control, for real time quality control.
- 5. Model: Simulation model is which allows generated, optimisation of the production process.

The Malaysian Government has formulated the National Policy on Industry 4.0 Blueprint and The Ministry of International Trade & Industry has proposed the nine technology drivers/pillars for Malaysia as Autonomous Robot, Big Data Analytics, Cloud Computing, Internet of Things, Additive Manufacturing (3D Printing), Systems Integration, Cyber Security, Augmented Reality and Simulation (see Figure 3).

However, most and small medium industries generally hesitate to adopting Industry 4.0 as they perceive investment cost as high and so still continue to use cheap foreign labour instead. As a result,

the country's industry is regarded as being in between Industry 2.0 and Industry 3.0 in terms of manufacturing technology. Industry 4.0 can offer the manufacturing industry benefits such as increased flexibility of production and increased productivity. Engineers play an important role to support the industry towards Industry 4.0. The industry needs to constantly reinvent itself and the adoption of Industry 4.0 can be considered part of the improvement process. The digitalisation of the manufacturing process will help solve important business issues so that industries have a high chance of remaining relevant and reaping success in the long run. It is hoped that Malaysian industries will transform with Industry 4.0 to ensure international competitiveness and economy sustainability.

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#### Author's Biodata

*Ir. Dr Tan Chee Fai* is a committee member of Consulting Engineer Special Interest Group (CESIG) and Chief Technical Director of Robolab Technology Sdn. Bhd.

#### IEM DIARY OF EVENTS

Title: 2-Day Course on Negotiation Skills in A Project Environment

#### 3-4 July 2018

Organised	by: Project Management
	Technical Division
Time	: 8.30 a.m 5.30 p.m.
CPD/PDP	: Applying

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

## ANNOUNCEMENT

### TITLE ABBREVIATION FOR INTERNATIONAL PROFESSIONAL ENGINEER AND APEC ENGINEER

The objective of the IntPE and APEC Engineer Registers is to ease the process of gaining access to work and to practice in other economies. Engineers of these two Registers shall have their competence recognised by members' jurisdictions.

Once a member is an International Professional Engineer and an APEC Engineer in Malaysia, he can use the abbreviation "IntPE (MY)" and "APEC Engineer" after his name. His membership registration numbers will be:

NO.	REGISTER	REGISTRATION NUMBER		UMBER
1.	APEC Engineer Register	MY	А	XXX
2.	International Engineer Register (IntPE)	MY	E	XXX

With this, the member can then be an International Professional Engineer or an APEC Engineer with another foreign jurisdiction.

However, an Engineer cannot use the abbreviation, IntPE, twice if he/she is also an International PE in another country. He/she must choose one or the other. Most would choose to use the one that is not in their own jurisdiction but it is a personal choice. One thing is certain, the Engineer cannot use both abbreviations, e.g. IntPE (MY) and IntPE (AUS).

**APEC Engineer** is not a recognised post nominal but there is nothing to prevent Engineers from describing themselves as such or putting that on their business cards. There is no need to reference the jurisdiction from which this is attained. Therefore, on the name cards, it should read:

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Contributed by Ir. Yee Thien Seng

## **Beauty in Motion**

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## **Addressing Timing**



by Ir. Shum Keng Yan Ir. Shum Keng Yan is a chemical engineer and a certified accident prevention and safety practitioner.

n April 2018, we looked at addressing the first perception of "Significance". Let us now look at the perception of "Timing".

SAIFIE TREA TRIMIE

Take a scenario where a person works unsafely. The supervisor sees the act but does not take immediate action to engage with the person. At the end of the year, during the performance review, the supervisor brings up the unsafe act to the person. How does the person feel? He may have a vague recollection, if any at all, of the unsafe act. This is what we mean by "timing". Action needs to be immediate.

In the February 2018 article, we read that the outcome from working unsafely and getting away without injury could be felt immediately. This encourages a repeat of the unsafe behaviour.

To address this "immediacy", any action to correct an unsafe act needs to be taken as early as possible and as close to the venue as possible. The action should include coaching the person on the unsafe act, ensuring proper working standards are in place, sharing the learning and so on. These will reinforce the expectations on working safely.

In order for this to work, a team leader needs to demonstrate safety leadership and take action at the workplace as early as possible. Thus, the shopfloor leadership plays a crucial role in driving "timing". The higher you go in hierarchy, the longer it takes for the correct response to be translated to the ground.

In the next article, we will look at "Consistency" as well as how all these tie together.

Time to give suggestions and ideas at pub@iem.org.my. ■

The time is always right to do what is right. "

Dr Martin Luther King, Jr.

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## Visit to Busduct Manufacturing Plant

CONSULTING ENGINEERING SPECIAL INTEREST GROUP

#### reported by





Mr. Ng Ban Hor (Managing Director) giving the welcoming speech to the visitors



Explaining busduct manufacturing process



Assembly Section



Dielectric Withstand Test

one-day visit to the LINKK Busway Systems at Balakong was organised by IEM and LINKK Busway Systems on 5 August 2017. The visit is educative as it lets the guests know more about "busduct".

Busduct is a sheet metal duct which consist of copper as the conductor bar (busbar) or sometimes aluminium. It is used in the electrical power distribution of buildings and carrying high amount of current in it. The visit also provides the knowledge on the structure of organisation as well as the factory operation. In addition, it also helps in learning through real working environment apart from theoretical studies.

LINKK Busway Systems (M) Sdn. Bhd. is the busduct specialist that owns the brand MEGADUCT which established since 1992, and it has supplied busduct to over 30 countries worldwide.

With the continued research and development process, the company keeps improving in product design and providing highly reliable products to the market.

The factory visit helps in better understanding on each process of busduct manufacture such as material cutting, bending, welding, curing, assemble and testing. Each process plays important roles in developing the quality end product which complies with the international standards.

Some demonstration was done on that day to show the quality of product such as conductor hardness testing, insulation strength testing after water submerged and fire resistance testing.

At the end of the visit, a group photo is taken with all the participants and workers as a prove for footstep to the factory.

#### **PROJECT REFERENCES**

LINKK has fantastic performance with many successful projects throughout the years. No matter local market or overseas, Megaduct brand is always one of the top competitor in Asia Pacific.



Group picture for memories

## FORUM



Example of Operating Busduct

Busduct is essential in many types of building as it provides electrical distribution which involves large currents. Thus, LINNK has supplied busducts in many projects at different countries.

The busduct can be horizontal or vertically installed. In high rise building, the busduct is normally installed vertically which placed in riser room. Horizontal busduct can be found at the area of indoor building carpark, factory and shopping malls.

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## Sharing Programme on Construction 4.0: The Next Revolution in Construction Industry

CONSULTING ENGINEERING SPECIAL INTEREST GROUP

reported by





Ir. Dr Low conducting the talk

merging technologies have changed the engineering environment to one with a fast pace. Cloud computing, internet of things, wireless sensor network, big data and mobile internet are starting to be implemented into industries.

The advances of science and technology continuously support the development of industrialisation all over the world. From a technological evolution perspective, there are four stages commonly identified with industrial revolution.

The first three industrial revolutions took place over two centuries and were the result of, respectively:

- 1. The use of wind, water and steam energy to power machinery,
- 2. The introduction of electricity to manufacturing for mass production and
- 3. The use of automation technology for manufacturing.

For the 4th Industrial Revolution, governments around the world have initiated different plans such as Advanced Manufacturing Partnership (United States), Industrie 4.0 (Germany), La Nouvelle France Industrielle (France), Future of Manufacturing (United Kingdom), Made in China 2025 (China), Innovation in Manufacturing 3.0 (South Korea) and Smart Manufacturing (Netherlands).

The new trends and advancements in the manufacturing industry are also able to give the construction industry a boost. The digital revolution in construction design has created building information modelling (BIM), which allows for the planning and management of construction information as well as to visualise the design in a 3D environment.

Unlike other industries, the construction sector has been slow to adopt new technologies and has certainly never undergone a major transformation. As a result, productivity has been stagnated in the last 4 decades or, in some cases, even declined.

On 13 January, 2018, the Consulting Engineers Special Interest Group (CESIG) organised a Sharing Programme on "Construction 4.0: The Next Revolution in Construction Industry".

This programme is one of the many CESIG initiatives to promote awareness of the 4th Industrial Revolution among members of IEM. It provides a comprehensive look at technological trends which will be shaping the global engineering profession and workforce of tomorrow in the construction industry. The four speakers were Ir. Dr Tan Chee Fai (Current Technology Trends in construction Industry), Ir. Prof. Dr Leong Wai Yie (Big Data and Analytics for Construction Industry), Ir. Tejinder Singh (Artificial Intelligence) and Ir. Dr Low Cheng Yee (Mechanisation for Construction Industry). ■



Session Chairman Ir. Vig presenting a certificate of appreciation to Ir. Dr Low Cheng Yee



Session Chairman Ir. Vig presenting a certificate of appreciation to Ir. Tejinder Singh



Session Chairman Ir. Vig presenting a certificate of appreciation to Ir. Dr Tan Chee Fai

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### FORUM

## World Congress on Advances in Structural Engineering & Mechanics 2017 on "Code Developments in Regions of Low-to-moderate Seismicity"

CIVIL AND STRUCTURAL ENGINEERING TECHNICAL DIVISION

reported by



his article reports on the two IEM-sponsored technical papers presented at ASEM17, a threeday world conference in structural engineering held at KINTEX II, Ilsan, Seoul, South Korea on 29-31 August, 2017. ASEM17 was chaired by Professor Chang-Koon Choi from KAIST University, who is an alumnus of The University of Illinois at Urbana Champaign.

The biannual event gathers structural engineering researchers and practitioners from around the world to participate and present state-of-the-art findings on various perspectives of structural engineering. Many of the papers were of good quality and some were selected to be published in various SCI-indexed journals (for example, Earthquakes and Structures, Structural Engineering and Mechanics, Steel and Composite Structures, Computers and Concrete) in Techno-Press series of publications.

The IEM-sponsored papers were presented at the mini symposia, "Code Developments in Regions of Low-to-moderate seismicity, Part I and II". Engineers and researchers from countries and regions of similar seismicity to Malaysia – South Korea, China, Hong Kong, India, Sri Lanka and Australia – also took part in the symposia which was chaired by Prof. Han-Seon Lee from Korea University and Professor Nelson Lam from University of Melbourne Australia.

The authors and the titles of the two papers are listed below; the published

proceedings can be downloaded from the internet links given:

- D.T.W. Looi\*, H.H. Tsang and M.C. Hee, "Seismic Hazard Modelling for Malaysia and Singapore" in Part (I): Seismic hazard studies. (1) http://www.i-asem.org/ publication\_conf/asem17/6.ES/ W4F.1.ES2372\_3460F1.pdf
- 2. D.T.W. Looi, E.P. Lim\* and M.C. Hee,



Presenters and chairpersons at the ASEM17 banquet. From left: Dr H.H. Tsang, Dr Ir. Goman Ho, Associate Professor Dr T.M. Chan, Prof. Nelson Lam and wife, Prof. Han-Seon Lee, Dr Daniel Looi and Ir. E.P. Lim.



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#### **ASEM17/ANBRE17 Programme At a Glance**

AUG 28 MON	AUGUST 29 TUESDAY	AUGUST 30 WEDNESDAY	AUGUST 31 THURSDAY
MON	TUESDAY         08:30 - 17:00       Registration         09:00 - 09:10 Opening Ceremony       TO: Opening Remarks (Chang-Koon Choi)         09:10 - 09:50 Plenary Keynote Lecture       TTP: KAIST Reform in the Fourth Industrial Revolution (O Ok Park, Korea)	WEDNESDAY           08:30 - 17:00         Registration           09:00 - 09:35         Keynote Lectures IV           W1A: On the reduction methods of structural finite element models (Phill-Scung Lec, Korea)         W1B: Performance Based Earthquake Engineering in a Moderate-Seismicity Region: South Korea (Han-Seon Lee, Korea)           09:40 - 10:15         Keynote Lectures V           W2A: Tunnelling on terrace soil deposits: Characterization and experiences on the Bogdat-Villavicencio road	THURSDAY           08:30 - 12:00         Registration           09:00 - 09:35         Keynote Lectures VI           H14: An orthotropic model for concrete structure subjected to impact loading (Hyo-Gyung Kwak, Korea)         H18: Alkali-Silica Reaction in concrete – numerical modelling: an engineering approach (Andrezej Winnicki, Poland)           09:40 - 10:15         Keynote Lectures VII           H2A: Buckling Restrained Braces for Existing and New Reinforced Concrete Frames (Keh-Chyuan Tsai, Taiwan)           H2B: New photocatalysts for hydrogen production by water
17:00 ~ 19:20	09:50 - 10:10 Coffee Break	(Julio E. Colmenares, Colombia) <b>W2B</b> : A Unified Practical Approach for Estimating the Effects of Rare Dynamic Loading on Structures (Nelson Lam,Australia) <b>10:15 - 10:30</b> Coffee Break	splitting (F.M. Linares, USA) 10:15 - 10:30 Coffee Break
Registration	10:10 - 10:45     Keynote Lectures I       T2A: Topology Optimization of Structures subjected to Stochastic Dynamic Loading (B.F. Spencer Jr., USA)       T2B: Robot Technology and the Future (Jun Ho Oh, Korea)       10:50 - 11:25     Keynote Lectures II       T2C: Sustainable urbanization through underground development -lowards an urban underground future (Antonia Comaro, Switzerland)       T2D: Frontier Technologies in Steel and Composite Structures (Brian Uy, Australia)       11:30 - 12:05     Keynote Lectures III       T2F: Bionspired Structureal Materiais: Virtual Processing and	<ul> <li>10:30 - 12:00 Concurrent Sessions</li> <li>W3A: Optimum Design of Structural and multidisciplinary (Shutian Liu, Jianhua Rong and Bin Xu)</li> <li>W3B: Composite Members and Structures</li> <li>W3C: Multi-hazard mitigation and sustainability assessment of smart structures (Zheng Yue, Y. Dong and Bu Zhanyu)</li> <li>W3D: Nano chemistry</li> <li>W3E: Modern Multidisciplinary Geomechanical Problems (Hatam Guliyev)</li> <li>W3F: Structures and Materials</li> <li>W3G: Tunneling and Underground Works in Extreme Conditions</li> <li>W3H: Energy</li> </ul>	<ul> <li>10:30 - 13:00 Concurrent Sessions</li> <li>H3A: Structural Engineering</li> <li>H3B: Steel Construction</li> <li>H3C: Structural Health Monitoring/Nondestructive Evaluation</li> <li>H3D: Recent Advances In Evaluation and Design of Concrete Structures (Hyo-Gyoung Kwak)</li> <li>H3E: Bridge Enchnology for Life-span Extension and Carbon Emission Mitigation (Hoon Sohn, Taek-Ryong Seong and In-Gyu Kim)</li> <li>H3H: Multiscale &amp; Multiphysics Approach to Environmentally Assisted Cracking (Afrocz Barnoush and Hisao Matsunaga)</li> </ul>
	Virtual Testing (C.S. David Chen. Taiwan)  T2F: Recent Advances and Innovation in Steel-Concrete Composite Structures (Dennis Lam, UK)  12:05 - 13:00  Lunch  KINTEX II 3 <sup>rd</sup> EI (Rm #301-302)	12:00 - 13:00 Lunch KINTEX II 3 <sup>rd</sup> EI (Rm #301.302)	

#### ASEM17/ANBRE17 Programme At a Glance

AUG 28 MON	AUGUST 29 TUESDAY	AUGUST 30 WEDNSEDAY	AUGUST 31 THURSDAY
	<ul> <li>13:00 - 14:30 Concurrent Sessions</li> <li>14A: Computational Mechanics</li> <li>14B: Plasticity, Fatigue and Fracture</li> <li>14B: Plasticity, Fatigue and Fracture</li> <li>14B: Plasticity, Fatigue and Fracture</li> <li>(Hyung-Jo-Jung)</li> <li>14D: Computational Technologies in Concrete Bridges &amp; Buildings</li> <li>14B: Advances in Experimental Testing and Numerical Simulation of Extreme Loadson Structures</li> <li>(Sashi K. Kunnath)</li> <li>14B: Experimential Investigations of Seismic Performance of Structures</li> <li>14B: Index and Structures</li> <li>14B: Multi-Physics and Multi-Disciplinary Problems</li> </ul>	13:00 - 14:30     Concurrent Sessions       W4A: Monitoring based structural modal identification and state assessment (Tring-Hua Yi and Hua-Peng Chen)       W4B: Fluid-Structural Interactions I (Alam Md Mahbub)       W4C: Structural Health Monitoring of Railway System 1       (Y1-Cing Ni, Xiao-Wei Ye, Sung-Han Sim and Soo-Jin Cho)       W4D: Concrete & RC Structures Construction       W4D: Concrete & RC Structures Construction       W4D: Concrete & RC Structures Construction       W4E: Strengthening of reinforced concrete structures using external steel plates (Ray Su)       W4E: Code developments in regions of low to moderate seismicity (I): Seismic hazard studies (Nelson Lam and Han-Soon Lee)       W4G: Developments in Underground Space Technologies       W4H: Structures and Relevant Issues	
17:00 ~	14:30 - 14:50 Coffee Break	14:30 - 14:50 Coffee Break	
20:00	14:50 - 17:20 Concurrent Sessions T5A: Robotics T5B: Innovative applications in steel connections (Michael CH	14:50 - 17:20 Concurrent Sessions W5A: Joint SNU-HIT Mini-Symposium on Structural Design, Behavior and Monitoring (Thomas Kang and Xiangguo Wu)	
Registration	Yam) Yam) T5C: Smart Structural Systems T5D: Engineering Properties of Advanced Concrete and Concrete Structures (Chac-Wei Tang) T5E: Analytical and qualitative methods in elasticity and plasticity (Sergei Alexandrov) T5F: Base-Isolated Structures and Seismic Analysis T5G: Innovation in Mechanized Tunneling T5H: Nano and Micromechanics for Heterogeneous Materials (Gunjin Yun and Seunghwa Yang)	WSB: Fluid-Structure Interactions II (Alam Md Mahbub)           WSC: Structural Health Monitoring of Railway System II           (Yi-Qing Ni, Xiao-Wei Ye, Sung-Han Sim and Soo-Jin Cho)           WSD: Advances in Smart Materials for Civil Infrastructure Systems (H.K. Lee and H.K. Kim)           WSE: Super tall building structural design and construction technology (Lan Chung)           [WSF: Code developments in regions of low to moderate seismicity (III): Structural design of buildings (Han-Seon Lee and Nelson Lam)           WSG: Resilience and Sustainability in Underground Space           WSH: Advances in Energy for Water and Wastewater Treatment (alinwoo Cho)	
	18:00 - 19:30 Reception KINTEX II 4 <sup>th</sup> FI. (Rm #401-402)	18:00 - 19:30 Banquet MVL Hotel,2 <sup>nd</sup> F. Grand Ballroom	

Figure 1: ASEM17 programme. The two papers presented on 30 August during Session W4F and W5F

"A case study of compliant design of building in regions of low-tomoderate seismicity" in Part (II): Structural design of buildings. (2) http://www.i-asem.org/ publication\_conf/asem17/6.ES/ W5F.3.ES2373\_3563F1.pdf

The opening ceremony of the conference was held in the morning of the first day (29 August). The conference was launched officially

after the speech for opening remarks given by Prof. Choi. The conference programme comprised four daily sessions over three days, with parallel lectures, concurrent sessions and symposia. Figure 1 shows the ASEM17 programme, including when the two papers were presented on the second day during Session W4F and W5F, on code development in regions of low-to-moderate seismicity (I) Seismic hazard studies and(II) Structural design of buildings, respectively.

Dr Daniel Looi presented the paper on seismic hazard modelling for Malaysia and Singapore during Session W4F. The presentation was completed in 15 minutes, with another 5 minutes of questions and answers. This was followed by other participants (many were code-

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## FORUM

drafters for their respective countries) who presented papers on seismic hazards for Sri Lanka, South Korea, India and Hong Kong. Three key points were found common in all the papers presented and they are briefly elaborated here:

- A minimum seismic hazard value needs to be established for protection in regions of low-to-moderate seismicity. For example, a minimum peak ground acceleration value of 0.07g should be provided in the code for a nominal 500-year return period for the protection of ordinary building structures.
- 2. A 2,500-year return period seismic hazard level must be achievable for important lifeline structures such as schools and hospital to achieve the no-collapse performance criteria.
- 3. The site period parameterisation should be fostered in the development of response spectrum in contemporary seismic code such as in the case of Malaysia, India and South Korea. The use of shear wave velocity at the 30-m soil depth to determine the soil type in common seismic codes for example Eurocode 8 (EC8) (3) which were drafted in the 1990s (considered out-dated) and IBC (4) which were only applicable in certain site conditions in US and Europe, was found to be not appropriate for these countries.

Ir. E.P. Lim presented his paper on a case study of compliant design of a 9-storey RC building situated in regions of low-to-moderate seismicity during Session W5F. The main objective of this paper was to guide practising engineers with little knowledge and experience on seismic analysis and design, so that they are able to estimate the building structural period by hand (or with a simple spreadsheet) and to arrive at a more realistic reduced base shear demand. This was done using an enhanced generalised lateral force method rather than the typical code lateral force method, which anchored upon regional-dependent empirical formula.

During this session, other topics discussed were on real practical applications, such as seismic design in regions of low-to-moderate seismicity for high-rise buildings, transfer structures, steel buildings, RC walls and displacement-controlled torsional response in buildings. The symposia ended with Q&A and discussions.

Readers of this article can follow up on the published proceedings for both Sessions W4F and W5F in ASEM17 at http://www.i-asem.org/asem17\_ publication.html#ISEM17. The papers are written in such a way so that readers will have a preliminary understanding of and exposure to the current seismic hazard issue and structural and seismic engineering development for low-tomoderate seismicity region.

#### ACKNOWLEDGEMENT

We thank IEM for its sponsorship of the two papers and the continued support in the facilitation of numerous workshops and meetings over the years, culminating in the drafting of the EC8 NA for Malaysia. The collaboration between the international advisors, Prof. Nelson Lam and Dr Hing-Ho Tsang, and local study group members, chaired by Adjunct Specialist Ir. M.C. Hee is also appreciated.

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- D.T.W. Looi\*, H.H. Tsang and M.C. Hee (2017), "Seismic Hazard Modelling for Malaysia and Singapore", Proceedings in ASEM17, 29-31 Aug, Ilsan, Seoul, Korea.
- [2] D.T.W. Looi, E.P. Lim\* and M.C. Hee (2017), "A case study of compliant design of building in regions of low-to-moderate seismicity", Proceedings in ASEM17, 29-31 Aug, Ilsan, Seoul, Korea.
- [3] Eurocode 8 Design of structures for earthquake resistance (1998). EN 1998-1 Part 1: General rules, seismic actions and rules for buildings.
- [4] International Code Council (ICC) (2012). International Building Code (IBC), Washington D.C.



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## NEWS FROM BRANCH

# Sabah Celebrates World Water Day 2018

reported by



**Ir. Dr Michael Tay** Senior Assistant Director DID Sabah. Programme Chairman for Sabah World Water Day 2018.



n 22 March every year, the world celebrates World Water Day, bringing attention to the importance of water in our lives. This year, the theme for World Water Day is "Nature for Water", focusing on nature-based solutions (NBS) to the water challenges we face today.

The campaign slogan, "The answer is in nature", further raises the awareness of NBS. The core message is that NBS – such as forest rehabilitation through replanting, reconnecting rivers for floodplains and restoring wetlands – is a sustainable and costeffective way to rebalance the water cycle and to mitigate the effects of climate change, with the ultimate goal of improving the quality of life.

The application of NBS will steer our development direction to create a "green infrastructure" to meet the water needs of an ever-growing population, the need to contribute

Source: image is from www.worldwaterday.org

to a circular economy, to protect the environment and reduce pollution and to secure sustainable management of water and sanitation.

The relation between NBS and Sustainable Development lies in the proper management of water supply and quality support to ensure the availability and sustainable management of water and sanitation for all. The application of NBS can play an essential role in the following aspects:

- Minimise poverty, hunger and improve health condition. New jobs are often created by NBS and improved health from better quality water means higher productivity.
- Affordable, clean energy, industry innovation and infrastructure, sustainable cities and communities, responsible consumption and production. NBS

requires little or no energy, so it can reduce reliance on energy hungry grey systems. NBS also helps provide more sustainable water resources to serve growing settlements.

 Improving life below water and on land. Wetlands can reduce pollution through filtration as well as increase biodiversity by expanding natural habitats.

Some examples of NBS include Sand Dams, Landscape Restoration, Conservation Agriculture and the creation of Sponge Cities.

A Sponge City is a new urban drainage infrastructure building paradigm made popular in China in recent years. It has the capacity to mainstream urban water management into urban planning policies and designs. It should have the appropriate planning, legal frameworks and tools in place

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## NEWS FROM BRANCH



A Sponge City has an urban underground water system that operates like a sponge to absorb, store, leak and purify rainwater as well as release it for use when necessary



Keynote Address by Datuk Ir. Hj. Yahiya Ag. Kahar, Director of Department of Irrigation and Drainage Sabah

to implement, maintain and adapt the infrastructure systems to collect, store and treat (excess) rainwater. A Sponge City will not only be able to deal with rainwater but will also reuse rainwater to help mitigate the impacts of urban flooding, heat island effects and water pollution.

This year, Sabah hosted the World Water Day Conference & Exhibition on 21-22 March. The event, attended by some 350 participants, was launched on 21 March at The Magellan Sutera Resort. There were 4 sessions and an optional site visit, with 20 invited speakers consisting of 4 international speakers from 3 countries, policy/implementers and practitioners who are specialised in their respective field. Sabah World Water Day was held with the aim of bringing greater awareness to the public on the possibility of using nature to overcome the water challenges of the 21st century.

Among the topics discussed were Policy & Management which includes ways to strengthen water governance in the country with emphasis on decentralised arrangements for the management of water and other natural resources.

The event was co-organised by the Department of Irrigation & Drainage Sabah and The Institution of Engineers Malaysia (Sabah Branch) and was supported by the Sabah Public Works Department and Sabah State Water Department.



Participants at the conference



Speakers for The Conference

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#### Ir. Chin Mee Poon

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

Basin aliau Conservation Area, often dubbed Sabah's Lost World, is a patch of nature in the south central part of Sabah, spread over 58,840 ha. A ring of formidable escarpment rising over 1,675m above sea level gives rise to a pristine forest with a unique ecosystem.

The entire basin constitutes the catchment area of Maliau River which leaves the basin through a gorge

in the south-east to join Kuamut River, a tributary of the Kinabatangan, Sabah's lonaest river. Maliau Basin is well known for its high concentration of magnificent waterfalls, including the spectacular 7-tier Maliau Falls, the Giluk Falls and the Takob-Akob Falls. The rich biodiversity within and around the basin includes more than 290 species of birds, over 80 species of mammals, many amphibians and reptiles, countless insects, at least 8 species of

nepenthes, several endemic orchid species, the rare Rafflesia tengku-adlinii and thousands of other plant species.

My first trip to Maliau Basin was in May 2001. It was organised by the Photography Group of the Malaysian Nature Society, Selangor Branch. Digital cameras were then still considered a novelty and I was using an analogue camera.

Our group of 14 photographers travelled in 4WD vehicles from Kota Kinabalu to Agathis Camp, the first camp in the conservation area. It was more than 20km from the security gate. A heavy downpour earlier had turned the laterite road very muddy and slippery, so much so that even our 4WD vehicles swayed from side to side. The last few hundred metres before the camp was worse - a muddy slope that even 4WD vehicles could not tackle, so we had to struggle up the slope in the dark carrying only what was needed for the night! What a welcome!

Fortunately the following day was dry. We trekked 7km to Camel Trophy Camp on Day 2, climbing a down in the basin, about 3km from the camp. Both waterfalls were quite magnificent but the descent to reach them was steep and slippery and two of my friends fell. Luckily they were not badlv hurt.

ENGINEER'S Or duentures

On the fourth day, 7 of us and 5 porters trekked 9km over mainly steep and slippery terrain to Bambangan Camp which comprised 3 opensided sheds. One shed was used for



750m steep slope initially, followed by an undulating walk on a ridge. We went through a mossy montane forest with many epiphytes including various species of wild orchids and pitcher plants. We also heard the loud, characteristic cry of a helmeted hornbill, one of the 8 species of hornbills found in Maliau Basin.

The Camel Trophy Base Camp was constructed by the multinational participants of the Camel Trophy Adventure Sabah 1993 as a token of appreciation to the people of Sabah for hosting the off-road challenge.

On the third day, we visited Takob-Akob Waterfalls and Giluk Waterfalls

cooking and the other two had bunks made of small tree trunks and branches. When we were having a simple dinner at 6.30 p.m., it was already dark in the forest even though patches of sky above the forest canopy were still bright. We went to bed at about 8 p.m. Against the subdued hum of the distant waterfalls, different insects came to provide us with nature's lullaby: First the cicadas, then grasshoppers and finally crickets.

We spent the best part of Day 5 at Tier 6 and Tier 7 of the seven-tier Maliau Waterfalls, the highlight of the trip. However, we could not find a vantage point to see all 7 tiers of the waterfall. Drones were not available then to give us an aerial view of the falls through the lens of an airborne camera.

We got back to Camel Trophy Camp on Day 6 and the whole group returned to Agathis Camp on Day 7 to conclude this often tough but memorable adventure in the Lost World of Sabah.

I visited Maliau Basin again in September 2015, but that's another story.



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#### TEMUDUGA PROFESIONAL

Kepada Semua Ahli,

Tarikh: 18 Mei 2018

#### SENARAI CALON-CALON YANG LAYAK MENDUDUKI TEMUDUGA PROFESIONAL **TAHUN 2018**

Berikut adalah senarai calon yang layak untuk menduduki Temuduga Profesional bagi tahun 2018.

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

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

#### Ir. Mohd Khir bin Muhammad

Setiausaha Kehormat, IEM

PE	RMOHONAN BARU
Nama	Kelayakan
KEJURUTERAAN AWAM	-
NORLIAH BINTI DAUD	BE HONS (UPM) (CIVIL, 2003)
ADNAN BIN AHMAD	BE HONS (BRADFORD) (CIVIL & STRUCTURAL, 1996)
SITI NUR AZZWA BINTI RAZALI	BE HONS (UiTM) (CIVIL, 2009)
NAZURAH BINTI SULAIMAN	BE HONS (UTM) (CIVIL, 2009)
KEJURUTERAAN ELEKTRIKAL	-
MOHD AFIZ BIN MOHD ZOLKEFPELI	BE HONS (UNITEN) (ELECTRICAL & ELECTRONIC, 2009) ME (UNITEN) (ELECTRICAL, 2017)
MOHD KHAIRUL FIKRI BIN MOHD SALLEH	BE HONS (UITM) (ELECTRICAL, 2009)
NORNIKMAN BIN RAHIMIN	BE HONS (UTeM) (INDUSTRIAL POWER, 2006) ME (UTM) (ELECTRICAL-POWER, 2016)
MOHD MOHYDDIN BIN MOHAMED NOR	BE HONS (UTM) (ELECTRICAL, 1995)
GOVINDAN A/L GOPAL	BE HONS (UNITEN) (ELECTRICAL & ELECTRONICS, 2000) ME (UM) (2014)
FARAH IZYAN BT ABDUL LATIF	BE HONS (UNITEN) (POWER ELECTRICAL, 2007)
MASTURA BT SAWAWI	BE HONS (USM) (ELECTRICAL & ELECTRONIC, 1998) CONVERSION (UNITEN) (2015)
AZRUL MOHD ARIFFIN	BE HONS (SOUTHAMPTON) (ELECTRICAL, 2004) PhD (SOUTHAMPTON) (2008)
PETER KENSIL	BE HONS (SUNDERLAND) (ELECTRICAL & ELECTRONIC, 1993)
NORLIZA MATASAN	BE HONS (UPM) (ELECTRICAL & ELECTRONIC, 2002)
ONG CHEA JIN	BE HONS (UPM) (ELECTRICAL & ELECTRONIC, 2002)
W. AMIRUL HAFIZ BIN W. MD. YUSOF	BE HONS (UTM) (ELECTRICAL, 2008)
MOHD SUFIAN BIN MOHD YUSOFF	BE HONS (UTM) (ELECTRICAL, 1989)
MARLEENAH RAMLEE	BE HONS (UNITEN) (ELECTRICAL & ELECTRONIC, 2004)
NUR KHAIRUNNISA BTE NOORAHIM	BE HONS (UNITEN) (ELECTRICAL POWER, 2013)
KEJURUTERAAN ELEKTRONIK	< Comparison of the second sec
GOH CHIN HOCK	BE HONS (UNITEN)(ELECTRICAL & ELECTRONIC, 2004) ME (UNITEN) (ELECTRICAL, 2008) PhD (UNITEN) (2012)
NOR HAZRIN BIN ZA'MAN	BE HONS (UniMAP) (BIOMEDICAL ELECTRONIC, 2013)
LEONG YENG WENG	BE HONS (UNITEN) (ELECTRICAL & ELECTRONICS, 2005) ME (UNITEN) (ELECTRICAL, 2009) PhD (KANAZAWA) (2015)
KEJURUTERAAN MEKANIKAL	
KU MOHD FAISOL BIN KU BAKAR	BE HONS (UTHM) (MECHANICAL, 2008)
ATIKULLAH BIN SALLEH	BSc (MARQUETTE) (MECHANICAL, 2006)
SUHANA BINTI CHE SEMAN	BE HONS (UTHM) (MECHANICAL, 2006)
KEJURUTERAAN PEMBUATAN	
AZMI BIN HASSAN	BE HONS (LEEDS POLY) (MANUFACTURING SYSTEMS, 1991) PhD (WALES) (1998)

#### No Ahli Nama Kelayakan **KEJURUTERAAN AWAM** 36804 TAN CHOON JIN BE HONS (USM) (CIVIL, 2002) BE HONS (UITM) (CIVIL, 2010) 33159 NORLIDA BINTI MOHD SAAD 25420 FAEZARATUL FAZLEIN BINTI ISA BE HONS (UTM) (CIVIL, 2001) 75266 MOHD AZUAN BIN TUKIAR BE HONS (UITM) (CIVIL, 2009) **KEJURUTERAAN ELEKTRIKAL** BE HONS (UMP) (POWER SYSTEM, 2010) 36548 MOHD SABHI BIN BACHOK MOHD SUHAIMI BIN MOHD 94150 BE HONS (UTM) (ELECTRICAL, 2006) YUNUS 48429 TANESH A/L RAVINCHANDRAN BE HONS (UNITEN) (ELECTRICAL POWER, 2013) BE HONS (UTeM) (POWER ELECTRONIC & DRIVE, 2011) 44296 SANDEEP SINGH THALIVAL BEHONS (UNITEN) (ELECTRICAL & ELECTRONIC, 2004) MSc (MANCHESTER) (ELECTRICAL POWER SYSTEMS, 2009) 59087 BIBI HAZRINA BINTI ALLI RAHMAN 51244 NUR FARHANA BINTI RAMI I BE HONS (UTM) (ELECTRICAL 2009) 76192 ATIF BIN MOHAMAD JOHARI BE HONS (UNITEN) (ELECTRICAL POWER, 2013) **KEJURUTERAAN ELEKTRONIK** BE HONS (UITM) (ELECTRICAL, 2009) MSc (UITM) (TELECOMMUNICATION & INFORMATION, 2011) 87343 ADZNINA EBERAHIM KE.IURUTERAAN PEMBUATAN 44597 ZULKARNAIN BIN ABDUL LATIFF BE HONS (BIRMINGHAM) (MANUFACTURING, 1998) **KEJURUTERAAN MEKATRONIK** MUHAMAD HAFIZ BIN MOHAMED BE HONS (STAFFORDSHIRE) (MECHATRONICS) 72127 2008) ME (STAFFORDSHIRE) (MECHATRONICS ALL 2009) KEJURUTERAAN KIMIA NUR MARDHIYA ABD RAHIM BE HONS (UTP) (CHEMICAL, 2008) MSc (UTM) (PROCESS PLANT MANAGEMENT, 30846 2015 **KEJURUTERAAN MEKANIKAL** 38334 THIAGARAJEN A/L MUNUSAMY BE HONS (UNITEN) (MECHANICAL, 2006) BE HONS (UNITEN) (MECHANICAL, 2001) 33906 SAIFUL HASMADY BIN ABU ME (TOKYO INST. OF TECH.) (MECHANICAL AND CONTROL, 2007) PhD (TOKYO INST. OF BAKAR TECH.) (2015) 96018

PERPINDAHAN AHLI

30010	SALLIHHUDIN	BEHONG (OTF) (MECHANICAE, 2010)
89527	MOHD SAFARIZAM BIN ABDULLAH	BE HONS (UTM) (MECHANICAL, 2004) ME (UTM) (MECHANICAL-ADV. MANUFACTURING TECH. 2015)
57103	TENGKU KHAIRUZZAMAN BIN TENGKU YUSOFF	BE HONS (USM) (MECHANICAL, 2007)

#### PERMOHONAN BARU/PEMINDAHAN MENJADI AHLI KORPORAT Nama Kelavakan **KEJURUTERAAN INSTRUMENTASI DAN KAWALAN**

2006)

NUR AZHANI BINTI MOHAMAD ROSLI BE HONS (UTP) (ELECTRICAL & ELECTRONICS.

**KEJURUTERAAN KIMIA** 

**KEJURUTERAAN BAHAN** No. Ahli Nama

LAI CHIN WEI 64773

TAN LIAN SEE

Kelayakan BE HONS (USM) (MATERIALS, 2009) PhD (USM) (2013)

BE HONS (UTM) (CHEMICAL, 2005) MSc (USM) (CHEMICAL, 2008) PhD (UTP) (2016)

#### **IEM DIARY OF EVENTS**

Title: Half-Day Course on "Training - Practical **Insight Toward MSPO Implementation The** Malaysian Sustainable Palm Oil (MSPO) on the implementation and the Practical approaches"

#### 14 July 2018

Time

Organised by:	Agricultural and	l Food	Enginee	ring
	Technical Divisio	20		

Technical Division : 8.30 a.m. - 1.00 p.m. CPD/PDP :4

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

#### KEJURUTERAAN KIMIA NOORASHRINA A. HAMID

**KEJURUTERAAN BAHAN** 

ZURATUL AIN ABDUL HAMID

BE HONS (USM) (MATERIALS, 2001) MSc (USM) (MATERIALS, 2002) PhD (MELBOURNE, 2011)

BE HONS (UTM) (CHEMICAL, 2004)

#### CALL FOR NOMINATIONS

**IEM ENGINEERING HALL OF FAME AWARD 2019** 

The Sub-Committee of Engineering Hall of Fame under the auspices of the Standing Committee on Professional Practice is proud to invite nominations for the IEM Engineering Hall of Fame Award 2019.

It is timely and expedient to induct and to record the accomplishments of engineers in the country who have or had demonstrated particularly outstanding professional achievements and provided excellent services to the Institution, the engineering industry and the Nation.

The IEM Engineering Hall of Fame is established with the aim to confer recognition and to celebrate the accomplishments of members of the IEM:

· Who have demonstrated outstanding

professional achievements.

- Who have made significant contributions to the engineering profession, the Institution of Engineers, Malaysia (IEM) and the Nation.
- Who have rendered valuable service to the Community.

The Engineering Hall of Fame will serve as the focal point or showcase of outstanding Malaysian engineers, past and present, who had or have made great contributions to the engineering profession and to the quality of life in Malaysia. Engineers honoured in the Engineering Hall of Fame will also serve as a beacon and as role models for young engineers as well as create greater interest in engineering in general and awareness of the contributions made by outstanding engineers in the country.

Nominations for the Award are open to Malaysian citizens who are or have been Corporate Members of the IEM.

The closing date for receipt of nominations for IEM Engineering Hall of Fame Award is **30 September 2018**.

Please submit nominations to:

Honorary Secretary The Institution of Engineers, Malaysia Bangunan Ingenieur, Lots 60&62 Jalan 52/4, 46720 Petaling Jaya, Selangor. The nomination form can be downloaded from the IEM website at www.myiem.org.my

For further details, kindly contact IEM Secretariat at **03-7968 4001/2** 

The Award shall comprise a metal plaque,

The closing date for nominations is

**Honorary Secretary** 

The Institution of Engineers, Malaysia

Bangunan Ingenieur, Lots 60&62

Jalan 52/4, 46720 Petaling Jaya, Selangor.

The nomination form can be downloaded

from the IEM website at www.myiem.org.my

For further details, kindly contact IEM

Secretariat at 03-7968 4001/2

a scroll and a sum of RM1,000.

30 September 2018.

Please submit nominations to:

#### IEM AWARD FOR CONTRIBUTIONS TO THE ENGINEERING PROFESSION IN MALAYSIA 2019

To encourage an interest in engineering and to recognise important services or contributions to engineering in Malaysia, the IEM Award for Contribution to the Engineering Profession in Malaysia is to be presented to the person(s), who has:

- Contributed to the advancement of engineering in Malaysia, and/or
- Designed and constructed an original engineering device or system of merit and applicability to industry.

This Award is open to all Malaysian citizens and permanent residents.

#### NOMINATIONS

Nominations will be invited annually. The

closing date for receipt of nominations for each year is 30 September.

- Nominations shall be made through a member of the Institution. Each member is restricted to one nomination per year.
- Each nomination shall be accompanied by a brief write up of the services rendered or contributions made or system designed and/or constructed together with relevant photographs and other documents.

#### AWARD

The Award is to be made by the Council upon recommendation by the Awards Committee.

**IEM OUTSTANDING ENGINEERING ACHIEVEMENT AWARD 2019** 

The IEM Outstanding Engineering Achievement Award is created to confer recognition to an organisation or body for outstanding engineering achievements within Malaysia. The award will be given to an organisation or body responsible for an outstanding engineering project in the country.

The basis for the award shall be an engineering achievement that demonstrates outstanding engineering skills which has made a significant contribution to the profession and to the quality of life in Malaysia. In making the selection, the following criteria will be given special consideration:

- 1. Contribution to the well-being of people and communities,
- 2. Resourcefulness in planning,
- 3. Creativity in the solution of design problems,
- 4. Pioneering use of materials and methods,
- 5. Innovations in planning, design and construction,
- 6. Unusual aspects and aesthetic values.

Engineering achievements which include, interalia, the following can be submitted for consideration:

 Bridges, Tunnels, Waterways Structures, Roads

- Telecommunications of national/ international character, Power Transmission and Transportation
- Dams and Power Stations
- Ports and Harbours
- Building and Structures
- Airports
- Water Supply, Waste Disposal Projects
- Military projects such as bases, launching units, harbour facilities
- Drainage, Irrigation and Flood Control Projects
- Local design and manufacture of high technology products
- Energy, Heat, Mass Transfer
- Outstanding work in engineering research and development
- Chemical processing of indigenous raw resources such as rubber, palm oil and various other local plants
- Innovative use of local engineering materials
- Outstanding contribution in engineering education
- Original discovery of useful engineering theory

Nominations are invited from all members of the Institution. Each nomination submitted should contain a brief summary/write-up of the project in approximately 1,000 to 2,000 words together with full relevant reports on the project and three copies of supporting documentation including photographs. A project or component part thereof which has received an earlier award, from IEM does not qualify for nomination.

- The award in the form of a metal plaque, naming the achievement shall be given to the organisation or body responsible for the project for permanent display.
- The award shall be presented with due ceremony at an appropriate function of the IEM.

The closing date for nominations is **30 September 2018**.

Please submit nominations to:

Honorary Secretary The Institution of Engineers, Malaysia Bangunan Ingenieur, Lots 60&62 Jalan 52/4, 46720 Petaling Jaya, Selangor.

The nomination form can be downloaded

from the IEM website at *www.myiem.org.my* For further details, kindly contact IEM

Secretariat at 03-7968 4001/2

JURUTERA • JUNE 2018

#### **CALL FOR NOMINATIONS**

#### **IEM YOUNG ENGINEER AWARD 2019**

The objective of the Award is to encourage interest in engineering and to recognise potential among young engineers in Malaysia. The Award will be presented to the person who has shown outstanding ability and leadership qualities, **either** 

- i. in the design and/or construction of an engineering device or system of merit; or
- ii. in the research and development or teaching of engineering.

In any one year, the Award may be made in either one or both of the categories mentioned above. If the Award is to be made in only one of the two category may be made in the year. The Award is open to candidate who are:

The primary objective of the Award is to recognise the contributions by women engineers. This Award may also incidentally encourage interest in engineering among women and encourage them to strive towards greater excellence. The Award will be presented to the woman engineer who has shown outstanding ability and leadership qualities, or has been a pioneer in any more of the following areas:

- In the design and/or construction of an engineering device or system, structural system, planned development, environmental improvements or,
- In the research and development of engineering device, systems, processes and/or materials, publication of paper or,
- In the teaching of engineering or,
- In the management of engineering projects,
- Entrepreneurship in the commercial sector.

- Registered member with the Board of Engineers, Malaysia and under 35 years of age
- ii. Malaysian citizens or permanent residents of Malaysia
- iii. Graduate or Corporate Members of IEM.

The Proposer may or may not be a member of IEM. However, each nomination shall be supported by a brief recommendation from two Referees who are Corporate members of IEM. If the Proposer himself is a Corporate member of IEM (or higher), then he may also act as one of the two required Referees.

The Award will comprise a cash prize of RM500.00, a scroll and plaque, to be presented

**IEM WOMAN ENGINEER AWARD 2019** 

In making the selection, the following criteria will be given special consideration:

- Contribution to the well-being of people and communities
- Resourcefulness in planning and in the solution of design problems
- Pioneering in use of materials and methods
- Innovations in planning, design and construction
- Unusual aspects and aesthetic values

The Award is opened to candidates who are: • Registered members of the Board of

- Engineers, Malaysia,
- Malaysian citizens or permanent residents of Malaysia,
- Graduate or Corporate Members of The
   Institution of Engineers, Malaysia.

The Proposer may or not be a member of IEM or BEM, or an engineer. However, each nomination shall be supported by a brief recommendation from two Referees who are

with due ceremony to each recipient of the Award.

The closing date for nominations is **30 September 2018**.

Please submit nominations to:

Honorary Secretary The Institution of Engineers, Malaysia Bangunan Ingenieur, Lots 60&62 Jalan 52/4, 46720 Petaling Jaya, Selangor. The nomination form can be downloaded from the IEM website at www.myiem.org.my For further details, kindly contact IEM Secretariat at 03-7968 4001/2

Graduate or Corporate member of IEM. If the Proposer is herself either a Corporate or Graduate member of IEM (or higher), then she may also act as one of the two required Referees.

The Award shall comprise a cash prize of RM800.00, a scroll and plaque, to be presented with due ceremony to each recipient of the Award.

The closing date for nominations is **30 September 2018**.

Please submit nominations to:

Honorary Secretary The Institution of Engineers, Malaysia Bangunan Ingenieur, Lots 60&62 Jalan 52/4, 46720 Petaling Jaya, Selangor. The nomination form can be downloaded from the IEM website at www.myiem.org.my For further details, kindly contact IEM Secretariat at 03-7968 4001/2

#### Pengumuman yang ke-116

#### SENARAI 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 secretariat di +603-7968 4001/5518 untuk maklumat lanjut. Senarai penyumbang untuk bulan April 2018 adalah seperti jadual di bawah:

NO.	NO. AHLI	NAMA
1	11946	CHEW YEE CHUAN
2	25252	FOO YEW CHIN

NO.	NO. AHLI	NAMA
3	15055	HING WAI KEONG
4	05673	JEYAKUMAR S/O V. THANGARAJAH
5	80788	KHAILASH DHASAN A/L VELAUTHAM
6	22909	LAU WEN ONG
7	99130	LIM JONG KEAT
8	34178	MOHD SHAIFUDDIN BIN ABDUL RAZAK
9	13229	MUHYI @ MOHAMAD YUSOF BIN HAJI ALI
10	12215	NG YOKE KIM
11	41710	NOR AISYAH BINTI YUSOFF
12	45369	NURMIN BINTI BOLONG
13	80677	RAJA ANDIFARIZAN RAJA AHMAD
14	17533	RAMLI BIN MAMAT
15	07750	TAM KAH YEN, STEVEN
16	15086	WAN THIAM HUAT
17	07039	WONG YII HENG

#### IEM DIARY OF EVENTS

Title: 9th Annual General Meeting of the Consulting Engineering Special Interest Group

#### 21 July 2018

Organised by	/: Consulting
	Engineering Special
	Interest Group
Time	: 11.00 a.m 1.00 p.m.
CPD/PDP	: 2

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

#### **KEAHLIAN**

#### CONTINUATION LIST FROM MAY JURUTERA 2018 ISSUE

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97568	CHAN JIA JIAT	B.E.HONS.(UTAR SG LONG) (CIVIL, 2018)
97366	CHOO CHEE PHIN	B.E.HONS.(UTAR)(CIVIL, 2011)
97563	YAP WOEI SHYONG	B.E.HONS.(UTAR)(CIVIL, 2016)
97439	SOH YANG WEE	B.E.HONS.(UTAR)(CIVIL, 2017)
97495	ANANDAN A/L ARUMUGAM	B.E.HONS.(UTHM)(CIVIL, 2011)
97570	MAXWEL BETI ANAK PIT	B.E.HONS.(UTHM)(CIVIL, 2011)
97347	TARMIZI BIN AHMAD	B.E.HONS.(UTM)(CIVIL, 2010)
97484	Mohamad ikmal Bin zulkifli	B.E.HONS.(UTM)(CIVIL, 2016)
97491	VANESSA JANE BINTI ZAINIP	B.E.HONS.(UTM)(CIVIL, 2016)
97368	WALDEN HARRY BEATTY	B.E.HONS.(UTP)(CIVIL, 2015)
97492	ONG LIONG SIK, TERENCE	M.E.HONS.(NOTTINGHAM) (CIVIL, 2018)
97341	TING YING YING, KAREN	M.E.HONS.(QUEEN'S OF BELFAST)(CIVIL, 2016)
97346	KHOO YIT SHEUN	M.E.HONS.(THE UNI. OF NOTTINGHAM)(CIVIL, 2017)

#### **KEJURUTERAAN BAHAN** 97

351	MOHAMAD AZNAN	B.E.HONS.(USM)(MATERIALS,
	BIN MOHD NAJIB	2014)

KEJURUTERAAN BIOPERUBATAN			
97558	ABDUL RAUF BIN ABU BAKAR	B.E.HONS.(MALAYA) (BIOMEDICAL-PROSTHETIC & ORTHOTIC, 2014) M.E.SC. (MALAYA)(BIOMEDICAL, 2017)	
KEJU	RUTERAAN ELEK	TRIKAL	
97432	MAHMUD HUZAIFI BIN MOBARAK	B.E.HONS.(MMU)(ELECTRICAL, 2014)	
97569	OH WEI SZIN	B.E.HONS.(TAYLOR'S UNI.) (ELECTRICAL & ELECTRONIC, 2017)	
97333	gan yi xian	B.E.HONS.(THE UNI. OF MELBOURNE)(ELECTRICAL, 2013)	
97371	MUHAMMAD HILMI BIN DZULKEFLI	B.E.HONS.(UITM)(ELECTRICAL, 2011)	
97485	Mohamad Nazrin Bin Mohamad Najib	B.E.HONS.(UITM)(ELECTRICAL, 2013)	
97498	NURUL FARHANA BINTI AZIS @ AZIZ	B.E.HONS.(UNIKL-BMI) (ELECTRICAL, 2017)	
97423	JAYASELAN A/L KRISHNAN	B.E.HONS.(UNITEN) (ELECTRICAL & ELECTRONICS, 2017)	
97487	MUHAMAD AFIQRI BIN IBRAHIM	B.E.HONS.(UNITEN) (ELECTRICAL POWER, 2013)	
97501	PAD KHAIRUL ANUAR BIN RAMLI	B.E.HONS.(UTHM)(ELECTRICAL 2012)	
97420	NORASYIDAH BINTI OMAR	B.E.HONS.(UTM)(ELECTRICAL, 2011)	
97353	MUHAMAD SHAHRIZUAN BIN TUKIMAN	B.E.HONS.(UTM)(ELECTRICAL, 2013)	
97359	MUHAMMAD IZWAN BIN MOHD SANI	B.E.HONS.(UTP)(ELECTRICAL & ELECTRONICS, 2011)	
97419	LOH JUI BOON	B.E.HONS.(UTP)(ELECTRICAL & ELECTRONICS, 2011)	
97413	ONG TING YU	M.E.HONS.(UCL)(ELECTRONIC & ELECTRICAL, 2012)	
KEJU	RUTERAAN ELEK	TRONIK	
97549	AMIRULLAH BIN ARIES	B.E.(UMP)(ELECTRONIC, 2012)	
97554	ROZMIE RAZIF BIN OTHMAN	B.E.HONS.(MMU) (ELECTRONICS- COMPUTER, 2006)	

		2006)
97425	FAIRUZ RIZAL BIN A RASHID	B.E.HONS.(MMU) (ELECTRONICS- MULTIMEDIA, 2001) M.SC.(UITM)(QUANTITATIVE SCIENCES, 2005)
97365	MOHD NIZAMUDDIN BIN ABD LATIF	B.E.HONS.(UITM) (ELECTRONICS- COMMUNICATION, 2013)
97431	Mohd Hafiz Bin Mukhtar	B.E.HONS.(UNIMAP) (INDUSTRIAL ELECTRONIC, 2009)
97357	WONG CHIN HONG	B.E.HONS.(UNIMAP) (INDUSTRIAL ELECTRONIC, 2011) PHD. (USM) (MICROELECTROMECHANICA SYSTEMS, 2017)

97358	FOO KHAI WEI, EVELYN	B.E.HONS.(UNIMAS) (ELECTRONICS & TELECOMMUNICATIONS, 2009)	
97343	MUHAMAD FAEZ ASYRAF BIN ASHAARI	B.E.HONS.(UTM)(ELECTRICAL- ELECTRONIC, 2016)	
97444	MOHAMED SHUAIB BIN MOHAMED SAHEED	B.E.HONS.(UTM)(ELECTRICAL- MECHATRONICS, 2009) PHD.(UTP)(ELECTRICAL & ELECTRONICS, 2014)	
KEJURUTERAAN KIMIA			
97354	TAN CHEE SIANG	B.E.HONS.(MALAYA)(CHEMICAL, 2017)	
97483	YONG WAI YEE	B.E.HONS.(USM)(CHEMICAL, 2012)	
97560	WONG KEE SEN,	B.E.HONS.(UTAR KAMPAR)	

	LOUIS	(CHEMICAL, 2018)
97488	P.PRAKAS A/L S.PALANYCHAMY	B.E.HONS.(UTAR) (CHEMICAL, 2012) M.E.SC.(UTAR)(2016)
97443	MOHD AZRI BIN WAGI	B.E.HONS.(UTM)(CHEMICAL, 2005)
97427	DR. HAZLINI BINTI DZINUN	B.E.HONS.(UTM) (CHEMICAL, 2009) M.E.(UTM)CIVIL- ENVIRONMENTAL MANAGEMENT, 2012) PHD.(UTM)(GAS, 2016)
97340	MOHAMAD AZREEN FIRDAUS BIN ABD AZIZ	B.E.HONS.(UTM) (CHEMICAL-GAS, 2011) M.E.(UTM)(GAS, 2014)

	AZREEN FIRDAUS BIN ABD AZIZ	(CHEMICAL-GAS, 2011) M.E.(UTM)(GAS, 2014)
334	WONG ZHI KIANG, LUKE	M.E.HONS.(UNI. OF BIRMINGHAM)(CHEMICAL, 2016)

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7561	MOHAMMAD NASSEER BIN SAAD	B.E.HONS.(UTM)(COMPUTER, 2009)
7350	MOHAMMAD RAFIE BIN YUNOS	B.SC.(RENSSELAER POLYTECHNIC INST.) (COMPUTER SYSTEMS, 2007)

#### **KEJURUTERAAN MARINE**

97552	MOHAMMAD	B.E.HONS.(UTM)(MECHANICAL-
	ZAREEF BIN	MARINE TECHNOLOGY, 2014)
	ARSAD	, . ,

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97496	MOHD KAMIL BIN HASAN	B.E.(TAKUSHOKU UNI.) (MECHANICAL SYSTEMS, 2011)
97377	AHMAD ZUBAIR BIN MOHD RAZALI	B.E.HONS.(CARDIFF UNI.) (MECHANICAL, 2013) M.SC.(UNI. OF SOUTH WALES, 2015)
97571	MOHD DZULKIFLI BIN ISMAIL	B.E.HONS.(IIUM)(MECHANICAL- AUTOMOTIVE, 2013)
97360	HO KYE WENN	B.E.HONS.(MALAYA) (MECHANICAL, 2017)
97494	FOO TZEH YIANG, GABRIEL	B.E.HONS.(MONASH) (MECHANICAL, 2017)
97557	LIEW WUI SEN	B.E.HONS.(SWINBURNE UNI. OF TECH.)(MECHANICAL, 2011)
97338	WONG YING CHAI	B.E.HONS.(SWINBURNE UNI. OF TECH.)(MECHANICAL, 2014)
97344	NG YEN MING	B.E.HONS.(TAR UC) (MECHANICAL, 2016)
97422	NEO WEI QI, ADELINE	B.E.HONS.(UMP)(MECHANICAL, 2016)
97336	CHIEW CHIN WEE, LOUIS	B.E.HONS.(UNI. OF WESTERN AUSTRALIA)(MECHANICAL, 2014)
97416	VENGKATA GIRI A/L ENGKANNAH	B.E.HONS.(UNISEL) (MECHANICAL, 2012)
97551	Mohamad Ridzuan Bin Jamli	B.E.HONS.(UNITEN) (MECHANICAL, 2003)
97441	YEE CHEE KIT	B.E.HONS.(UPM)(MECHANICAL, 2007)
97376	KIRUBAHARAN A/L MERAPAN	B.E.HONS.(UTEM) (MECHANICAL- AUTOMOTIVE, 2011) M.E.(UTM)(MECHANICAL, 2015)
97424	RASIDIN BIN SENAWI	B.E.HONS.(UTEM) (MECHANICAL-STRUCTURE & MATERIAL, 2009)
97339	JAFFAR BIN IBRAHIM	B.E.HONS.(UTHM) (MECHANICAL, 2006)
97434	ADAM HARIZ BIN AUGUSTINE	B.E.HONS.(UTHM) (MECHANICAL, 2008)
97426	HAFIZ BIN SHAMSULHUDA	B.E.HONS.(UTM)(MECHANICAL, 2004)
97345	MOHD EZZANIE BIN ADNAN	B.E.HONS.(UTM)(MECHANICAL, 2008)

97342	Muhammad Ainul Haidar Bin Yahaya	B.E.HONS.(UTM)(MECHANICAL, 2016)
97361	PUTERA NAZREEN SHAH BIN MOHAMAD ZAKI	B.E.HONS.(UTP)(MECHANICAL, 2014)
97435	AHMAD SYAFIQ AIMAN ZULKIPLI	B.SC.(RENSSELAER POLYTECHNIC INST.) (MECHANICAL, 2008) M.SC.(UITM)(CIVIL- CONSTRUCTION, 2014)

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97497	THEENGAHARAN A/L MUTHUSAMY	B.E.HONS.(APU) (MECHATRONIC, 2012)
97428	DR FATANAH MOHAMAD SUHAIMI	B.E.HONS.(IIUM) (MECHATRONICS, 2008) PHD.(UNI. OF CANTERBURY) (MECHANICAL, 2013)
97363	MOHD NOR IQBAL BIN ZULKIPLI	B.E.HONS.(IIUM) (MECHATRONICS, 2017)
97436	MUHAMMAD AFIF BIN MANSOR	B.E.HONS.(UNISEL) (MECHATRONICS, 2011)
97364	LEE CHEE KEEN	B.E.HONS.(UTEM) (MECHATRONICS, 2016)
97348	CHONG MIN CHUN	M.E.HONS.(THE UNI. OF SHEFFIELD)(MECHATRONICS, 2015)

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7493	CHEONG JAN XI	B.E.HONS.(BRADFORD) (INDUSTRIAL, 2010) M.E.M.(UPM)(2016)
7489	MUHAIMIN MUSTAQIM BIN JAMALUDIN	B.E.HONS.(UITM)(MECHANICAL- MANUFACTURING, 2017)
7564	MUSFIRAH BINTI	B.E.HONS.(UKM) (MANUFACTURING 2008)

#### **KEJURUTERAAN PERTANIAN**

97562 YAP CHORNG		B.E.HONS.(UPM)(BIOLOGY &		
	SHIN	AGRICULTURAL, 2002)		

#### **KEJURUTERAAN PETROLEUM**

9

97440	MUHAMMAD	B.E.HONS.(UTP)(PETROLEUM,
	FIRDAUS BIN	2015)
	ADYNEY	

#### KEJURUTERAAN TELEKOMUNIKASI 9

7337	OOI HOONG CHUAN	B.E.HONS.(MALAYA) (TELECOMMUNICATION, 2008)
7433	SEE BEE LOON	B.E.HONS.(MALAYA) (TELECOMMUNICATION, 2012)

#### PERMOHONAN MENJADI AHLI

	INCORFORATED			
No. Ahli	Nama	Kelayakan		
KEJU	RUTERAAN ELEK	TRIKAL		
97482	KARTHIKEYAN A/L RAJAMOHAN	B.E.HONS.(NORTHUMBRI AT NEWCASTLE) (ELECTRICAL & ELECTRONIC, 2013)		
97480	LOW LIANG HING	B.SC.(ROBERT GORDON UNI.) (ELECTRONIC & ELECTRICAL, 1996)		
97481	MUHAMMAD HAKIM BIN SALIM	B.E.TECH.HONS.(UNIKL BMI) (ELECTRICAL, 2015)		

#### PERMOHONAN MENJADI AHLI 'AFFILIATE' No. Ahli Nama Kelayakan

**KEJURUTERAAN ELEKTRONIK** 97479 BASRI BIN BERAHIM

B.SC.(UMS)(PHYSICS WITH ELECTRONICS, 2004)

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