

INGENIEUR PENANG

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From Tackling Traffic Congestion to Enhancing Sustainability

>> SEE INSIDE



*Bayan Lepas LRT Along Tun Dr Lim Chong Eu Expressway (Artist's Impression for Illustration Only),
Courtesy of Transport Section, Penang State Economic Planning Division*

Time flies, by the time you read this, 2019 will already have become history. Year 2019 is a very busy and productive year for the Branch. The Branch has organized a series of technical seminars, dialogues, oversea technical trip, activities by the Young Engineers Section & Women Engineers, adding up to almost 260 BEM CPD hours for the year 2019. I would like to record my heartfelt thanks to the Executive Committee for the strong support given to me. I am truly impressed by Standing Committees, Women Engineers and Young Engineers Sections' tireless efforts, and I would also like to congratulate the committee of the Newsletter with the successful publish of the inaugural IEM Penang Branch Bulletin "The Ingenieur Penang". I am proud to announce that our 52nd Anniversary Dinner had been successfully held on the 15th November 2019 at Hotel Equatorial with a total of 103 dinner tables. Many thanks to all of you who has participated in organizing the dinner as well as those of you who have attended the dinner.



The dawn of the new year brings fresh aspirations at IEM Penang Branch. We have been looking forward with great expectations to turn a new leaf and opportunities to transform and build more sustainable communities. Penang has approximately 30,000 engineers working in the state. These huge resources of engineers, and the multi-national companies in the state, will enable the industry to prosper and support Penang's economic growth. The engineering fraternity anticipates participation in the state's projected massive infrastructures projects in the coming years, such as the Penang Transport Master Plan. We hope local engineers will be given the opportunities and priority to contribute to these world class engineering projects of providing better infrastructures, facilities and amenities for the benefit of all in Penang State. IEM Penang wish to progress together with the state government, city councils, various governmental agencies and SPEAD component bodies whilst helping in the development of the state and be part of the state's vision of "Penang 2030".

Due to the COVID-19 pandemic, Malaysia entered Movement Control Order (MCO) from 18th March 2020. During this period, our monthly Branch EXCO meetings were carried out through video conferencing. Our branch activities have been affected, unfortunately. At the time of writing this article, we have moved into Recovery Movement Control Order (RMCO) phase from 10th June. We are now able to organize Technical Talks, Seminars etc. using Webinar to serve our members. We remain committed to this and continue to be actively involved in SPEAD meetings of MBPP and MBSP, and dialogues with authorities. This is to keep our fellow engineers constantly updated on new development policies and technical/submission guidelines implemented by the local authorities.

IEM Penang Branch has been able to contribute to the society during this difficult period. My sincere gratitude and appreciations to our IEM Penang Branch COVID-19 team and our members who have generously donated for the following charity events:

1. Front liners of Penang General Hospital.
2. Penang Handicapped Welfare Association.
3. BE Home for Special Care Penang

Last but not least, I wish this news bulletin, The Ingenieur Penang, can create a networking platform for our members to share ideas and interact. Members are urged to participate with the sharing of their technical knowledge, experiences, their jokes and leisure in this news bulletin. ■

The past one year of 2019 had seen impressive number of activities been organized by our Branch Committee, YES, WE and eETD, surpassing the previous year. All together 117 activities had rolled out from the branch with a total of 257.5 approved CPD hours recorded. Thanks to the wonderful work by the committee members!

As they say, hard work pays off! We are particularly pleased that the inaugural edition of Ingenieur Penang receives good feed backs and was commended by many, including people from IEM HQ and other IEM branches. This has brought much needed encouragement to the editorial team. Thank you all!

For The cover feature of this issue, we zoom in to topics related to Penangites. We share with our members on these topics through a precious exclusive interview with Ir. Rajendran P. Anthony, Director of Engineering Department, MBPP.

One thing we notice is that response from our members in contributing articles to this news bulletin is rather quiet. The Editorial Team seriously hope that our members, especially the senior members, will care to share with us their experiences and interesting stories. Simply emailing your articles to the IEM Penang Branch secretariat at iempenangbranch@gmail.com any time. An article of 500 to 1000 words with one or two pictures will be wonderful. We also welcome members from other IEM branches to share their interesting articles with us.

For most if not all of us, 2020 will definitely be remembered as the most eventful and unforgettable year of our entire life because of Covid-19 pandemic. We salute the front liners who risk their lives to make us safe, and every one of us who has strictly observed the MCO to help battle the pandemic. The aftermath, like acclaimed sci-fi writer Ted Chiang says: "we don't want everything to go back to business as usual, because business as usual is what led us to this crisis". If this is the case, we hope everyone of us will be ready to face the new normal and move forward from there, for every crisis in life, there is also an opportunity to turn the fate around! ■

The Editorial Team

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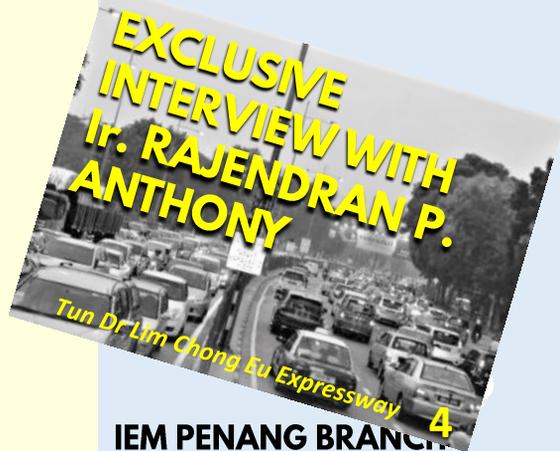
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Volunteer to contribute articles to the newsletter contact IEM secretariat (iempenangbranch@gmail.com)

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EXCLUSIVE INTERVIEW

Ir. RAJENDRAN P. ANTHONY

AMN, BCN, PKT, PJK



► *The Cover Feature for this issue features an exclusive interview with Ir. Rajendran A/L P. Anthony, the Director of Engineering Department, Majlis Bandaraya Pulau Pinang (MBPP) on 11 November 2019. Ir. Ng Sin Chie, Dato' Ir. Dr. Goh Teik Cheong, Ms. Loh Yee Teng and Mr. Sim Kai Sheng from IEM Penang Branch talked to Ir Rajendran at his office in KOMTAR on various issues affecting Penangites, from traffic management, transportation, flood mitigation, green infrastructure, environmental and social matters. Ir. Rajendran has been in the forefront tackling the issues, finding solutions, and implementing them throughout his career with the public sector.* ◀



At MBPP Smart City Centre: From left: Ms. Loh Yee Teng, Dato' Ir. Dr. Goh Teik Cheong, Ir. Rajendran, Ir. Ng Sin Chie, Mr. Sim Kai Sheng

Ingenieur Penang: Ir. Rajendran, thank you for accepting our request for this exclusive interview. Firstly, what inspired you to become an Engineer, and mind to share some of your best memories serving at MBPP?

Ir. Rajendran: I am interested in structures and building constructions. I was destined into engineering field since I was 16, whereby I studied building construction in Technical Institute Penang. On best memories serving at MBPP, I will never forget is MBPP's collaboration with IEM Penang (as appointed by YAB Tuan Lim Guan Eng) into the investigation of the UMNO Tower's Collapse incident in 13th June 2013. It was an unforgettable experience working with some of the most elite members in the engineering field, Ir. Yau Ann Nian, Dato' Ir. Dr. Goh Teik Cheong, Ir. Khoo Koon Tai, Dato' Ir. Lim Kok Khong, Ir. Ting Chek Choon and Ir. Chin Too Hong. That was a tough time. We worked days and nights at the site, implemented safety measures, monitor excavation to ensure stability of the pit. The close collaboration was very useful and fruitful.

Ingenieur Penang: Ir. Rajendran, you have spent your entire career in the engineering industry in Penang. How would you sum up your experience as a civil engineer working in the public sector?

Ir. Rajendran: With 33 years in public

service (with JKR at age of 21 and MBPP from age of 23), I think I have contributed my part to the society. The job is full of challenges. We need to engage with the public, listen to their voice, try to accommodate them as much as we can, although we are unable to satisfy everybody's requests. We deal lot with floods, slope failures and illegal dumping. We monitor, analyse, predict, and try to prevent them from happening. We are unable to do everything ourselves and we need co-operations from the public and other sectors. For example, we need public awareness to prevent illegal dumping into rivers. We also need funds for our efforts. All these improvement efforts will require time.

Ingenieur Penang: What are the major challenges you have faced?

Ir. Rajendran: Dealing with the public is a major challenge. One of the many challenging tasks was the implementation of one-way street system in Penang Island, where so many parties will be affected directly. Before 1996, the two-way systems in George Town had caused serious congestions. From 1996 to 1998, we progressively implemented one-way street system. Then came the Pulau Tikus one-way street system in 1998 but was put on hold due to public



Jalan Kelawai: The one-way street connecting George Town, Pulau Tikus & Tanjung Tokong

complaints. We knew that with the tremendous development growth rate in Penang coupled with the concomitant traffic volume growth profile, this had to be done to cater for the exponential rise of the enormous traffic volumes. We worked relentlessly, days and nights at site, to get things done. We needed to keep improvising until we get it done. There will always be complaints at the initial stages of every new adaptations. But towards the end, people will realize that the changes are necessary. In this case, we did it and now it is working fine.

Apart from that, improving public transport system is also a remarkable challenge we have undertaken. There were a lot of problems with the minibuses in the late 90's, uncontrolled, no proper schedule, poor safety regulations and without proper bus stops. I was assigned to the state government and tasked to improve the situation from 2002 and 2005.

I became the General Manager of *Bas Negeri Pulau Pinang* in 2006 and we fought hard for Rapid Penang to be formed in August 2007, second state after KL that Rapid offers a comprehensive service. We worked closely with Rapid to organize the routes and hence the overall bus line system. Besides that, we also started the first free shuttle bus service in Georgetown Penang.

We also engaged in many major road and junction up-grading upgrading works. Currently, we are proposing underpass construction projects from Mount Erskine to Jalan Burma and underpass link from Jalan Kelawai to Tanjung Tokong, which we are still sourcing funds from the federal government. At the same time, we have also proposed the Pan-island link to smoothen out traffic congestions island wise.

Ingenieur Penang: We understand that JPS, MBPP, MPSP, JKR and other relevant authorities are working hand-in-hand to overcome Penang’s flash flood issue. How far is the Engineering department of MBPP contributing to this matter, and what is the status of the mitigation plan?

Ir. Rajendran: The main core in alleviating flood problem is the Sungai Pinang Flood Mitigation Project. We have appointed consultants to study and prepare proposals for long term flood mitigation measures. We have already probed into various localized flood problems such as at the City Stadium area. Here, we introduced an underground diversion as an alternative flow to the existing drains. This will resolve flood around the food courts areas. Next, we will be raising the road level at Jalan P. Ramlee. With the raised road level, the drains will be deeper and will have larger holding capacities before discharging. The discharge will finally flow into Sungai Jelutong via the pumping station near the end of Jalan Ismail Che Mat, which was completed earlier this year as a prerequisite action before we raise Jalan P. Ramlee. All these works must be carefully planned and executed so that a solution devised to resolve one problem will not cause another problem to arise.

Ingenieur Penang: Nowadays, several of MBPP’s on-going projects consists of upgrading of infrastructure, roads and drainage systems as well as public utilities. How far has these projects achieved goals?

Ir. Rajendran: We can say that all projects have help to achieve

progressive improvements, but not overnight changes. Aesthetically wise, roads in town are being improved from one area to another.

The funds of these projects are from MBPP and the state government, from drainage contribution by the developers at RM 50,000 per acre of land development.

We learnt our lessons that we must not solely focus on road widening and road infrastructure upgrading. We must also improve our public transport. We have made improvements on the outlook of all bus stops. We began to implement Smart Bus Stations with Wi-Fi, Digitalized Monitoring and Smart Information System. We have LCD panels displaying scheduled arrivals of buses through real-time tracking via GPS of the buses’ locations and estimated time of arrivals.

Within the buses, we provided air-conditioned spaces with comfortable seats. The torn and dirty seats in the old days in “yellow bus” is now being forgotten. Nonetheless, the mindset where people think buses are for the poor, still exist. We are almost there to put a stop to this.



Sia Boey Park Decorative Lanterns

Not only improving the bus facilities, we have also improved the walkways to encourage people to move around on foot. The walkways are so captivating that people had never been so fond of walking over driving than they had ever been. They literally shield themselves with the cooling shades while strolling along the wide and secured walkways, mesmerized by the still well preserved, culture-rich heritage buildings. These are the multipronged actions to improve public transport and alleviate congestion.



Pedestrian walkway along the Esplanade

We have increased the number of shuttle buses from 3 to 5 due to the increasing demands. Many elderly and youngsters are benefiting the most from it. Every now and then, I also utilize the service for my own convenience.

We are currently replacing all ordinary high-pressure sodium vapour light bulbs with LED. This applies to all traffic lights and streetlights. Early last year, we have changed 7,135 streetlights to LED. Recently, we have awarded another contract to replace another 10,407 streetlights. In total, we have over 17,000 streetlights

Ingenieur Penang: Ir. Rajendran, what are the regulations implemented or will be implemented by the engineering department of MBPP in order to achieve the goal of a cleaner, greener, safer and healthier Penang, and how far has this program achieved its goals?

Ir. Rajendran: There are various departments in the city council. For engineering department alone, we initiate to undertake numerous projects relating to the greenery of the environment on our own. Firstly, we necessitate developers to provide walkways and bicycle facilities to promote greener modes of transport and reduce carbon footprints. With more bicycle lanes in place, the number of cyclists in Penang are rising. Bicycle shops have increased significantly. There is a total of 39.3 km of dedicated cycling routes from south to north, from the Batu Maung Waste Transfer Station to Tesco Tanjung Pinang. 24 km of which are along the coastal line. Now, at the north we are extending the bicycle route for another 3 km to Tanjung Bungah, followed by from Tanjung Bungah to Batu Ferringhi with *eco-deck*, an extended steel and timber structure platform overhung from the existing roadway along the coastal road.



Dedicated bicycle lane along Tun Dr Lim Chong Eu Expressway

under the city council and all will be fully LED. Another agency, TNB, has over 16,000 streetlights of which half have been changed to LED. We are working towards having all streetlights on the island to be fully LED by 2020. These will give us 50-55% energy savings and reduce maintenance cost.

Ingenieur Penang: Ir. Rajendran, MBPP has embarked on a civic consciousness campaign to educate the public on road safety and other social issues. How do you see this campaign able to achieve its goals?

Ir. Rajendran: We all know that road safety awareness, similar to other virtuous and ethical qualities such as composure and cleanliness, must be instilled since young ages. This requires participation from the public. We have approached schools to organize road safety competitions, knowing that children are keen to learn more about road safety and they often influence their parents in driving attitude. Now, with the campaign, the Penang Chinese Girls' High School has set a good example. Students tend to advise their parents

not to break traffic rules.

Ingenieur Penang: Can you very briefly tell us about the progress of Penang Transport Master Plan?

Ir. Rajendran: We have LRT for Penang scheduled to start construction in 2021, after the island reclamation. After that, we plan to start the Pan-island link in 2022. For Air Itam by-pass, we have already started the preliminary studies last November 2019, and will start the construction full swing starting from April 2020 to April 2023. ■

Ingenieur Penang: Would you please elaborate on the SMART city concept that Penang is adopting?

Ir. Rajendran: We have appointed IBM to advise and provide technical expertise for the implementation of MBPP's smart city plans. Currently, we have 935 CCTV cameras. 528 are used for Smart City plans with video analytics such as facial recognition, vehicle counting and vehicle number plate recognition. With these, we are able to observe and study the flow pattern of traffic distribution, help in crime detection, and track down of suspicious vehicles or criminals. The system tracks down illegal dumping to ensure cleaner environment. Illegal parking that obstructs traffic can be instructed to move their vehicles immediately. Enforcement becomes more efficient.

We also utilise them for flood monitoring, where different colour codes were used to indicate water levels and trigger alarms when necessary. Likewise, with disaster management system, people get to know first-hand information from mobile application about anything that happens around and get prepared early.

Finally, a lot of people appreciates our smart parking system where we can pay parking fees online via mobile application. We are now installing transponders at all parking spaces so that the application can notify you from far of any empty spots nearby before navigating you to the nearest empty parking. If the place has been taken, it is smart enough to guide you to the next available spots. In short, we can say that Penang is quite advance in terms of the SMART city concept as compared to the other states. Nevertheless, we are still improving it. ■



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SPEAD MEETING:

A UNIQUE AUTHORITIES VS PROFESSIONALS MEETING IN PENANG

SPEAD is the short form for Surveyors(S), Planners (P), Engineers(E), Architects(A) and Developer(D). Surveyors are represented by The Royal Institute of Surveyors Malaysia (RISM). Planners are represented by Malaysia Institute of Planners (MIP), Engineers are represented by the Institution of Engineers Malaysia (IEM), Architects are represented by Pertubuhan Akitek Malaysia (PAM) and Developers are represented by Real Estate & Housing Developers' Association (REHDA) Malaysia. These are the permanent SPEAD component members (Ahli Tetap SPEAD) and they are purposefully included by recognition of them being the major stake holders of development projects.

The SPEAD meeting is an official meeting between SPEAD Component members and the local authorities and government agencies. These local authorities and government agencies consist of the City Council (Datuk Bandar as Chairman and represented by all the technical departments of City Council), external technical departments and service providers like JKR, JPS, Bomba, PBA, TNB, Telekom and IWK. In SPEAD meeting, relevant issues with regards to developments, land matters, technical compliances, building by-laws, submission procedures and requirements, implementation of new policies and rules, changes to contribution charges, taxes, fees etc. will be brought up for discussion and decisions. SPEAD meetings are held quarterly and chaired by the mayors of both MBPP and MPSP. Minutes of meeting is taken and prepared by the respective City Councils and circulated to the component members.

IEM Penang Branch has a SPEAD sub-committee coordinating all SPEAD related matters and attends SPEAD

meetings. Members of the Branch can submit to the secretariat issues or suggestions they wished to be brought up for discussion in the SPEAD meeting. These will be reviewed by the sub-committee so that only relevant technical issues/suggestions generally affecting the submission/approval procedures and guidelines are brought up in the SPEAD meeting. Individual cases (e.g. dispute with agencies on individual issues) and irrelevant matters will not be taken up.

IEM SPEAD sub-committee is of the opinion that only technical issues and constructive suggestions affecting the overall practicing engineers shall be brought up to SPEAD meeting.

SPEAD meeting covers a wide spectrum of matters in connection with development projects.. Very often these involve land matters, planning guidelines, development charges, plot ratios and densities, infrastructure requirements, services availability etc. Usually a great deal of matters discussed in the SPEAD meeting are more relevant to REHDA and PAM. These, however, often require engineering input which involves IEM. Both C & S and M & E engineering matters are of relevant in the meeting. For instance, recently both city councils are contemplating compulsory installation of LED street lighting towards developing an efficient eco city. IEM Penang Branch held several dialogues and discussions with the councils to propose a design guide which the engineers can refer to and use with ease. IEM Penang branch had also organised several brain storming sessions with members before presenting the proposal to the council and deliberated in the SPEAD meeting.

SPEAD meeting is an important and excellent platform for the engineers to interact with the local authorities and government agencies, as well as strengthening collaboration with the fellow stake holders like RISM, MIP, PAM and REDHA. ■



IEM Penang Branch 2020/2021 Session Branch Committee Group Photograph

Front row from left:

Ir. Chan Wah Cheong
Ir. Assoc. Prof. Dr. Yee Hooi Min
Ir. Than Sheau Wei, Sophia
Ir. Yeap Geok Nghoh
Ir. Heng Lee Sun
Ir. Tean Sze Nee
Ir. Catherine Sim Siew Ping
Ir. Assoc. Prof. Dr. Leo Choe Peng
Dato' Ir. Dr. Goh Teik Cheong

Centre row from left:

Ir. Fong Choon Fuoi
Ir. Teh Khian Beng
Wong Kok Nian (YES Chairman)

Back row from left:

Ir. Lian Shin Wai, Andy
Ir. Dr. Chang Chun Kiat
Ir. Tiu Jon Hui
Ir. Yau Ann Nian (Branch Chairman)
Ir. Dr. Mui Kai Yin
Ir. Bernard Lim Kee Weng
Ir. Paul Phor Chi Wei
Ir. Dr. Khor Jeen Ghee
Ir. Ng Sin Chie

IEM Penang Branch - COVID19 Charity Drive



PPE for Penang General Hospital



At Penang Handicapped Welfare Association



At Be Home Special Care Penang

After the first phase of Movement Control Order (MCO), which was initiated on March 18, IEM Penang Branch organized a Charity Drive among its members from 3rd April to 8th April to help alleviate the shortage of Personal Protection Equipment (PPE) in Penang General Hospital. The Charity Drive was successfully carried out with heart-warming supports from our members. We collected a total of RM13,700 donation from our members which was used to purchase PPE supplies. On 13th April 2020, IEM Penang Branch delivered 2,000 pieces of Bouffant Caps, 2,000 pieces of Shoe Covers, 500 pieces of KN95 Face Masks, 100 pieces of Isolation Gowns and 60 pieces of Surgical Gowns to the Penang General Hospital to support the front liners who are fighting this pandemic for our well beings.

Besides donation of PPE to General Hospital, IEM Penang Branch has also carried out charity drive to help the local charitable organizations that were badly hit due to MCO. There were two charitable organizations benefited from our members and associates' generous donations, namely the Penang Handicapped Welfare Association, located at Jelutong and the Persatuan Kebajikan Anak-anak OKU Taman Island Penang (Be Home Special Care Penang) at Island Glades. We have donated a total RM5,400 in food and daily needs. IEM Penang Branch sincerely appreciate our members' and associates' generous donations and their time for this meaningful Charity Drive.

Beyond engineering solutions, we drive our engineers towards social responsibilities and community relief activities. Kudos IEM Penang Branch! ■

A Look Back In Connecting Human Technology

From Connecting Voice, Connecting Data to Connecting Things... Ir. Teh Khian Beng

A look back of communication system design development in residential building in the past 3 decades is indeed an interesting exercise. In the period before early 1990s, consumers only hoped that their residential units were equipped with a fixed telephone line to link up with other people. It was common scene then that family members were "fighting" for this sole telephone line to communicate with friends and relatives to make appointments, chit-chat, and gossips. Those who could not use the telephone line for longer hours at home due to high demands will have to go queuing outside at the public phone booth. At that time, we connected "voice" between people into the home.

In the middle of 1990s, the new internet era started when TM launched its first dial-up connection at 56kbps. From that time onwards, internet and social media communications became more and more popular in our daily life. The demand for faster internet access speed became an important design criterion in the residential building services profession. The designers explored other methods such as working with multiple telco service providers to set up local area network (LAN) to provide higher speed access within the residential building, say 2Mbps. The building management

SPECIAL ANNOUNCEMENT

NO BRANCH ANNUAL DINNER FOR 2020

Due to the unfortunate Covid-19 pandemic and the MCO, the Branch Committee has, with much regret, decided to cancel this year's branch annual dinner. Therefore, kindly take note that there will be no annual dinner for 2020. IEM Penang Branch's 53rd Annual dinner will be held in 2021 at a date to be announced later.

would then be required to maintain their own network system and imposed higher monthly fees on the residents. When we look back, we could see how people were craving for higher network speed and find all alternative ways to get things faster. *That time, we connected "data" between people into the home.*

As a designer, we are always caught in difficult predicament as we are aware that technology would advance faster than our conventional building construction period. Thus, we must ensure that the selected new technology system used in the building is still relevant upon completion of the building such as:

- The systems are not outdated or could be upgraded with simple alterations.
- The systems are not obsolete and still available in the market
- The systems are easily maintained, and replacement of parts is convenient

For example, a building's Master Antenna TV (MATV) system that was widely used for decades faced replacement by Satellite MATV (SMATV) system in the end of 1990s when Astro Satellite was launched. It takes bold and decisive designers and developers to alter the whole

cabling system to new design configurations in the middle of a construction to adopt the new technology.

Another similar experience is Smart Home System. Smart Home is a building automation system that enable the control of lighting and power system with more interesting and versatile options such as different ambience lighting, scheduling, and communication between appliances. They can control air conditioners, entertainment systems and appliances. Besides, they can also integrate with security surveillance control and monitoring to secure your home into one system.

Nowadays, high speed broadband services (HSBS) is a basic service that provides fiber speed connection into every home. The speed of 1Gbps is not a dream anymore. With higher speed access and Wi-Fi technology, many big players around the regions started competing to capture market shares with

their own proprietary technology and standards. Building designers and developers are caught in a dilemma again. At the same time, Wi-Fi technology has developed into a stable and well-established utility. These technologies bring about another new revolution of services called The Internet of Things.

The Internet of Things (IoT), from its Wikipedia *definition*, is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers (UIDs) and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. 30 years ago, We connected “voice” between people into our home; then we connected “data communication” between people. And now, with 5G technologies and others, we are not only connected with people but also connected with things surrounding us. Now, we connect “things with people”. ■

A LOOK INTO PRODUCT DEVELOPMENT PROCESS

Ir. Dr. Lee Choo Yong

Product development process is a series of activities to introduce new products to market. As every product has its product life cycle, it is crucial for companies to continuously develop new products to sustain business success. Product life cycle has 4 stages, namely market development, growth, maturity, and decline., as shown in Fig. 1. Product life cycle varies from product to product, e.g. smartphone will have shorter life cycle than home appliance. When existing products are in the growing stage, we should start developing new product before it is too late. Typical examples are the fall of Kodak and Nokia as a result of not responding fast enough to rapid change of the market.

Product development process is becoming more complex and challenging owing to pressures such as lower cost, customer experience, aggressive timeline, government policies, intense competition, globalized supply chain, global trade, and cross-cultural team (Fig. 2). Product development process varies from industry to industry.

In general, there are 5 stages in product development process. Every product starts with idea generation where innovation and creativity play an important role. Next stage is feasibility study whether the idea could be implemented. Once feasibility study is confirmed, detailed design and development of both product and manufacturing process will follow. Validation is an important stage to ensure that product and manufacturing process are robust enough and fulfilling quality and intended use requirements. The last stage is production where products are produced in mass scale and delivered to customer.

It is a systematic approach to guide all stakeholders and experts to ensure product reaches maturity in terms of function, cost, and time to market before production to reduce cost of defect. The earlier the defect or imperfection is detected, the lower cost of defect as shown in Figure 2. Cost of defect could lead to catastrophic consequences to company, e.g. massive product recall of Takata airbag.



Fig. 1 Product Life Cycle

In conclusion, this article introduces product life cycle, generic product development process, activities of 5 stages of product development process and idea of cost of defect. Product development process is important to develop product which is robust and safe for intended use by customer. Any defect should be detected as earlier as possible to avoid enormous cost of defect when product is in production. ■

References

Exploit the Product Life Cycle

H. Wu and H. Hsu, "A framework of generating collaborative and dynamic new product development process," *2007 IEEE International Engineering Management Conference*, Austin, TX, 2007, pp. 220-224.

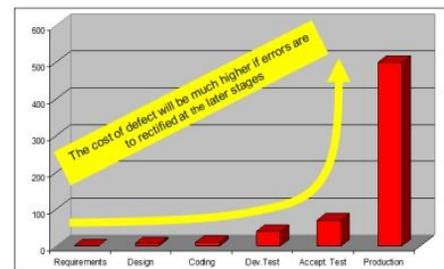


Fig. 2 Cost of defect

EARTHQUAKE DESIGN CONSIDERATIONS OF BUILDING STRUCTURES IN PENANG ISLAND

Ir. Chua Beng Seong, Ir. Yau Ann Nian DJN PKT

The Institution of Engineers, Penang Branch led by its Chairman Ir. Yau Ann Nian paid a courtesy visit to the Datuk Bandar (Dato' Ar. Yew Tung Seang) of Majlis Bandaraya Pulau Pinang (MBPP) on 26th Feb. 2019. At the dialogue session, Dato' Ar. Yew requested IEM (Pg) to put up a study on the subject of "Earthquake Design Provisions in Penang Island" in view of the recent frequent tremors felt which were caused by the strong earthquakes in Sumatra.

The IEM (Pg) Executive Committee held its meeting No. 6 dated 26th March 2019 and had unanimously agreed to set up an Earthquake Design Standing Sub-Committee which would be led by Ir. Chua Beng Seong. The sub-committee has 11 members which made up of 9 Professional Engineers and 2 Associate Professors from the USM.

The sub-committee submitted the findings/report to the Datuk Bandar on 21st June 2019. This is the compressed report for the IEM (Pg) newsletter publication. The full report is available at the IEM (Pg) Secretariat upon request.

GENERAL INFORMATION

Earthquakes are vibrations of the earth's surface caused by sudden movements of the earth's crust which consists of several thick rock plates that float on the earth's molten mantle. The plates drift on convection currents generated by hot spots deep within the earth. As the plates move, due to interlocking at the plate boundaries, they deform. As a result, stress builds up and when the shear stress exceeds the strength of the rock, a rupture occurs along the fault line in the rock and energy is released in the form of seismic waves.

The origin of the fracture is known as the focus of the earthquake. The diagrammatic section is reproduced in Figure 1.

The point on the surface directly above the focus is called **epicenter** of the earthquake.

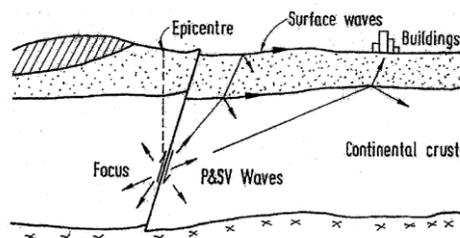


Figure 1 – Types of Seismic Wave

Table 1: Approximate Description of Earthquake Intensities⁵ (Table 9, Ciria Report) Modified Mercalli Intensity (MMI) = subjective scale defining the level of shaking at specific sites

MMI	Richter Scale	Approx. Acceleration	Effect
1	3	-	Felt Slightly
2	3 - 4	0.001 - 0.003g	Felt Indoors
3	4	0.003 - 0.005g	Some cracking
4	5	0.005 - 0.01g	Some movement, Alarm
5	6	0.01 - 0.025g	Some damage, Chimneys fall
6	6 - 7	0.025 - 0.05g	Panels deformed, Some buildings collapse
7	7	0.05 - 0.1g	Considerable damage, frames out of plumb, masonry bldgs collapse
8	7 - 8	0.1 - 0.25g	Most frame structures seriously damaged, landslides
9	8	0.25 - 0.5g	Few structures survive

Two kinds of body waves are propagated from the focus:

- P waves** (compressional), which is propagated as an expanding sphere of disturbance.
- S waves**, which is characterized by shearing distortion without any volumetric change.

When body waves strike the free surface, they give rise to two kinds of surface waves:

- Love waves**, which consist of horizontal motion of the surface transverse to the direction of propagation.
- Rayleigh waves**, in which surface particles move in vertical retrograde elliptical orbits.

The body-wave amplitudes decay at the rate of r^2 , where r is radial distance from the focus.

The surface-wave amplitudes decay at the rate of $r^{-1/2}$.

As the latter decay much less rapidly, the earthquakes may be felt hundreds of miles from their epicentre. This is the geotechnical fact as to why the Peninsula Malaysia experienced the tremors as the result of the Sumatra earthquakes. Table 1 shows the approximate description of earthquake intensities.

EFFECTS ON BUILDING STRUCTURES

Since the foundation is the point of contact between the building and the earth, the seismic waves act on the building by shaking the foundation back and forth.

The mass of the building resists this motion, setting up inertia forces throughout the structure.

Vertical inertia forces are generally ignored, however, since buildings are already designed for vertical loadings and hence, they are strong in this direction.

Thus, only the horizontal inertia forces are considered, which may exceed the wind forces acting on a structure.

THE MAGNITUDE OF THE HORIZONTAL INERTIA FORCE

The magnitude of the horizontal inertia force depends on:

- The building mass
- Ground acceleration
- Type of structure

If a building and its foundation were rigid, it would have the same acceleration as the ground and the peak lateral force would be the mass times the peak acceleration ($F=ma$).

In reality, this is never the case, since all buildings are flexible to some degree.

1985 Mexico City Earthquake:

Moment magnitude = 8.0 ; Mercalli Intensity = IX (Violent) ;

PGA=0.1-0.15g

The ground motion at Mexico City had a predominant period of 2 seconds. This coincided with the natural period of vibration in buildings in the medium height range (typically 6 – 20 storey), many of which collapsed or suffered serious damage whereas the other buildings were practically unaffected.

GEOGRAPHICAL SITE CONDITION OF PENANG ISLAND

Peninsula Malaysia (and Penang Island) is located on the stable Sunda Shelf with low to moderate seismic activity level. The closest fault is the Sumatra fault which is >1500 km long and runs through the entire length of Sumatra. At the closest point this fault is about 500km from Penang Island. However, tremors due Sumatra earthquake had been reported several times in the past.

It was reported ¹⁰ that the energy that could be released from this Sumatra fault will not exceed the Richter magnitude (M_L) of 7.5-7.6 or Moment magnitude (M_w) of 7.8.

PAST RECORDS & EFFECTS

- a. 2 Nov 2002 Sumatra Earthquake:
 - Moment magnitude (M_w) = 7.4; Depth = 33 km below surface
 - Location of epicentre = 500 km from Penang
 - Damage: cracks on some nonstructural walls of the buildings.
- b. 25 July 2004 South Sumatra Earthquake:
 - Moment magnitude (M_w) = 7.3; Depth = 576 km below surface
 - Location of epicentre = 400 km from Johor Bharu
 - Damage: cracks on one apartment in Gelan Patah though not serious.

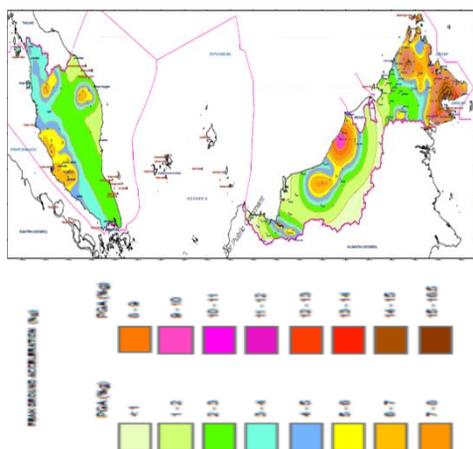


Figure 2 – Seismic Hazard Map of Malaysia (First Edition 2017)

PEAK GROUND ACCELERATION (PGA or a_{gR}) FOR PENANG ISLAND

The seismic action to be considered for design purposes should be based on the estimation of the ground motion expected at each location in the future, i.e. it should be based on the hazard assessment.

In EC8 (EN 1998-1), the seismic hazard is described by the value of the **reference peak ground acceleration** on the ground type A, (a_{gR})

- a. Based on the **Draft Malaysian Standard** – Malaysia National Annex to MS EN 1998-1:2015, Eurocode 8: Design of structures for earthquake resistance – Part 1: General rules, seismic actions and rules for buildings: The initial recommended PGA (Figure 2) for Penang Island as prepared by the Jabatan Mineral dan Geosains Malaysia, ranges between 0.03g – 0.04g or 30 – 40 Gal.
- b. However, the PGA for Penang island (Figure 3) has since been revised to **0.05g or 50 Gal.** (with a 10% probability of exceedance in 50 years) as in the **Annex B** (normative) of the official **Malaysian Standard MS EN 1998-1:2015 (National Annex: 2017)** – Malaysia National Annex to Eurocode 8: Design of structures for earthquake resistance – Part 1

PROVISION IN EUROCODE 8 (EN1998-1)

The provisions in Eurocode 8 (EN1998-1) which states that the defining line of 40 Gal (0.04g) in PGA is used to determine if there is a need to carry out structural design for seismic (for PGA above 0.04g) or if it is not necessary to do so (for PGA below 0.04g).

The range for seismicity design in Eurocode 8 (EN 1998-1) is as follow:

Range of PGA (m/s ²)	Level of seismicity for design consideration
PGA < 0.04g or PGA.S <= 0.05g	Very low seismicity, hence no necessity for seismic design consideration for structure
0.04g <= PGA <= 0.08g or PGA.S <= 0.1g	Low seismicity, a need for a simplified approach for seismic design consideration for structure
PGA > 0.08g or PGA.S > 0.1g	Medium to high seismicity level, requires a detailed seismic design consideration for structures.

where S = shape factor of the horizontal elastic response spectra of the ground. S=1 for Peninsula Malaysia

EARTHQUAKE DESIGN PHILOSOPHY

Eurocode 8 (EN 1998-1) asks for a two-level seismic design establishing explicitly the following 2 requirements:

- a) No-Collapse Requirement or Ultimate Limit States (ULS): Prevent collapse during worst credible event (1:475 yrs) while accepting some structural damage. Satisfaction of this limit state asks for the verification that the structural system has simultaneously lateral resistance and energy-dissipation capacity. This is met by designing the structure to be ductile. Design seismic action (for local collapse prevention) with 10% probability of exceedance in 50 years which corresponds to a mean return period of 475 years.

- c. 26 Dec 2004 Indian Ocean Earthquake:
 - Moment magnitude (M_w) = 9.1; Depth = 30 km below surface
 - Location of epicentre = 160 km off the western coast of Northern Sumatra.
 - Damage: Tsunami waves damaged weak & unreinforced temporary structures along the Tanjung Tokong / Tanjung Bungah coastlines.

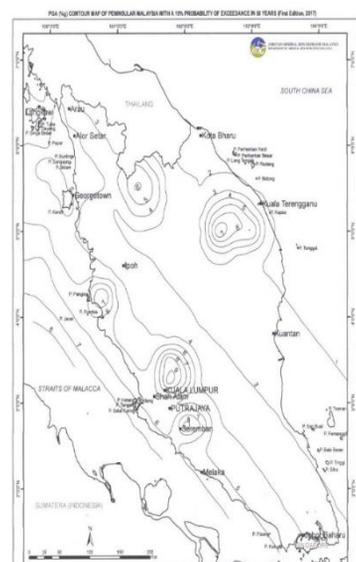


Figure 3 - PGA (%) Contour Map of Peninsular Malaysia

b) Damage Limitation Requirement or Serviceability Limit States (SLS):

Prevent structural damage and limit non-structural damage during the maximum expected event in the lifetime of a structure (1 in 95 yrs).

This is met by providing adequate stiffness and strength through linear behavior.

Design limitation seismic action with 10% probability of exceedance in 10 years which corresponds to a mean return period of 95 years.

TYPES OF SEISMIC ANALYSIS IN EC8 (EN1998-1)

a) Linear –Elastic Methods of Analysis

- Equivalent Static Force / Lateral Force Analysis. (**Static Linear**)

- Several regularity criteria must be met;
- Forces using empirical formulas.

The damage limitation seismic action is sometimes also referred to as the **Serviceability Seismic Action**.

- Modal Response Spectrum Analysis (**Dynamic Linear**)

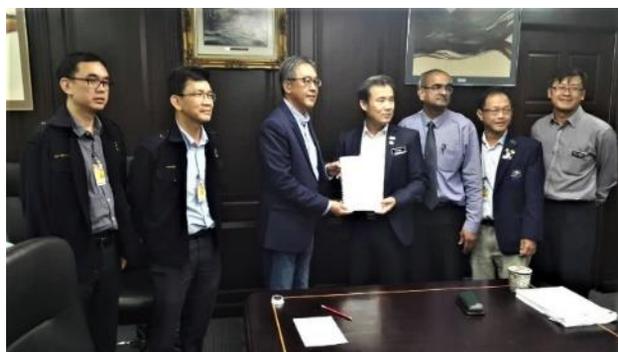
- Applicable to all buildings including irregular structures;
- Takes into account so many modes that at least 90% of the total mass becomes active in earthquake forces.

b) Non-Linear Methods of Analysis

- **Non-Linear** Static (pushover) Analysis;
- **Non-Linear Dynamic** (Time-history) Analysis

CONCLUDING SUMMARY

- a. Based on the “Malaysian Standard MS EN 1998-1:2015 (National Annex: 2017) – Malaysia National Annex to Eurocode 8: Design of structures for earthquake resistance – Part 1: General rules, seismic actions and rules for buildings”, the **PGA for Penang island** shall be taken as **0.05g or 50 Gal.** (with a 10% probability of exceedance in 50 years) in the earthquake design and analysis.



Ir Chua presenting report to Datuk Bandar, accompanied by Earthquake Design Standing Sub-committee

- b. Based on the provision in Eurocode 8 and MS EN 1998-1:2015 (National Annex: 2017) Table N.A.1, Penang Island therefore falls under the **lower bound** category of Low seismicity (**0.04g <= PGA <= 0.08g or PGA.S <= 0.1g**).

Therefore, **Static** Linear Elastic Analysis or Equivalent Static Force Procedure (a simplified approach) for the seismic design consideration should be suffice for the purpose Earthquake design check on regular low-rise structures.

However for irregular and/or high-rise building, **Dynamic** Linear Elastic or Modal Response Spectrum Analysis is to be employed.

- c. Structural seismic analysis & design is a specialized field in the structural engineering discipline. Since this requirement had not been practiced in Penang Island in the past, we believe that not many local consultant engineers had developed the necessary skills and equipped with open-source software for Eurocode 8 compliant to embark on the new level of design compliance.

- d. It is therefore recommended that a grace period of one (1) year be given to the local consultant engineers and the property industry stakeholders to prepare and to be equipped for the submission of future structural plans in compliance to the “Malaysian Standard MS EN 1998-1:2015 (National Annex: 2017) – Malaysia National Annex to Eurocode 8”.

- e. IEM (Pg) and the USM School of Civil Engineering are currently in collaboration to undertake the seismic studies on the cost implication of the various shapes of the buildings under the soft ground condition in Penang Island. ■

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6. “An Overview of Seismic Hazard Study in Malaysia” By Assoc. Prof. Dr. Azlan Adnan and Hendriyawan Malaysian Structural Steel News Issue No. 4 2005

AI Ir. Dr. Khor Jeen Ghee

ARTIFICIAL INTELLIGENCE IN ENGINEERING



Artificial Intelligence (AI) is one of the fastest growing fields in engineering recently. Its application is pervasive and has been applied in wide range of sectors. It is also widely applied to traditional engineering fields yet many engineers who do not work directly in AI struggle to understand the basic concepts of AI. So, what is AI?

Although Artificial Intelligence seems like a recent phenomenon, it is not new. The term Artificial Intelligence was first coined in the mid-1950s when a group of scientists came together to study how machines can be made to learn and simulate features similar to human intelligence. Since then, interests in the field has undergone cycles of wax and wane, with the 1970s and 1990s sometimes referred to as the AI Winter due to dropping popularity. Of course, for every period of disillusionment, there were also periods of great excitement. In 1997, IBM's chess-playing machine, Deep Blue, made history by being the first AI system to beat the reigning world-class champion, Gary Kasparov. Less than two decades later, Google's AI system, AlphaGo, beat top international Go (围棋) master, Lee Sedol, a feat that was previously thought impossible due to the complex nature of Go. These accomplishments sparked the imagination of the public about potential of AI.

AI CHARACTERISTICS AND APPLICATIONS

In essence, AI, or at least the AI of today, are not without limits. They are still a far cry away from the seemingly sentient and usually malevolent characters we see in movies like 2001: A Space Odyssey, The Terminator and The Matrix. Those are what we call Artificial General Intelligence (AGI) - machines that are capable of generalized learning and thinking. In contrast, today's AI are very specialized. They have characteristics which make them very powerful in certain specific tasks, but they do not possess the intellectual capabilities to think like humans. For example, today's AI are very good at finding patterns in large datasets. From these characteristics, AI

have been very successfully applied to solve problems in image processing, speech processing, natural language processing, etc. Common applications include social media analysis for product marketing, special effects for the entertainment industry, email spam filtering and computer games development. A big driving factor for recent advances in AI applications, particularly Machine Learning, is the availability of large amounts of data, thanks to social media and cloud-based IoT data acquisition systems. Machine Learning is a discipline of AI that focuses on making machines learn from experience (data) without the need for humans to explicitly program the machines. In order to achieve this, machine learning systems need to undergo a 'training' process using the datasets – usually the more data, the better.

ENGINEERING APPLICATIONS

In engineering, one of the early areas of AI application is in control systems, giving rise to systems such as neural fuzzy control, genetic control, and expert systems. The last decade or so has seen more and more applications of machine learning and AI in different engineering sectors. For example, AI and machine vision is the key technology behind automated visual inspection systems in manufacturing engineering. In automotive engineering, research into self-driving cars has become one of the foremost areas of focus for most companies in the field. In electrical power systems, AI has been able to make load forecasting, control, and protection systems more efficient and effective. In construction, AI has been used in everything from cost estimation and prediction to the more technical areas of geotechnics, structure strength analysis and bridge structure designs.

However, the availability of data for engineering applications still falls behind those in other areas. As discussed earlier, AI systems, particularly machine learning systems, are dependent on datasets for their accuracy and effectiveness. Engineers need to recognize the value of data beyond their respective areas. At the end of the day, we must be more open to the sharing of data for the greater good - to facilitate the development of AI techniques – which will ultimately produce better systems and tools for the engineers. ■

Route to MIEM & PE

Compiled by Ir. Dr. Mui Kai Yin PKT PJK

IEM Enhanced/Outcome Based Professional Interview (PI)

Background of Revised Professional Interview:

The IEM Professional Interview (Outcome Based Competence Assessment) started the evolution process back in 2014. IEM embarked on enhancing the existing Professional Interview (PI) Process and Practice as part of periodic review to improve quality. The objectives include:

1. Establishing a competency-based Professional Interview by benchmarking a well-established outcome-based competence standard.
2. Developing rubrics with common yardsticks for rating PI Candidate in order to minimize subjectivity of assessment in both the oral interview and the written papers.
3. Revising current PI process with related documentation to support the above-mentioned.

In benchmarking an outcome-based competence standard, IEM has opted to adopt and adapt:

1. The United Kingdom Standard for Professional Engineering Competence (UK-SPEC) for Chartered Engineers mainly for the oral interview.
2. The Institution of Engineering and Technology (IET) Model which is more generic and readily applicable to almost all engineering disciplines since IEM is the Institution that caters for all engineering disciplines.

The enhanced version retains the main structure of existing PI Process in that it consists of two essential parts:

- the documentary review and
- professional interview which is made up of oral interview and essay writing.

The Enhanced Professional Interview Process will undergo periodic review and changes in the continuous effort to enhance its quality and keep up with the most up-to-date development in professional engineering competence assessment.

Purpose of Professional Interview:

The main objective of professional interview is to assess candidate competency.

Competencies Categories:

- A – Knowledge and Understanding
- B – Design and Development of Process, System, Service and Product
- C – Responsibilities, Management and Leadership
- D – Communication and Interpersonal Skills
- E – Professional Commitment

Application Procedure:

Submit the following forms in duplicate:

1. IEM PI A100 (Professional Interview Application Form)
2. IEM PI A300 (MIEM Application Form)
3. IEM PI A401 (Training & Experience-Portfolio of Evidence)
4. IEM PI C300 (Development Action Plan)
5. Technical Report

Application Procedure:

Submit the following forms in duplicate:

1. IEM PI A100 (Professional Interview Application Form)
2. IEM PI A300 (MIEM Application Form)
3. IEM PI A401 (Training & Experience-Portfolio of Evidence)
4. IEM PI C300 (Development Action Plan)
5. Technical Report

Submit supporting documents:

- BEM Registration Letter/Certificate as a Graduate Engineer (for new applicant)
- Degree certificates and academic transcripts (Certificates from overseas universities issued in foreign languages must be accompanied by translation from University Registrar/Embassy Officials)
- Name will be circulated in IEM Bulletin for a month upon approval of application
- PI Application Fee

Application Fees:

- Processing Fee: RM 100.00 and
- PI Fee for Graduate Member: RM 200.00
- PI Fee for Non-Graduate Member: RM 300.00

Application Form:

The PI Guidelines and PI Application Forms can be accessed via the following link:

http://www.myiem.org.my/content/professional_interview-801.aspx

BLAST RESISTANT CONCRETE PANEL

Ir. Dr. Mohammed Alias Yusof, Ir. Dr. Norazman Mohamad Nor, Dr. Arifin Ismail, UPNM

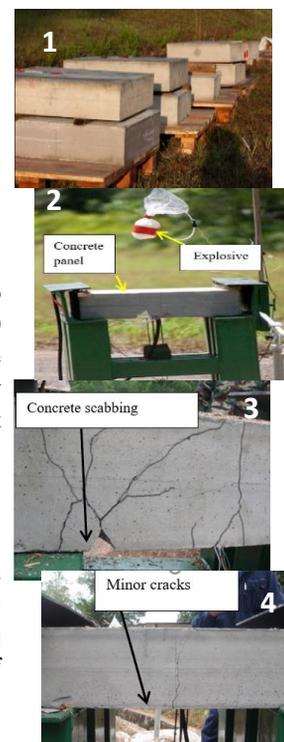
Blast resistant concrete was developed by the researchers from National Defense University Malaysia (UPNM) through some modifications made on the normal concrete mix with additional steel fibers. This new innovative construction material has obtained patent from Intellectual Properties Corporation of Malaysia (MyIPO) in year 2016. It has a compressive strength of 37 MPa and can resist blast pressure of 14.5 MPa from 1 kg of military explosive, namely the Plastic Explosive (PE4) with a standoff distance of 300 mm.

The blast resistant concrete panel is made of cement, coarse and fine aggregate, water and also hybrid hooked end steel fibers. The coarse aggregate is crushed aggregate with a nominal size of 10 mm. The lengths of the fibers are 30 mm for short fibers and 60 mm for long fibers. The fibers have aspect ratio of 80 for long fibers and 40 for short steel fiber with a tensile strength of approximately 1100 MPa. The concrete mix proportion is as follows: water/cement ratio: coarse aggregate/cement ratio: sand/cement ratio: fiber content(%) is 0.5:3:1.9:1.5.

Field blast test on the blast resistant concrete panel was carried out to determine the behavior of the concrete subjected to air blast loading, normal reinforced concrete panel vs blast resistant concrete panel. The blast test was conducted using military explosive (PE4) and the data was captured using a high-speed data acquisition system. Piezoelectric ICP® pressure sensor was used to measure the peak overpressure on the concrete panel. One (1) kilogram of Plastic Explosive (PE4) was molded into spherical shape and then suspended with the wooden frame using steel wire at a standoff distance of 300 mm.

Normal concrete panel which act as a control specimen has failed in shear and flexural modes. It has cracks at the back and rear face. Besides, a full depth inverted shear cracks greater than 4 mm appeared on the support and the concrete had crushed. It could not absorb the energy resulting from the explosive detonation and failed in brittle condition. On the other hand, there were only fine vertical cracks of width less than 1 mm at the mid span of the blast resistant concrete panel. The blast resistant concrete panel was able to resist a blast pressure up to 14.5 MPa at a distance of 300 mm from the explosion. ■

The authors are associate professors with the National Defence University of Malaysia.



Pictures above:

1. Typical blast resistant concrete panel
2. Field blast test set up
3. Failure pattern normal concrete
4. Failure pattern blast resistant concrete

Corporate Member Admission/Transfer of Grade from January 2019 to January 2020:

Membership No	Full Name	Grade	Discipline
24754	TING CHEK CHOON	FELLOW	WATER RESOURCES
29653	YEE HOOI MIN	FELLOW	CIVIL
95827	SITI NORAINI BINTI SULAIMAN	MEMBER	BIO-MEDICAL
103084	NOORASHRINA BINTI A.HAMID	MEMBER	CHEMICAL
105193	SYAMSUL RIZAL BIN ABD SHUKOR	MEMBER	CHEMICAL
33311	NUR AZWA BINTI MUHAMAD BASHAR	MEMBER	CIVIL
21643	CHAN HUN BENG	MEMBER	CIVIL
28923	THAM CHIN HORNG	MEMBER	CIVIL
36804	TAN CHOON JIN	MEMBER	CIVIL
37214	HAFEZAA DZULIEANAA BINTI MD. PUZI	MEMBER	CIVIL
38863	YAP WERN YIAN, MICHAEL	MEMBER	CIVIL
43916	HENG SHIN AI, SHIRLEY	MEMBER	CIVIL
45549	OOI ZI XUN	MEMBER	CIVIL
45840	MOHD ASHA'ARI BIN MASROM	MEMBER	CIVIL
47057	MOHD ZAIDI BIN MOHAMAD SAAD	MEMBER	CIVIL
51825	LIM JUIN KHYE	MEMBER	CIVIL
57620	OOI CHI HUI	MEMBER	CIVIL
58859	TAN TEIK NING	MEMBER	CIVIL
59944	FADZLI BIN MOHAMED NAZRI	MEMBER	CIVIL
103069	MUHAMMAD HARRIDZAN BIN ABDULLAH	MEMBER	CIVIL
104154	NUR INSYIRAHNADIA BINTI YAAKOP	MEMBER	CIVIL
104272	ISMAIL BIN ABUSTAN	MEMBER	CIVIL
105558	MASTURA BINTI IBRAHIM	MEMBER	CIVIL
105686	MOHD REMY ROZAINY BIN MOHD ARIF ZAINOL	MEMBER	CIVIL
107667	THANABALA A/L KRISHNASAMY	MEMBER	CIVIL
108319	CHEAH SHI YUN	MEMBER	CIVIL
21689	NEW HUANG CHIN	MEMBER	ELECTRICAL
34577	NORHAZIMI BINTI HAMZAH	MEMBER	ELECTRICAL
29054	AZHARUDIN BIN MUKHTARUDDIN	MEMBER	ELECTRICAL
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93810	WAN ABDUL AZIR BIN WAN MUSA	MEMBER	ELECTRICAL
103550	NOR ATIKAH BINTI MOHD SABKI	MEMBER	ELECTRICAL

Membership No	Full Name	Grade	Discipline
105559	MERLIZA BINTI MOHD KASSIM	MEMBER	ELECTRICAL
105691	MOHD NASSURUDDEN BIN KADER BAWA	MEMBER	ELECTRICAL
108222	KHAIRUN SYAZMIN BINTI ISMAIL	MEMBER	ELECTRICAL
108316	JAYVARMAA A/L RAJARAM	MEMBER	ELECTRICAL
96883	ALHAN FARHANAH BINTI ABD RAHIM	MEMBER	ELECTRONIC
103568	IRNI HAMIZA BINTI HAMZAH	MEMBER	ELECTRONIC
104246	MUSA BIN MOHAMED ZAHIDI	MEMBER	ELECTRONIC
105551	NOR SALWA BINTI DAMANHURI	MEMBER	ELECTRONIC
105553	EMILIA BINTI NOORSAL	MEMBER	ELECTRONIC
105576	ASLINA BINTI ABU BAKAR	MEMBER	ELECTRONIC
104109	MOHD ASHRAF BIN MOHAMAD ISMAIL	MEMBER	GEOTECHNICAL
51720	HASMALIZA BINTI MOHAMAD	MEMBER	MATERIALS
107673	ANASYIDA BINTI ABU SEMAN @ AHMAD	MEMBER	MATERIALS
32345	HUSNUL AMIR BIN TAJARUDIN	MEMBER	MECHANICAL
38004	MOHAMED FAZLY BIN EUSOFF	MEMBER	MECHANICAL
39219	MGT MOHD FIRDAUS BIN MGT MOHD MAHAIYIDDIN	MEMBER	MECHANICAL
41216	MOHD SAFARUL IZMI BIN SAIDIN	MEMBER	MECHANICAL
66385	ROZMAN BIN GHAZULI	MEMBER	MECHANICAL
69692	ISHAK BIN HAJI ABDUL AZID	MEMBER	MECHANICAL
70568	TAN CHEE HSIANG	MEMBER	MECHANICAL
88875	TAN SIEW AUN	MEMBER	MECHANICAL
89527	MOHD SAFARIZAM BIN ABDULLAH	MEMBER	MECHANICAL
104173	MOHD ASLAM BIN JUSOH	MEMBER	MECHANICAL
104592	NUR AZURA BINTI ZEOL	MEMBER	MECHANICAL
105682	AZWAN RIZAL BIN GHAZALI	MEMBER	MECHANICAL
23630	MOHD HAZIZAN BIN MOHD HASHIM	MEMBER	MINERAL RESOURCES
107670	NADRAS BINTI OTHMAN	MEMBER	POLYMER





From Left: Ir. Baddrul Hisham, Ir. Leng Boon Hock, Mr. Yee Tack Weng, Ir. Yau Ann Nian, Mr. Thomas Domanski, Mr. Chong Mun Fai



Organizing committee and the speakers

Geotechnical Engineering Seminar 2019

Reported By:
Ir. Khor Wei Huat

The Institution of Engineers, Malaysia (IEM) Penang Branch aims to promote the continuous enhancement of professional practice in geotechnical engineering and to increase the awareness of importance of geotechnical engineering in construction sector. Thus, on 23rd September 2019 at the Cititel Hotel, Penang, the Geotechnical Engineering Sub-Committee lead by Dato' Ir. Dr. Goh Teik Cheong organized the Geotechnical Engineering Seminar 2019.

The seminar presented six speakers of very senior and renowned engineers sharing their experiences with more than 80 participants. This was a highly anticipated seminar among engineers in Penang. It carries 6 BEM CPD hours.

The Speakers

1) **Ir. Baddrul Hisham.** Ir Baddrul is an experienced engineering geologist specializing in the field of geological and geotechnical engineering. His works involve soil investigation, terrain & rock slope mapping, geophysical survey, ground improvement as specialist contractor, and slope (soil and rock) stabilization, and geotechnical studies for private development project and public works as a consultant.

2) **Ir. Leng Boon Hock.** Ir Leng has more than 30 years of experience in structural and geotechnical engineering investigation and design. He has co-founded Geoscience Engineering Sdn Bhd and Perunding Petra (M) Sdn Bhd specializing in soil investigation, foundation engineering work and geotechnical engineering consultancy services.

3) **Mr. Yee Tack Weng.** Mr Yee is currently the Asia Technical Manager of TenCate Geosynthetics. He has over 35 years of work experience in geotechnical and geosynthetics

engineering and he was a founding member of the South East Asian Chapter of the International Geosynthetics Society. Mr. Yee has written more than 50 publications for seminars, conferences, and journals and is highly active in promoting the knowledge of geotechnical engineering.

4) **Ir. Yau Ann Nian.** Ir Yau is a senior engineer having 39 years of working experience in Civil Engineering. Ir. Yau is currently the Chairman of IEM (Penang Branch), and a Geotechnical Engineer in the team working on Guidelines of Hill Land Development for Jabatan Perancang Bandar Dan Desa (JPBD). He is a recognized Checker in Geotechnical Engineering with the Penang High Risk Development Area Committee and Majlis Bandaraya Pulau Pinang.

5) **Mr. Thomas Domanski.** Mr Domanski is currently the Regional Director of SEA Pacific of Bauer Spezialtiefbau GmbH responsible for Bauer's operations in Malaysia, Singapore, Hong Kong, Vietnam, Indonesia, Thailand, Philippines, and Australia. He has over 35 years of experience in Civil Engineering works. He was instrumental in developing new drilling and grouting techniques for Limestone and Granite Rock in Malaysia, developed ground improvement techniques for the region such as compaction grouting, stone columns, wet soil mixing techniques and Full Displacement Columns.

6) **Mr. Chong Mun Fai.** Mr Chong is a Civil Engineer who has been involved in the foundation testing industry since 1989. He is a certified PDA tester from Pile Driving Contractors Association (USA) with a MASTER level and has been doing foundation and structural testing for the past 30 years. At present he is the Managing Director of

Dynamic Pile Testing Sdn Bhd which he set up in 1994. In 2015 he established Smart Sensing Technology Sdn Bhd to facilitate testing using Fiber Optics Sensing.

The Topics

This seminar was conducted over two sessions covering seven topics, i.e. the morning and afternoon sessions. The morning session was moderated by Ir Ng Sin Chie whilst the afternoon session was moderated by Dato' Ir Dr Goh Teik Cheong.

Topic 1: Rock Slope: Geology and Engineering by Ir. Baddrul Hisham

Ir. Baddrul presented rock slope engineering which includes introduction of geology in Penang, rock slope field data collection, failures in the rock slope, the relationship between rock mass and the failure types. Ir. Baddrul also shared the types of rock failures and method of analysis typically used for determining factor of safety, stabilization and remedial of rock slope.

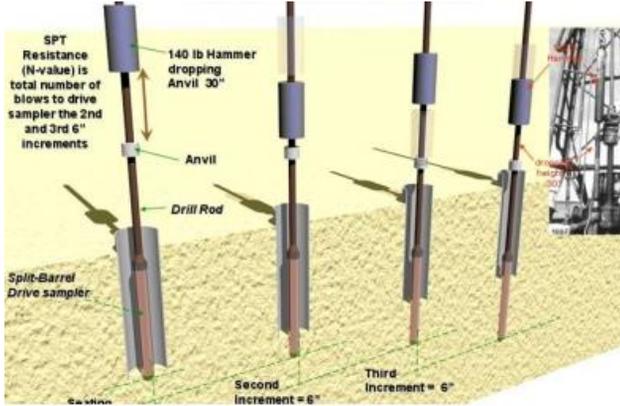


Different Types of Possible Rock Slope Failures

Topic 2: Soil Investigation by Ir. Leng Boon Hock

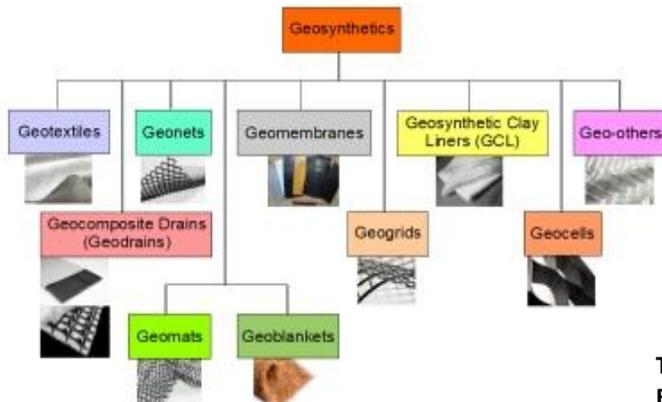
Ir Leng shared his experience and knowledge on various soil investigation (SI) techniques that commonly used in the market, as well as the types of laboratory tests. Ir. Leng emphasized on the importance of the SI work prior to design and actual construction of a project, citing that the purpose of SI is to determine the sub-surface soil strata strata, examine the engineering properties of the soil and rock for

establishment of parameters for slope, foundation, substructures, site formation and infrastructures design. Ir. Leng shared that very often the SI has often been overlooked, largely due to some developers' perception of the exercise as being a waste of fund, despite it being the smallest cost item of a development project. Other than that, lack of practical understanding of the subject by some consultants and those who used to design based on assumed parameters has also caused the importance of the SI to be overlooked.



Topic 3: Soil Improvement Through Mechanical Stabilization and Moisture Management using Geosynthetics by Mr. Yee Tack Weng

Mechanical stabilization of soil involves the use of high tensile modulus geosynthetics with good soil interaction properties to improve the performance of engineered soil structures e.g. slopes, embankments, subgrade foundations, etc. Mr. Yee shared that the development of high tensile modulus geosynthetics have revolutionized geotechnical engineering as it have been used to construct slopes at very steep angles; lead to the development of reinforced soil retaining walls that can be constructed higher and with many different aesthetical fascia; allowed embankments, highway pavements and railroads to be constructed over difficult soil subgrades and foundations. Mr Yee introduced the drainage geosynthetics for moisture management. More recently, high tensile modulus geosynthetics with enhanced soil moisture wicking capability have been used to stabilize roads over moisture sensitive subgrades



Classification of Geosynthetics

Topic 4: Hill Site Developments- Case Studies by Ir. Yau Ann Nian

There has been a significant increase in hill site developments over the past 30 years in Penang Island. This is especially due to the scarcity of flat land and the attraction of the aesthetic quality of the scenery and the unique environmental qualities that come with living on the hills. Hill site developments often associate with the safety and the stability of slopes, leading to serious public discussion and objections, as pointed out by Ir Yau. The irony is that hill sites can be safely and beneficially developed with proper planning, design, construction control and maintenance. Ir. Yau shared several cases of hill site development which he was involved with, emphasizing on planning of hill site development, design considerations, stability checks on hill slopes, methods of strengthening the hill slopes, construction control and slope maintenance.



Strengthening of existing slope using soil nails and grid beams

Topic 5: Offshore Bored Piling using Kelly Drilling for the Hong Kong Zhuhai Macau Bridge (HKZMB) & Topic 6: Deep Basements in soft Clays supported by Diaphragm Wall or Secant Pile Wall by Mr. Thomas Domanski

Mr. Thomas Domanski shared with the participants two projects dealing with the topics which have been completed successfully, namely the Bored Pile Foundation for the Hong Kong Zhuhai Macau Bridge in the deep-water section, and the new benchmark setting development in Thailand, the "One Bangkok" which has 4 levels basement retained by a permanent Diaphragm Wall. The sub-ground conditions of the site are typical for Bangkok consisting of a thick layer of soft marine clay over a lamination of sand and hard clay.



L: Drilling rigs for long bored piles
R: Aerial view of offshore bored piling

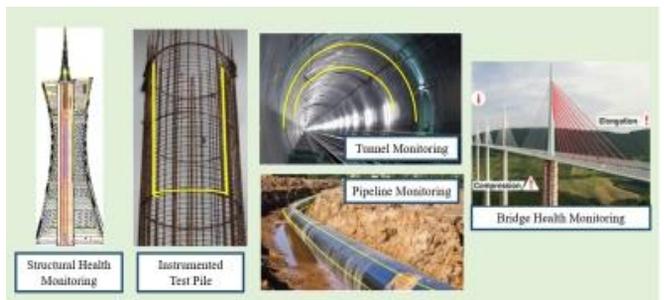
Topic 7: Application of Distributed fiber Optic Sensor in Civil Engineering by Mr. Chong Mun Fei

Recent technological advancement in optical fiber sensing has opened new ways in measuring strain in civil and geotechnical structures.

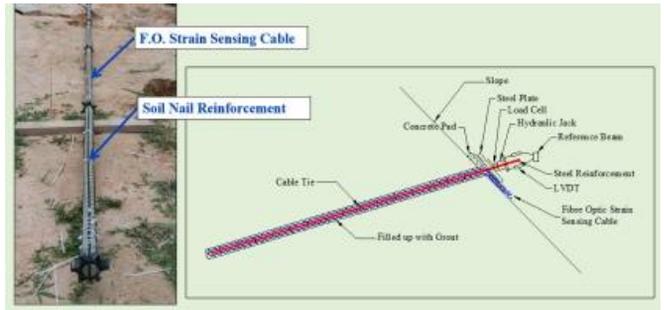
The distributed sensing, namely Brillouin Optical Time Domain Analysis (BOTDA) is a novel technique of measuring strain in a continuous manner which has a distinct advantage over conventional point-based sensors. Mr. Chong shared that the optical fiber sensors in the form of Fiber Bragg Grating (FBG) which used to measure localized strain (similar to VWSG), and due to its sampling frequency which is much higher (up to 5000Hz) we are able to utilize it to measure dynamic strain in structures. Mr. Chong shared an overview of the capabilities of the BOTDA and FBG optical fiber sensors in foundations and structural health monitoring. These instrumentations have been used in tunnels, soil nails, driven and cast-in-situ piles. And, the application of FBG in bridges in Malaysia.

Closing of the Seminar

The seminar ended at about 5pm after Q & A session and the presentation of Certificate of Appreciation to the speakers. It was an informative and good seminar. The participants and the organizing committee are looking forward to another seminar of the like in the coming year. ■



Applications of fiber optic in civil engineering



Application of fiber optic sensor in soil nail pull out test

Technical Talk on Industry4WRD: National Policy on Industry 4.0 A Competitiveness Catalyst for Malaysia Manufacturing Sector

At the invitation of IEM (Penang Branch), Ir. Dr. Tan Chee Fai gave a talk on “Industry4WRD: National Policy on Industry 4.0 – A Competitiveness Catalyst for Malaysia Manufacturing Sector” from 9:00 am to 11:00 am on 25th May 2019.

Ir. Dr Tan gave a briefing on the waves of technology revolution, mainly in agricultural, industrial, electronic, information technology, physical and cyber systems. He also showed the trends of industrial revolution, such as:1) faster pace, 2) convergence, 3) personalization & individualization, 4) borderless world & opportunities, 5) higher expectation, 6) cost effectiveness and 7) knowledge. Table 1 shows the past, current and future trend of industrial revolution.

Table 1 - Past, current and future trend of industrial revolution.

Past and Current	Future
Small groups of experts	Human centric
Hardware	Knowledge creation
Big capital environment	Software
Local markets	Small investment
Single specialization	Open Market
Manual/Semi-auto	Free Market
	Multi-disciplinary
	Automation/AI

Ir. Dr. Tan explained that I4WRD is included in RMK 11 Thrust 6 Strategy B2. The objectives of I4WRD are to attract stakeholder, create right ecosystem and transform industry capabilities

Table 2 – Malaysia has transformed from predominantly agriculture-based economy in the 1970s to a more diversified economy

Sector	GDP Contribution (%)	
	1970	2017
Agriculture	33.6	8.2
Mining	7.2	8.4
Construction	3.8	4.6
Manufacturing	12.8	23.0
Services	42.6	54.4

Reported by:
Ir. Ooi Zi Xun

Left:
Ir. Dr. Tan Chee Fai delivering his talk



Malaysia’s Economic Development Journey

The speaker also explained the factors affecting business performance by beneficial sectors, i.e. domestic competition, lower domestic demand, Ringgit’s fluctuations, increase in prices of raw materials, governmental policies, manpower shortage, foreign competition, excess production capacity.

According to Malaysian Technology Strategic Outlook (MTSO) interview, I4 transformation drivers consist of global economic order, technology advancement, knowledge and skills, global supply chain, competitiveness, regulations, customer behavior etc. The speaker also shared some of the loans and grants available such as:

1. Soft Loan Scheme for Automation and Modernization (SLSAM)
2. Industry Digitalization Transformation Fund (IDTF)
3. Domestic Investment Strategic Fund (DISF)
4. Digital Transformation Acceleration Program (DTAP) Pilot Grant
5. Automation Capital Allowance (Automation CA)

Ir. Dr. Tan summarized the moving forward for I4WRD as follows:

1. increase female labour force participation rate to offset reduction in labour force,
2. gradual retirement and re-employment opportunities for post-retirement-aged workers,
3. improve productivity,
4. reform of the pension scheme,
5. elderly-friendly environment, encourage lifelong learning. ■

NATSUM 2019

The staple annual event of Young Engineers is back to the Pearl of the Orient...

Reported by YES of IEM Penang Branch

IEM Young Engineers National Summit, NATSUM 2019 was held on 4-7 July 2019 in George Town, Penang with 150 participants. This event is highly anticipated by young engineers coming together from different parts of Malaysia. of NATSUM 2019 at KOMTAR Auditorium. "We need more engineers not only in Penang but also in Malaysia as a whole, working together towards making Malaysia an advanced and developed country with high income economy while having highly skilled workers and professionals," said The Penang State Executive Councilor for public works, utilities, and flood mitigation, YB Zairil Khir Johari who officiated the opening ceremony YB Zairil.



Group photo at the opening ceremony

NATSUM 2019 conducted two insightful technical visits, i.e. to ViTrox Corporation Berhad in Batu Kawan and Penang Island City Council (MBPP) Smart City Surveillance Centre. ViTrox is specialized in developing machine vision system and automated optical inspection system for applications in semiconductor and electronic packaging industries. MBPP has installed a total of 767 CCTVs with facial recognition on the island. Their Smart City Surveillance system links with the police using AI technology to reduce crime rate and improve public safety in the state.



Participants taking part in Heritage Hunt at the World Heritage Site of George Town



"IEM" posture in front of George Town city hall

FEES (Future Engineers Engagement Session) was another highlight of the submit. It was the first time NATSUM opens to secondary school students (Form 4 and 5) and pre-university students (Form 6) to take part. FEES also exposed students to firsthand information on engineering career through talks, experience sharing, and interactive sessions with the young practicing engineers.

The closing dinner for the summit was uniquely held at the highest spot in Georgetown Heritage Site, at the 60th floor of KOMTAR amid the beautiful sunset and stunning panorama view of Penang island. Highlight of the night was the announcement of outstanding branch/student sections awards. This year, the outstanding awards go to:

The yearly YES branches and Student Sections meeting during NATSUM 2019 yielded the following key decisions:

1. NATSUM 2020 will be hosted by Southern Branch, followed by Sabah branch.
2. Branches agreed upon a common month for organizing NATSUM every year.
3. A common YEAFEO fund which helps subsidizing participation costs for each branch was set up.
4. Previous proposal where council seats were to be filled by representatives from other branches was scrapped due to by-law restrictions.
5. Standardized ecards among all branches to continue.

- | | | |
|--|---|--|
| Outstanding Student Section Session 2018/19: | ➡ | Universiti Malaysia Sarawak
Swinburne University of Technology Sarawak
Universiti Sains Malaysia |
| Outstanding IEM YES Branch Session 2018/19: | ➡ | YES Penang Branch
YES Sarawak Branch
YES Miri Branch |

Women Engineers' Networking Day

Reported By: Ir. Heng Lee Sun

From the Board of Engineers Malaysia's statistics, out of the 26% female graduate engineers in Malaysia, only 6% of this group are professional engineers. When talking about the subject of engineering, rarely do we picture women at the center of the conversation. Many women shy away from engineering because engineering is seen as a man-predominant field and a physically demanding career, with the impression of hardcore tasks such as working under hot sun, dealing with construction site risk etc.



Women engineers networking luncheon

More challenging for women engineers?

Yes, indeed. It is not easy to get hold of or even get in touch with women engineers in the engineering fraternity after they have got married and started their family. Women engineers do have extra challenges and responsibilities because they have to take care of their families after works like cooking, babysitting, guiding their children on schoolwork etc. There have been cases of women engineers switching careers after settling down simply because they have no one to turn for help whilst they would not scarify their dedication towards family.

This is exactly why IEM sets up a WE sub-committee, to urge lady engineers to come together and join as members of the sub-committee, to support IEM in general and each other in particular. IEM is here to lend support to women engineers too when it comes to matters pertaining to engineering profession. Having networking sessions is one way to lend support and encouragement among each other in terms of coping with the demands in the workplace, juggling between work and family, besides contributing idea and resources to IEM in organizing activities. Sometimes, things that appear impossible to you will take on a different light when you see someone else achieving success on the same matter and share with you.

First networking session...

IEM Penang Women Engineers (WE) have their first gathering and networking session on 12th October 2019. More than ten women engineers ranging from young engineers to mature Professional Engineers attended the networking session. Although it was a small group gathering, we managed to share and discuss during the networking session before we went back with some key points and suggestions which will be implemented in the coming year.

We discussed about the engineering profession, activities on career talk which will be extended to the secondary school, organizing technical talks and mentoring guidance among women engineers, corporate social responsibility and many other voluntary roles which can be achieved through supporting each other, and help to garner good bonding with the next generation in our society.

In writing this article, I would like to urge and say: "Lady engineers, please join WE platform and help us to transform a better WE in IEM Penang!"



Women Engineers posing beautifully during networking

FORUM

IEM PENANG HOSTS ASEAN ELECTROTECHNICAL SYMPOSIUM & EXHIBITION

Reported By:
Ir. Paul Phor PJK



Guests of honor, speakers & organizing committee

IEM (Penang Branch) collaborated with IEM HQ, Malaysia EETD (Electrical Engineering Technical Division), Standard Malaysia and Suruhanjaya Tenaga (ST) hosted the ASEAN Engineering Inspectorate (AEI) Mid-Term symposium on 5th December 2019 at Bayview Hotel, Penang. It was a successful technical sharing session with local and ASEAN technical personnel in electrical engineering and installation works. 120 engineers, technicians, contractors and local government agencies attended the symposium. IEM President Ir. David Lai Kong Phooi, IEM (Penang Branch) Chairman Ir. Yau Ann Nian, Standard Malaysia Senior Director of Standardisation Mr. Hussalmizzar bin Hussain and IEC Regional Director Mr. Dennis Chew graced the occasion.

AEI (ASEAN Engineering Inspectorate) is a working task force under AFEO (ASEAN Federation of Engineering Organizations) to propagate the initiatives to synergies electrical installation works and industry practices among ASEAN countries. The task force's primary objective is to drive for standardization and harmonize the electrical installation works in local authorities and industry practices in each ASEAN countries. The symposium is deemed as an effective platform for various stakeholders to share their experience and challenges. The invited speakers from ASEAN countries showcased their field of specialty and competency. AFEO shall advocate the resolutions of the symposium among ASEAN countries' governmental agencies for adaptation and adoption.

Mr. Dennis Chew, IEC Regional Director for the Asia-Pacific Centre, conducted an overview of the IEC practices and encouraged participants to actively involved in standards development. Ir. Yau Chou Fong, Chair of ASEAN Engineering Inspectorate –Electrical Installation (AEI-EI) delivered a topic on Asean Engineering Inspectorate – Electrical Installation, reporting the latest AEI-EI Blueprint progress, and key-findings of each ASEAN country member. In Special Location Installation Forum, the panel speakers provided the latest updates on standards and regulations applicable in low voltage electrical installations within special locations. This forum consists of representative from ASEAN Country, Ir. Ng Win Sau (Malaysia), Mr. Bounthavee Chantanguen (Laos), Dr. Tran Thanh Son (Vietnam), Er. Lim Say Leong (Singapore), Mr. Anggoro Yudho Nuswantoro (Indonesia), Mr Khin Maung Win (Myanmar), Mr Prassit Hemwarapornchai (Thailand). Electrical Installation Technical Sub-Committee (TSC EI) presented three topics through Ir. Simon Leong (Brunei- Terms and Definitions); Dr. Florigo Verona (Philippine- Energy Efficiency) and Mr. H.E Ly (Cambodia-Prosumer Low Voltage Electrical Installation). The symposium continued with presentation from Mr Suwit Srisuk (Thailand-Grounding System for Electrical Installation) and Ir. Francis Xavier Jacob (Malaysia-Energy Efficiency Regulations and Minimum Energy Performance Standards) (MEPS). Last topic of the day was from Ir Lee Cheng Pay, who presented Malaysia Electrical Installation Codes. This symposium has allowed local engineers to network with many ASEAN delegates to further explore the opportunities for future collaborations in electrical installation works. The engineering fraternity anticipates better business prospect within ASEAN region in electrical engineering.



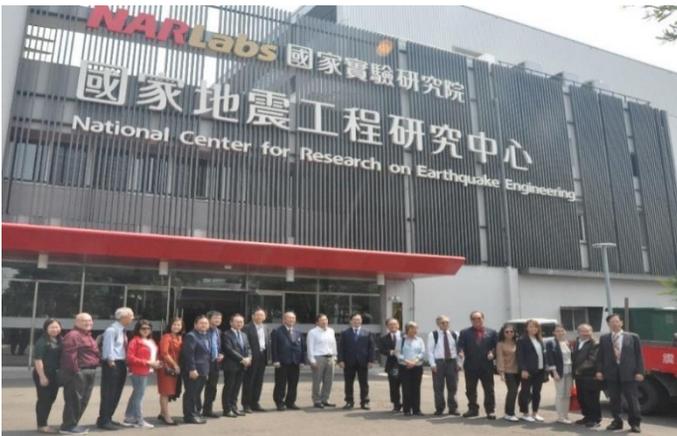
Left: Attendees of the symposium

TECHNICAL VISIT TO TAINAN, JINMEN AND XIAMEN

Reported By: Ir. Assoc. Prof. Dr. Leo Choe Peng BCN

IEM Penang Branch held a technical visit to Tainan, Jinmen in Taiwan, and Xiamen in China from 12th March to 18th March 2019. Twenty-two participants include IEM members and spouses joined the visit. The IEM members are Ir. Yau Ann Nian, Ir. Tiu Jon Hui, Ir. Khoo Khoon Tai, Ir. Heng Lee Sun, Ir. Paul Phor Chi Wei, Dato' Ir. Dr. Goh Teik Cheong, Ir. Dr. Leo Choe Peng, Dato' Ir. Lim Kok Khong, Dato' Ir. Tan Yew Thong, Ir. Teh Kiak Seng, Ir. Lai Fook Hoy and Ir. Pheh Guan Choon. The delegation first touched down in Tainan which is at the south of Taiwan island before taking a domestic flight to Jinmen, a small island just south of Fujian Province of mainland China, and finally by ferry to Xiamen. I have been tasked as the tour coordinator for the trip.

On the first day, the delegates visited a private museum, Chimei Museum which has been named by Forbes magazine as having one of the world's most surprising art collections. We later headed to Xiaobei Night Market to enjoy the local food. On the next day, we began our technical visit to National Cheng Kung University. Prof. Kuo Chen-Ming, the Dean of Civil Engineering Faculty gave the group a briefing of the Department of Civil Engineering while Prof. Tsai Jiin Song explained on the retrofitting of a classroom with Japanese architectural elements. Then, the delegates visited NCREE (National Centre for Research on Earthquake Engineering) Tainan Laboratory to understand earthquake response simulation based on an 8 m × 8 m high-speed long stroke triaxial shaking table.



Top:
At the
NCREE,
Tainan.

Left:
Ladies
having
good
time...

We learned on dynamic high axial load tests using a high-speed Bi-Axial Testing System (known as BATS). After the technical visit, we visited historical buildings on Anping Old Street and Fort Zeelandia, which is built by the Dutch in 1600s. We also managed to visit Chihkan Tower and Confusion Temple before heading to Jinmen on the following day.

The flight to Jinmen took about an hour. For most of us, although Taiwan has been a frequent holiday destination, this was our first visit to Jinmen. This is a small island closer to China than Taiwan and used to be a strategic military beachhead for Taiwan before opening up for tourists. We visited the 700-year-old community of Shuitou Village features one of the best collections



Bi-Axial Testing System (BATS)

of old houses, with both Chinese and Western styles. We also visited Juguang Tower, a memorial building with a small military museum as well as Chastity Arch for Qiu Liang-gong's Mother, a historical arch that was constructed in 1812. At Mofan street, the delegates enjoy food in the special buildings with brick exteriors and arched door fronts modelled after the Japanese, Fujian and Western architecture. We proceeded to Successful Tunnel after visiting Chen Jian-lan Wester House. We learned on the construction of Successful Tunnel which used to provide shelter to protect boats from bombardment and allowed for the safe unloading of military supplies.

We visited GuNingtou Museum, Ci Lake and Shuangli Wetlands Nature Center before ending our Jinmen itinerary with the visit to another military tunnel, the Zhaishan tunnel. This tunnel is 101m in length, 6m in width and 3.5m in height. It has in it a water canal of 357m long, 11.5m wide and 8m high which can accommodate 42 boats. There are seven rooms inside the tunnel serving as barracks.

Taking a ferry, we crossed the narrow strait and reached Xiamen in mainland China in about 30 minutes. This is a city with modern buildings and structures. However, the delegates enjoyed most the visit to Nanputuo Temple with traditional architecture element of Southern Fujian. We took a break on a pedestrian-only island off the coast of Xiamen, the UNESCO World Heritage Site of Gulangyu Island, the delegates visited buildings of the 19th-century European style as well as Shuzhuang Garden with magnificent seascape. On the mainland, we went to Tianluokeng Tulou Cluster, which consists of four magnificent round earth buildings and a square

earth building. These made of earth buildings are more than 700 years old and have been surviving through centuries until present days. They are one of the most unique architectures we encountered in this visit. Finally, we visited Yuchang Building and Taxia Village before heading home.

This visit not only enhanced our technical knowledge on the architectural and engineering of Chinese buildings and infrastructures, but also improved our understanding on Chinese culture. Most importantly, we met friends and created sweet memories together. ■

Compiled By: Ir. Teh Khian Beng

LOL...

1. Choices

Two engineering students were crossing campus when one asked the other, "Where did you get such a great bike?"

The second engineer replied, "Well, I was walking along yesterday minding my own business when a beautiful woman rode up on this bike.

She threw the bike to the ground, took off all her clothes and said, "Take what you want."

"The second engineer nodded approvingly, "Good choice; the clothes probably wouldn't have fit."

2. The Optimist, the pessimist & the Engineer

The Optimist, the Pessimist, and the Engineer

The optimist says: "The glass is half full."

The pessimist says: "The glass is half empty."

The engineer says: "The glass is twice as big as it needs to be."

(source: Vincent Charbonneau posted on June 22, 2017 in engineering.com)

SNailKitchen

Ir. Tean Sze Nee PJK

1..Salted Egg Yolks Biscuits

Ingredients:

4 salted egg yolks (steam 15 minutes)
120g butter
60g icing sugar
180g flour
20g corn flour
1/4 tsp baking powder
3/8 tsp salt

Surface decoration:

1nos Egg yolk
1tsp Water

Handful white sesame seeds

(Recipe =81pcs cookies=(3cm Flower Cookie Cutter)
Convention Oven 180C-20minutes)



Steps:

1. Salted egg yolks steam for 15 minutes and mash it
2. In a bowl, add in flour, corn flour, baking powder & salt. Mix well.
3. Beat the butter till soft and fluffy with icing sugar.
4. Add in 2) into 3) and mix it.
5. Add in 1) into 4) and beat slightly to mix it.
6. Make 5) into a dough and put inside the fridge for 1 hour.
7. Cut the dough into shape with cutters.
8. Decorate 7) with egg yolk and sesame seeds
9. Preheat oven and bake the product with 180c for 20 minutes.

2..Pumpkin Ondeh-ondeh



Ingredients:

Steamed Pumpkin 120g
Glutinous rice flour 150g
Corn oil 1tbsp
Water 100g
Melaka coconut sugar 1 bowl
Shredded coconut steamed with salt 100g

Steps

- 1) Steam the pumpkin and mash it
- 2) Add in 1 tbsp of oil and glutinous rice flour and mix well.
- 3) Add in suitable amount of water
- 4) Make it into a dough
- 5) Make the dough into balls after add in the coconut sugar
- 6) Steam the shredded coconut with salt for 5 minutes and put aside.
- 7) Cook 5) with boiling water, take out the balls when they float on top of the water,
- 8) Coat balls with shredded coconut and serve

Ir. Tean Sze Nee is a Civil Engineer who love cooking, baking, and travelling. In her spare time, she loves to try out new recipe and share "ko cha bi" (traditional taste) with her family members and friends.

Follow her at: Youtube: SNailKitchen

Facebook: SNailKitchen





Left: Construction of underground MRT station.

Right: Group photograph at the site

On 24th July 2019, the undergraduates from Universiti Sains Malaysia (USM) and King Mongkut's University of Technology Thonburi (KMUTT) visited the Bangkok MRT Orange Line Project construction site located at the main office of Mass Rapid Transit Authority (MRTA). The visit was organized by IEM-USM Student Section as part of the student mobility program with KMUTT. We were shown the underground tunnel construction using the Tunnel Boring Machine (TBM). There are two types of underground tunnel structures in the east MRT Orange Line, the horizontal and the stacked twin bored tunnels. Some of the stations are built underground while some are elevated structures, depending on the suitability of the location. Another main civil work structure is the intervention shaft,

which serves to relieve air pressure from the tunnels as well as acting as an emergency exit. We were briefed that the authority pays great attention to the safety features, cleanliness, and orderliness at the construction sites. The MRT Orange Line will improve the traffic condition in Bangkok with limited available roads surface and helps to reduce the dependence on oil import which will benefit the people of Bangkok. This visit was a rare opportunity for the future civil engineers to get the industry exposure and to learn about the construction technologies in overseas. The interaction and exchange of knowledge was meaningful between the students of the two countries. ■

Reported by Ching Meng Xuan, IEM-USM Student Section

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