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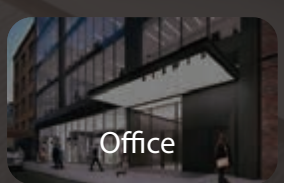

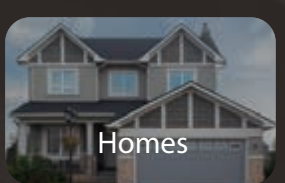

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COVER NOTE

IEM CONNECTS

by Ir. Prof. Dr Leong Wai Yie
Chairman, Standing Committee on Information & Publications

This month's cover story highlights IEM Connects, professionals, member value and engagement as well as those who exemplify fresh thinking and embrace new strategies to thrive.

We talk to economists to find out what's in store for the coming year and we look at words added to our daily vocabulary: Zoom, social distancing, quarantine etc.

One thing is clear. In 2021, we will continue to amplify our reliance on technology, particularly in work-from-home environments, schools, entertainment and manufacturers which have implemented automation solutions to increase efficiency and to offset the loss of skilled workforce.

As we mark one year of pandemic life, there is much to strategise: Branding, recovery, economic growth and the longing for shared experiences. There are reasons for hope. We have learnt and innovated. We rejoice in simple pleasures. We recognise the things we cherish most about IEM Connects and how excited we will be to get back to them.

This month, we honour and articulate it all. Together, I believe we can go beyond our roles and transcend to be a more robust professional institution with a multifaceted role in all aspects of engineering.

Lastly, the Editorial Board wishes all a safe and healthy year. Let us continue to engineer our country to greater heights! ■

EDITOR'S NOTE

CELEBRATING LABOUR DAY

by Ir. Dr Bhuvendhraa Rudrusamy
Principle Bulletin Editor

At the height of the Industrial Revolution in the 19th century, labourers had to work 12-hour days and 7-day weeks to earn the necessities for basic living. Often, they also faced unsafe working conditions, poor sanitary facilities and little access to fresh air. All these resulted in rallies, strikes and protests to better the welfare of the workers.

The first thing that workers demanded was an 8-hour work day. The struggle for better welfare continues and the world celebrates International Workers' Day in May to honour the sufferings and struggles of labourers in the past. Malaysia also observes Labour Day on May 1.

Eight-hour Day Monument, Russell & Victoria Streets, Melbourne, Australia.
Source: https://www.monumentaustralia.org.au/themes/culture/social/display/32235-eight-hour-day-monument

This month, *JURUTERA* reflects on the challenging terms of the past and moves into the future with a fresh mindset. As engineers, we should embrace the well-planned strategies of IEM and society.

On behalf of the Editorial Board, I would like to wish everyone a restful Labour Day and to our Muslim members, Selamat Hari Raya Aidilfitri. ■

62nd PRESIDENTIAL ADDRESS

"IEM Connects"

Ir. ONG CHING LOON
SESSION 2021/2022

Respected Past Presidents, Immediate Past President, Deputy President, Council Members and fellow IEM Members,

Nine months have passed since I stood before you in this auditorium and was installed as the 35th President of our beloved Institution. I am deeply honoured to be in the long line of esteemed and respected Presidents who have served IEM. I am extremely grateful to the Executive Committee, Council and IEM Members for the support given to me in the past nine months. It has been an unforgettable experience.

My Fellow Engineers, Ladies and Gentlemen,

Last year, I presented a Presidential Address on the topic "Augmenting IEM" – focused on continuing the efforts of my predecessors to strengthen IEM's position as the largest professional learned society in the country. Please allow me to recap the 4 strategic goals which I had put forward at the time. They were:

1. To accentuate the Branding of IEM
2. To position IEM as the essential technical hub nationally and internationally
3. To increase member value and engagement
4. To adopt the new normal.

These goals were intertwined and had significant impacts on the masses, government and industry besides capacity building and engaging our Members both at headquarters and branches. They also helped to improve the financial position of IEM.

In engineering, we deal with different stakeholders, no matter which branch of engineering work we are in. Without professionals such as engineers, technologists and technicians, including engineers in disciplines other than our own, we would not be able to accomplish engineering duties like we do today. Therefore, it is important that we strengthen the professional cooperation and camaraderie between one another or, in technical terms, enhance the connectivity among us. Having said that, I have therefore framed the theme of my Presidential Address this morning as **"IEM Connects"**.

Allow me to elaborate on my focus or my "Connect Enables" on how to connect effectively with all stakeholders within IEM or externally. My strategic focus is divided into Internal Focus and External Focus.

Internal Focus

1. IEM Mobile App – IEMGo
2. Professional Practice Advisory Committee (PPAC)
3. Quarterly dialogue with YES and Branches

4. Promoting job gallery
5. Industry placement opportunities
6. IEM's own publications
7. Exciting and captivating benefits for Members
8. Increase the use of virtual training, seminars and meetings
9. Embracing technologists and technicians with open arms

External Focus

10. Inaugural IEM Convention and Engineer 2021
11. Engineers meet-the-public sessions
12. To promote and cultivate interest in STEM among schoolchildren with Adopt-A-School project
13. The proposed formation of Manufacturing Industry Organisation Presidents' Council (MIPC).

My Fellow IEM Members, Ladies and Gentlemen,

To connect is to bring together or into contact so that a real or notional link is established. To me, the surge of professionals working, learning and socialising online is at its absolute peak as we navigate the COVID-19 pandemic. The pandemic has forced us to appreciate more the value of social capital and our ability to interact with one another.

The real challenge within any organisation or professional institution often lies within the office, the internal stakeholders. To do this, I will need the support and involvement of all IEM Branches and the active participation of our Members. I have carefully developed a framework on how to achieve this and my focus in this area will be on:

1. Members
2. Branches
3. Secretariat

The COVID-19 pandemic has created the need for social distancing, quarantine and isolation so that vulnerable individuals are not exposed to the virus and that health care systems are not overwhelmed. Collectively, we understand the benefits of flattening the curve as we all do our part to slow the spread of the virus. COVID-19 is not the only epidemic we are facing. Separating ourselves because of COVID-19 comes at a time when Malaysia and many other countries are in the midst of an epidemic of loneliness – and the antidote is greater positive social connection.

Our current situation – the simultaneous need to reduce physical distance and to increase social or relational connection so as not to see a further rise in loneliness – presents a challenge for us all. Ignoring the need for connection at this challenging time is not an option. Now, more than ever, it is increasingly tangible how vital connectivity, communication and unity are in the face of adversity. The outbreak of COVID-19 has cast a spotlight on mobile technology, the enabler for so many of the services we now rely on. This is why it is my utmost pleasure to announce that we have launched our very own mobile app, IEMGo.

Connect Enabler #1: IEM Mobile App, IEMGo

In the age of low touch economy, more and more physical activities are now digitalised and have had to move online. In line with this unavoidable trend, we have launched IEMGo, an app that functions as yet another convenient platform for our over 52,000 Members to interact effectively and to share their thoughts.

The IEM mobile app is a personalised app which will help instill a sense of belonging among our Members, a one-stop app that Members can utilise. IEMGo will:

1. Provide information
2. Enable interaction between IEM Members
3. Connect Members with Members
4. Provide new income streams

The availability of the IEMGo app was announced on the IEM website and all IEM social media platforms to create greater awareness among our Members on the rolling out of this brand new service. At the moment, you can access the latest *JURUTERA* and IEM Journals with the app.

Moving forward, more services are in the pipeline, for instance the announcement of events such as meetings or forums and chatrooms specially created for each and every sub-committee to have discussions. Besides administrative functions, another very important feature is to facilitate business matching and job hunting as mobility and the career development of our Members are always close to our heart. This is a benefit for IEM Members only. We have discussed with the app developer, Silverlake Lifestyle Community Sdn. Bhd., it has agreed to make these possible .

Once the app becomes a thriving platform with a huge number of subscribers, advertising will be rolled out as another avenue for IEM to generate income and to further increase the quality of service to Members.

Hence, I urge all of you, esteemed IEM Members, especially those who have not downloaded the app, to do so today and start benefitting from its various functions.

Connect Enabler #2 – Professional Practice Advisory Committee

In response to requests from Branches, I have initiated a Professional Practice Advisory Committee to advise Members who face difficulties pertaining to engineering practice matters such as preliminary or general advice on legal matters.

I am very excited about the setting up of this additional service and hope it will further add value to the long list of benefits for IEM Members.

Connect Enabler #3 – Quarterly Dialogue with YES and Branches

The most difficult issues we face in life, whether in families, organisations, societies, nation states or as human beings, cannot be resolved by individuals acting alone, by elites acting autocratically or by factions acting in their own distinct and exclusive self-interest. They can only be resolved by coming together across our differences, listening and talking to each other, exploring

our disagreements, working collaboratively, reaching a consensus and deciding what to do democratically, in the best interest of everyone.

IEM has 12 Branches located in different regions of the country and sometimes, this gives rise to different ways of life and thinking. As such, I believe it is crucial for HQ and Branches to have positive and impactful dialogues to iron out the creases and to improve relations in this big family of ours. At the top Institutional management level, we have created the quarterly Branch Dialogue with the President to enable HQ to listen to problems faced by the Branches and to collectively look for the best possible solutions. I am extremely pleased with the cooperation exhibited by each respective Branch Chairman during the last session which has helped bridge communication between HQ and Branches.

For this session, I would like the Young Engineers Section (YES) to also adopt a similar model by engaging YES in the various Branches via quarterly dialogues to create the linkage to bind us and fundamentally, to strengthen the connection that will enable our young engineers to grow. It will also provide a platform for YES in the Branches to receive guidance and support as they grow to form the next generation of IEM leaders.

Connect Enabler #4 – Promoting Job Gallery

One of the main casualties of the COVID-19 pandemic is unemployment. It is estimated that more than 1 million workers will be unemployed. Through the Special Committee on COVID-19, we have initiated actions to enhance the IEM Job Gallery to facilitate employment opportunities for our Members and to provide an avenue for employer Members to recruit staff who meet their requirements.

Since last year, we have promoted the Job Gallery on our website. As of March 2021, we had posted 71 recruitment advertisements with over 3,000 views. We will continue to aggressively promote the IEM Job Gallery as THE platform to go to for job seekers as well as employers in the industry.

Connect Enabler #5 – Industry Placement Opportunities

In addition, I would also like to see IEM provide opportunities for engineering students seeking industry placement. This is something that HQ and all 12 Branches can provide to help groom our next generation of engineers. According to news reports, industrial training opportunities have been badly affected by the COVID-19 pandemic and many students face difficulty in getting industry placements.

If IEM can provide industry placement opportunities for Student Members, then we will be able to live up to the students' expectations of what we can do for them. All Branches are also encouraged to seek and promote industrial training opportunities for local students. I strongly urge Members who are willing to provide industry placement opportunities to get in touch with the IEM Secretariat.

Connect Enabler #6 – IEM's Own Publications

In my last Presidential Address, I mentioned that it was an opportune time to bring our own publications to another level. We have in the IEM structure, 18 Technical Divisions, 5 Special Interest Groups comprising experts in the respective fields and talents from YES and Women Engineers Section. IEM, as the largest professional body of engineers in the country, should be leading the industry, guiding engineers with our profound knowledge through guidelines, manuals, best practices, industry benchmarks and even IEM standards.

It is one of my aspirations for IEM to compile the immense knowledge and expertise of our talented Members in all engineering disciplines for publication as IEM handbooks to be adopted by the industry not just in Malaysia but also internationally .

With the vast pool of talents in our Technical Divisions and Branches, I am confident that we can produce many more IEM brand of guidelines, best practices, handbooks and standards for use by the industry. This will bring IEM to another level, which is where we should rightfully be , a referral point or resource centre for engineering standards or technical expertise.

Right now, we are in the midst of preparing the IEM Guideline on the Testing & Commissioning of Fire Protection Systems as well as the Engineering Guideline on the Prevention & Control of Dengue. As a matter of fact, the task force for the preparation of Engineering Guidelines on the Prevention & Control of Dengue is made up of representatives from the various Branches. I understand they had a very fruitful workshop recently, and discussed a number of issues related to the guidelines. It is my aim to realise this potential and to also generate some revenue for IEM in the near future.

Connect Enabler #7 – Exciting and Captivating Benefits for Members

While there are many benefits of being an IEM Member, we must remember that the force that drives any non-profit organisation is membership. Members are the ones who put in the time, energy and funds necessary for the organisation to exist. It is through the work of its members that a non-profit organisation can carry out its mission. Members are truly the heart of such organisations. We must understand the importance of membership and be reminded that, in order to have a positive growth in membership and to keep the organisation going strong, we need a steady flow of new Members. Recruitment is an ongoing process which requires a great deal of planning and well-thought-out strategies. To do this, we must devise ways to attract new Members and, at the same time, retain existing Members.

I strongly believe we should come up with new exciting benefits, such as enlisting more merchants from other parts of the country as partners, so as to offer more benefits to current Members and to attract new ones.

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BUILDING TRUST

With the right benefits, I believe we will see an increase in Member engagement and, hopefully, an increase in membership as well.

Since the start of the MCO, IEM had ensured that we stayed connected to Members through regular circulars issued with information on the various stimulus plans such as Prihatin, Penjana, Kita Prihatin, Permai and Pemerkasa as well as various other policies and SOPs. These are intended to help keep our members abreast of the various incentive packages offered by the government as well as procedures, restrictions, guidelines etc. in the implementation of work processes and business related matters. A total of 18 circulars have been issued to Members and we hope these have been of help to them. Those who have missed these circulars can still check them out on the IEM website.

My Fellow IEM Members, Ladies and Gentlemen,

None of us lives in a silo. Many levels of connectivity have always existed between us. For a start, we shall enhance the connectivity between the HQ and Branches. As IEM President, I have worked hard to foster closer cooperation between HQ and Branches. I have tried to understand the challenges faced by the Branches and have strived to create more collaborations where the HQ and Branches can work hand-in-hand.

I believe all issues from the Branches need to be heard and resolved together. This is why I have instituted a new practice or a segment in the Excomm agenda whereby some time is dedicated to the discussion of Branch issues at every Excomm meeting. I am proud to say that, from this initiative, a number of issues brought up by the Branches have been looked into and resolved, including:

- Accreditation of IEM events by PE Board of Singapore for granting of CPD
- Setting up of the Professional Practice Advisory Committee
- Electronic balloting for Branches
- Increasing Branch subsidies
- Recorded webinars to be re-screened at Branches for the benefit of members from the respective States.

Various collaborations have been instituted with the Branches, so as to provide more activities for them.

Collaborations with the respective local governments will still be the cornerstone of our efforts to promote IEM. Continuing with the achievements of IEM in recent years, my focus this session will be on connecting with State Governments. It is my fervent hope that our Branches are able to be engaged by the State Governments to address the concerns of various technical issues in engineering services at State level. I would like to suggest that each Branch strives to sign at least 1 Memorandum of Understanding with 1 local council or agency every year, so as to foster closer collaboration. It will be great if you can offer them something beneficial, such as training/ workshops on managing municipal matters or to provide technical guidance and advice. This is the most direct way for engineers to engage with the local community and to uplift the livelihood of our fellow countrymen.

There is also the connectivity between IEM and other professional bodies through various joint initiatives such as the Building Industry Presidents Council, Malaysian Service Providers Council, Balai Ikhtisas Malaysia and many more, where IEM is well represented and participates actively.

We also have to stay in touch with our counterparts in the region through regional organisations such as the ASEAN Federation of Engineering Organisations (AFEO), Federation of Engineering Institutions of Asia & the Pacific (FEIAP), Federation of Engineering Institutions of Islamic Countries (FEIIC) and the World Federation of Engineering Organisations (WFEO), because it is beneficial to all of us to learn from one another. It will also enhance IEM's visibility in the international engineering fraternity and provide better prospects for our members to gain recognition overseas.

IEM has also maintained connectivity with various government authorities such as the Ministry of Works (KKR), Ministry of International Trade & Industry (MITI), Public Works Department (JKR), Construction Industry Development Board (CIDB) and many more. Our representatives serve in these agencies in various capacities and provide feedback from IEM and our members for the benefit of the industry.

My Fellow IEM Members, Ladies and Gentlemen,

Almost everything around us has gone digital since the beginning of this century and the COVID-19 pandemic has only served to hasten the pace for digitalisation of services. This year, in keeping up with this modernisation pace, IEM embarked on e-balloting for the IEM Council vacancy elections for the first time. This e-balloting mode will not only make it more convenient for members to cast their votes but it will also reach members faster and be much more cost efficient. After having completed the e-balloting exercise at HQ level this year, we will be assisting Branches to convert to electronic balloting as well. Branches will be in control of the election exercise while HQ will assist to provide the e-ballot platform.

Connect Enabler #8 – "Increase the use of virtual trainings, seminars and meetings"

At my Presidential Address 9 months ago, I mentioned that one key activity would be "to increase the use of virtual trainings, seminars and meetings".

I am proud to inform that this initiative has been a resounding success. Our investment on hardware, Zoom licence and GoToWebinar licence was good judgement. As of 31 March 2021, IEM had organised a total of 273 webinars with attendance by 29,211 participants clocking a total of 586 CPD hours. We are greatly encouraged to see a strong participation by Members from all 12 Branches. Interestingly, we even had participants from overseas. To me, this is an awesome achievement and I assure you that

IEM will continue to organise more and better webinars for our Members.

Last year, meetings at IEM were mostly conducted virtually and we noted that participation was much better as Members could just click in to the virtual platform to join in the meetings instead of rushing to reach IEM on time or getting stuck in traffic jams on the way. In fact, for the first time in IEM's history, the IEM Council had a completely virtual meeting on 18 January 2021, with very good participation from the Council Members!

Connect Enabler #9 – IEM embraces Technologists & Technicians with open arms

To enhance the professionalism of all technical personnel in the engineering value chain under one roof, two weeks ago, IEM has officially launched 4 new membership grades specifically for engineering technologists and engineering technicians.

If you may recall, the AGM had approved the amendment to the IEM Constitution to include these 2 categories of engineering personnel. The amendments were subsequently approved by Corporate Members via postal ballot and thereafter by the Registrar of Societies on 6 November 2020.

As you might also be aware, the Registration of Engineers Act (REA, or Act 138) was amended (in 2015) to acknowledge the crucial role played by a highly skilled engineering fraternity in nation building and economic development, which comprised engineers, engineering technologists and engineering technicians.

As a professional learned engineering institution, it is IEM's duty to ensure and uphold the professionalism of all in the engineering industry. With the inclusion of engineering technologists and engineering technicians into IEM, we will be able to extend the right guidance and assistance to these 2 groups as they are the ones responsible for bringing the designs of engineers to fruition. IEM will also look into providing a pathway for their professional development, just like what we have done for the engineers.

IEM has applied for provisional signatory to the International Engineering Technologist Agreement (IETA) and the Agreement for International Engineering Technicians (AIET). Once accepted, the door to cross-border practice will be opened to engineering technologists and engineering technicians, offering new Members an avenue for international recognition and greater mobility.

It is my sincere belief that, by coming together in IEM and creating a stronger synergy across the entire engineering ecosystem, Malaysia will march forward in spearheading the transformation made possible by the 4th Industrial Revolution and become a developed nation empowered by sustainable economic growth. To Engineering Technologists and Engineering Technicians, we say "Welcome Aboard"!

Expanding IEM Revenue Stream

As I mentioned last year, we need to be creative in generating income for IEM. For the last 62 years, IEM has depended largely on Member subscriptions which makes up at least 60% of our total income. I feel that IEM needs to diversify its income streams in order to sustain itself in the years to come.

I have said that I would like IEM to produce and publish handbooks, codes of practices and guidelines for use as reference materials by not only engineers but also by others related to the engineering profession. Besides being a branding exercise, these publications can also be another income stream for IEM. Many established engineering institutions worldwide have notable journals and publications which contribute a major portion of their income, thereby enabling them to be less dependent on member

subscriptions for sustainability. I will continue to strive towards moving IEM along this line and yet, not forget our roots as a professional learned society that is inclusive and non-biased.

One main focus of my income diversification efforts was the introduction of IEM's very own exhibition, known as ENGINEER. Scheduled to happen in 2020, it was derailed by the COVID-19 pandemic but we are back to make it a reality this year.

Connect Enabler #10 – Inaugural IEM Convention and Engineer 2021

My Fellow IEM Members, Ladies and Gentlemen,

ENGINEER will be a significant event for the engineering community as it will be a platform to elevate the profession and industry as well as showcase the future of engineering. Besides reinforcing our IEM brand, the exhibition will be the anchor event under the umbrella of IEM Convention to showcase to the public and industry, the might of Science, Technology, Engineering & Mathematics (STEM). Most importantly, this is our flagship event and will be the go-to event for the engineering community moving forward. With great potential for learning and collaborations across disciplines, ENGINEER will be a truly unique and exciting platform for engineering professionals in Malaysia and the region.

It is my fervent hope that the event, besides being a part of my Income Diversification plans, will also grow to be an IEM brand in the region in years to come.

Connect Enabler #11 – Engineers Meet-the-Public Sessions

Based on the Key Results Areas (KRA) that I have developed, IEM has to engage with the public in more activities so as to have greater interaction. The Standing Committee on Corporate Affairs is planning an Engineer Meet-the-Public Session where IEM can offer advice to members of the general public who may be troubled by problems related to engineering.

Everything we rely on in this modern age has been created by engineers and it is not an exaggeration to say that engineering is deeply embedded in our everyday lives. In fact, very few of us will prefer a life without the comforts of modern amenities such as electricity, the Internet and transportation.

There will therefore be areas or instances when an IEM Member or a member of the public faces a problem perceived as related to engineering but is uncertain about who to approach or where to go to for advice. This is where IEM can step in. As a professional learned society, IEM should be there to help people who need advice on problems related to engineering. With a whole battalion of experienced experts from the various engineering disciplines, IEM is certainly well-poised to offer suggestions or give advice to those in need of help.

In my opinion, this community service will elevate the profile of engineers among the general public and improve our image in their eyes. But more importantly, it will help the general public to understand the problems and hopefully assist them to find a solution.

Connect Enabler #12 – Promoting & Cultivating Interest in STEM among Schoolchildren with Adopt-A-School project

From reports issued by the Ministry of Education, we know there was a decline in interest in Science and Mathematics among schoolchildren. In 2019, only 44% of students chose STEM related streams compared to 48% in 2012. This decline will affect the supply of technical personnel for the engineering industry in the future which, in turn, will hinder the country's progress towards becoming a developed nation. IEM is aware of this and, over the years, we have actively promoted STEM education in schools. Over the last year, various promotional activities were initiated to stimulate the interest of students and to expose their young minds to the wonders of science and technology.

For the coming session, I would like to see IEM, especially the Branches, take up the Adopt-A-School project challenge. Members can adopt a certain school to offer their support and to work with the schools on initiatives to promote greater interest in STEM.

I am aware of Branches which have conducted wonderful projects for students to learn to design digital devices with Arduino controllers, robotics exposure workshops, science quizzes and games as well as to create videos on their understanding of engineering etc. These are marvellous ventures that can be done together with the adopted schools.

However, compared to the number of schools in the country, what we have done is just a drop in the ocean. Therefore, I sincerely urge Members in the Branches, as well as Members in the Student Chapters to multiply their efforts and be more proactive in sharing the joy of Science & Technology with the youngsters.

Connect Enabler #13 – The Proposed Formation of Manufacturing Industry Organisation Presidents' Council (MIPC)

My Fellow IEM Members, Ladies and Gentlemen,

With the fast moving technologies in today's world, industries will be left behind if they do not adopt the latest technologies such as the Internet of Things, Artificial Intelligence, Robotics and Wearable Technologies. It is critical for industries, especially those in the manufacturing sector, to keep abreast with the development of technology.

Today, manufacturing consists of 8 major sectors, including Electronics & Electricals, Machinery & Equipment, Chemical, Medical Devices, Aerospace, Transport and Automotive. According to information from the Department of Statistics Malaysia, the manufacturing sector contributed RM299.2 billion to our national GDP in

2019. For 2020, our GDP stood at RM1.342 trillion, of which 23.6% came from the manufacturing sector. Of the overall workforce, 16.9% are employed in the manufacturing sector, compared to 8.8% in the construction sector.

With so many issues that need our attention, it is my wish to explore the possibility of forming a cross-sectoral forum for all stakeholders in the manufacturing industry to discuss issues of mutual importance. This will be another line to connect a different sector of the engineering industry which will be named Manufacturing Industry Organisation Presidents' Council (MIPC); it will serve the manufacturing industry in the same way that the Building Industry Presidents Council serves the building industry.

It will be a platform where issues faced by the industry players will be discussed and examined in detail, while the technical experts offer their expertise in tackling these issues. After all, when the manufacturers expand their operations and the economy grows, it will benefit engineers, engineering technologists and engineering technicians.

Our share of manufacturing will increase if we make proactive efforts to enhance the skills of our workforce and adopt the latest technology. As IEM is an institution which encompasses all disciplines of engineering, we should also actively participate in and offer our feedback on issues that concern industries other than construction or building. I believe it is very timely for IEM to initiate this idea as many of our Members are from the manufacturing sector.

Conclusion

My Fellow IEM Members, Ladies and Gentlemen,

The last 9 months have gone by in the blink of an eye and I am sure the next 12 months will also be the same. I cannot say if I have achieved all the goals which I set last year, but I do believe we have accomplished a lot despite the barriers and setbacks caused by the pandemic.

I will continue to push forward with the goals I have set and I look forward to the full support of the Council and ExComm Members who have spent a lot of their time, efforts and energy to participate in the intense task of Augmenting IEM.

Together, I believe we can go beyond our role and transcend to be a more robust professional institution with a multifaceted role in all aspects of engineering as envisaged by our Founding Fathers. I will also need the help of all Members to make the IEM brand the 'MUST-HAVE' brand in the engineering profession. It is my ardent hope that together, we will make this happen. May we prevail in our efforts towards this mission.

I hope all Members have registered for the COVID-19 vaccination. Stay Safe and Stay Healthy.

Selamat Berpuasa and Selamat Hari Raya Aidilfitri.

Thank You.

Ir. Ong Ching Loon
IEM President
Session 2021/2022

Dear IEM members,

I am delighted to announce the launching of IEM's very own Mobile App (on 14 April 2021)! Named "IEMGo", this mobile app will enhance communication between IEM and its members. For a start, it will enable IEM members to connect to the IEM Community site for easy access to IEM Bulletin, IEM Journal, obtain information or first-hand announcements and to register for events. More features will be added in future to further enhance the app, such as providing job matching opportunities for members, enabling communication between IEM members and a host of other possibilities which we are exploring.

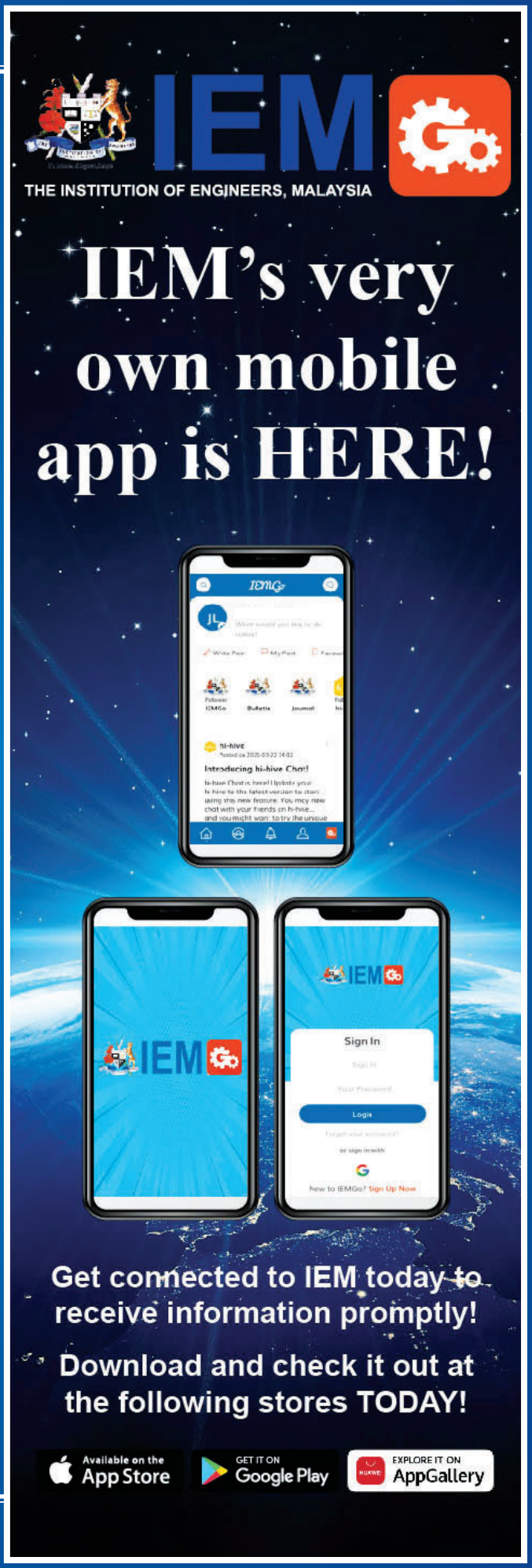
In fact, the need for IEM's very own mobile app was one of the feedbacks we obtained from members in our first survey carried out during the MCO last year. We are very excited to have accomplished this in just one year and without incurring any cost for IEM. On this note, I would like to thank Silverlake – the developer of IEMGo and IEM Secretariat for its relentless efforts to make the app a reality.

I hope all our members will join the community under IEMGo and make this project a success. You can download the app from Google Play Store, Apple App Store or Huawei App Gallery.

We will be sharing the steps on how to install IEMGo and how to make use of the app in our email blast, social media channels and website. Should you need further information, please contact our Secretariat staff for assistance.

Finally, I would like to express my appreciation to the IEM Council and Excomm, the respective Committees and Members for their support and I look forward to the success of IEMGo.

Thank you. Stay Safe and Stay Healthy.



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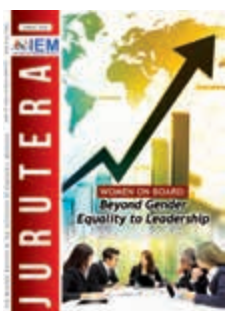

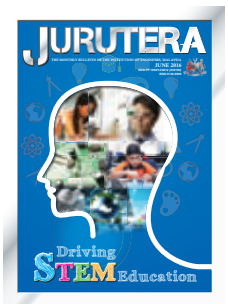

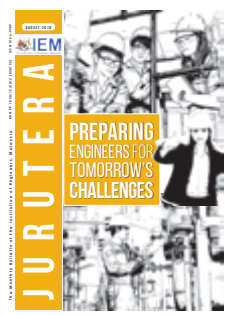

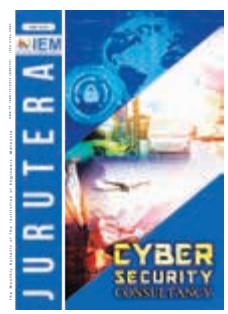

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Facing Inside Back Cover (FIBC)	6,150	5,850	5,550	5,250	4,950
Facing Cover Note (FCN)	5,850	5,300	5,100	4,900	4,700
Facing Contents Page (FCP)	5,700	5,150	4,950	4,750	4,550
Centre Spread	11,200	9,500	9,000	8,500	8,000
ROP Full Page	4,900	4,500	4,300	4,100	3,900
ROP Half Page	2,900	2,650	2,550	2,450	2,350
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62 YEARS AND GOING STRONG

MoU signing with Johor Centre for Construction Development on 7 April 2021

It may be just an ordinary date in the calendar but, for IEM, 17 April 2021 marked another milestone achievement. 62 years had gone by since IEM was established and it is still going from strength to strength. Just like in 2020 the previous year, this year's 62nd IEM Annual General Meeting (AGM) was held online as the global COVID-19 pandemic had yet to be contained.

IEM is very pleased with the support shown by members from all over the country who had taken the time to attend the AGM and to ensure that it would still proceed as planned despite being unable to do so physically, thereby not hampering the progress of the Institution in terms of compliance with the requirements of the Registrar of Societies (ROS).

The President, Ir. Ong Ching Loon, continued with his session in office after serving one of the shortest terms of only 8½ months in the last session. Despite the short term, Ir. Ong presented a very eventful report on how IEM had coped with the global pandemic.

ENSURING OUR VOICE IS HEARD

IEM office bearers had attended several meetings arranged by Ministries and government agencies to support and offer advice to the government in various initiatives. The Ministry of Works and the Construction Industry Development Board held 3 stakeholders meetings in the last 8 months to address issues related to "Compliance & Implementation of SOPs at Construction Sites". Attendance at such meetings is part of the IEM initiative to ensure we stay connected to the government and to ensure that our voice is heard when the government makes decisions on issues concerning the engineering profession and industry. Such initiatives included a number of other joint collaborative responses or memorandums issued by IEM together with other professional bodies.

In November last year, IEM issued a joint statement with other members of the Building Industry Presidents Council pertaining to Temporary Measures for Reducing the Impact Coronavirus Disease (COVID-19) Act 2020. Another joint statement was made in objecting to the expansion of Human Resources Development Fund (PSMB) Act 2001 to cover construction industry. These joint statements are available on the IEM website for members who wish to know more. IEM will continue to be vigilant on matters that concern and affect the engineering profession and industry so as to protect the interests of our members.

In his Presidential Address, Ir. Ong stressed on the importance of increasing connectivity between IEM and

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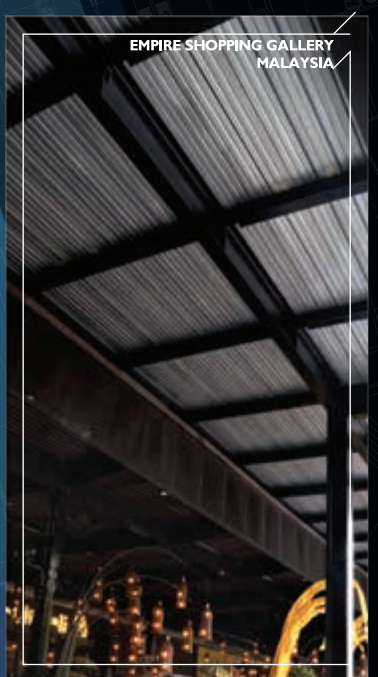
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all stakeholders to ensure that efforts on professional development and nation-building would be further strengthened in view of current challenges.

He updated members on Memorandums of Understanding being initiated or signed with the various State authorities for their benefit and to ensure that IEM members were represented at State Government levels. An MoU was signed with the Johor Centre for Construction Development recently to promote collaboration between IEM members in the Southern Branch region and the Centre. He called upon other branches to look into similar collaborations in their respective regions.

TOWARDS INCLUSIVENESS

Members attending the AGM were reminded that IEM was formed on 1 May 1959, about 20 months after Mereka. Over the last 62 years, IEM had expanded from the initial 20 founding members to nearly 53,000 members today while still maintaining its initial objective to promote and advance the science and profession of all aspects of engineering.

Members also took note that the previous IEM Vision was "The Institution of Engineers, Malaysia aims to be the premier professional organisation pivotal to Malaysia achieving Vision 2020". At the AGM last year, there was a suggestion from a member that IEM should revise its Vision statement now that we had reached 2020. Prior to the AGM last year. IEM had, in fact, reviewed this Vision and decided on a new Vision statement which was "To be the premier learned engineering society championing the adoption of ethics and professional best practices in all sectors of the industry". IEM members were notified of this vision statement in the annual report.

Over the years, IEM has been very focused on developing the skills and professionalism of engineers by organising technical lectures, courses, conferences, workshops etc. Since our objective is to promote and advance the science and profession of all aspects of engineering and to champion the adoption of ethics and professional best practices in all sectors of the industry, we cannot confine our efforts to engineers alone as the engineering fraternity comprises two other groups of technical personnel: Engineering technologists and engineering technicians.

To achieve this objective, IEM introduced 4 new grades of membership on 3 April 2021, after obtaining approval from the ROS on 6 November 2020. This process started three years ago with efforts to amend the IEM Constitution & Bylaws to include these two groups of engineering personnel. The amendment was first approved at the July 2020 AGM and subsequently approved by Corporate Members via postal ballot in September 2020, prior to submission to ROS.

With the inclusion of these 2 groups of engineering personnel into the IEM family, we can now truly say that IEM is well connected to the engineering industry and that we extend our promotion of competency and professionalism to the whole engineering fraternity.

ADAPTING TO THE NEW NORM

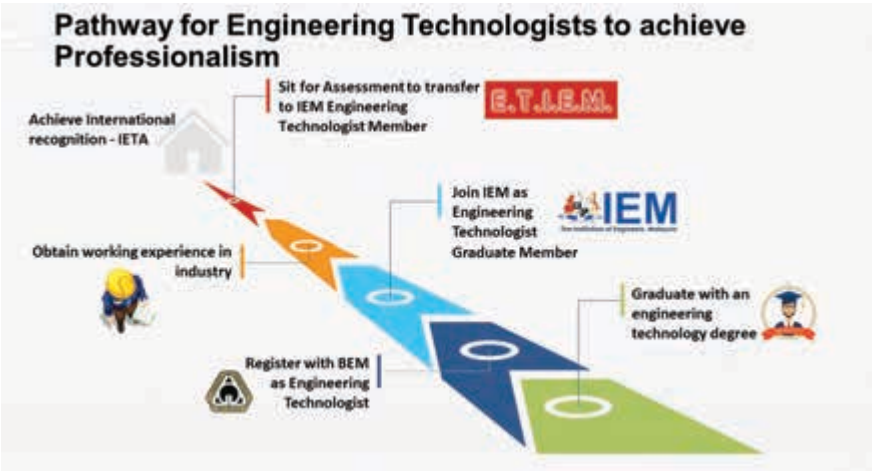
For the last 13 months, the world had come face-to-face with one of the greatest challenges to mankind. The world has still not recovered and it is envisaged that it will be quite some time before things return to normal. In the meantime, IEM will continue in its efforts to focus on connecting with members, stakeholders and partners alike to stay relevant.

We hope all IEM members will support our initiatives such as IEMGo, electronic balloting, e-Jurutera, e-Journal, webinars and virtual exhibitions, especially ENGINEER 2021, to ensure that IEM stays strong and is be able to represent the voice of the engineering profession and professionals.

ELECTRONIC BALLOTING

At the AGM, members were informed that, for the first time, IEM had conducted Council Elections via electronic balloting for Council Members session 2021/2022. This electronic balloting was among the modules designed when IEM embarked on the development of its portal back in 2010. However, at the time, more emphasis was placed on the automation of the various operational processes, with priority given to membership application, activities registration and Library management.

The Constitution & Bylaws was amended in 2013 to allow the use of electronic balloting for the election of Council Members. However, due to the need to ensure reliability, security and other features of the electronic



Year	No. of ballot papers issued	Returned	% Returned
2011	8967	1,633	18.21
2012	9,058	1,741	19.22
2013	9,476	1,513	15.97
2014	9,698	1,319	13.6
2015	9,637	1,730	17.95
2016	9,776	1,712	17.5
2017	10,480	1,801	17.17
2018	10,580	1,706	16.12
2019	11,542	1,711	14.82
2020	12,033	1,657	13.7
2021	12,122	1,584	13.1%

Figure 1: Comparison of votes received in the past 10 years

balloting module, it was only ready for testing at the AGM in 2020. After testing was completed, it was further perfected by putting out regular announcements for members to update their contact information in the IEM portal to enable ballot documents to be sent to them via email.

As reported during the AGM by the Election Officer, Y.Bhg. Dato' Paduka Ir. Hj. Keizrul bin Abdullah, the number of votes received via electronic balloting was less than postal ballots received last year. IEM hopes more members will participate in the electronic balloting next year as 87% of members have not submitted their votes for the nominated candidates to represent their interests on the IEM Council. Figure 1 shows a comparison of votes received in the past 10 years.

The electronic balloting system was initiated after IEM noted the problems a member faced to return the ballot papers to IEM. Even though IEM had provided a self-addressed, postage-paid return envelope, there was still the hassle of looking for a post box – not an easy task nowadays – to drop in the envelope.

In contrast, the electronic balloting module allows members to easily cast their votes and without even having to leave their homes. Besides the convenience to members, the electronic balloting module also enables IEM to cut down on printing cost. Ir. Hj. Keizrul reported that election expenses incurred in 2021 was only RM2,385 (cost of sending sms messages to members) compared to RM40,511.05 in 2020. These are huge savings, so IEM hopes that all members will show their support for this initiative.

For a start, members are encouraged to update their email addresses in the system and to check emails frequently so as not to miss out on any news from IEM.

ENHANCING CONNECTIVITY

IEM's very own Mobile App, named IEMGo, was launched 2 days before the AGM. The effort, which took over 12 months, had finally became a reality. IEMGo, which will connect members with IEM as well as with each other more speedily, was made possible with the assistance and support from Silverlake Lifestyle Community Sdn. Bhd. which provided the platform and expertise for developing the mobile app.

Vice Presidents	Ir. Yau Chau Fong Ir. Hj. Mohd Aman bin Hj. Idris Y.Bhg. Dato' Ir. Hj. Ahmad Murad bin Omar Ir. Chen Harn Shean
Honorary Secretary	Ir. Dr David Chuah Joon Huang
Honorary Treasurer	Ir. Fam Yew Hin
Council Member – Chemical Representative	Ir. Dr Chong Chien Hwa
Council Member – Ordinary Representative	Ir. Dr Siti Hawa binti Hamzah Ir. Chen Harn Shean Ir. Dr Tan Chee Fai Ir. Mah Way Sheng Ir. Dr Zuhaina binti Zakaria Ir. Lee Cheng Pay Ir. Dr Kannan a/l M. Munisamy Ir. Dr Siow Chun Lim Ir. Wong Chee Fui Ir. Dr Hum Yan Chai

Figure 2: Newly elected office bearers 2021

With IEMGo, members will be provided with real-time information and news alerts expeditiously. Members will be able to access IEM publications (*JURUTERA* and Journal) on their mobile phones without having to download them from the IEM website. Members can also expect more features in the pipeline, such as:

- Loyalty vouchers
- Business card
- Event registration
- Jobs matching platform
- Market place
- Business matching platform.

All members are encouraged to download IEMGo from the following mobile stores:

- iOS phones: Download IEMGO from App Store (or search "IEMGO" in App Store).
- Android phones: Download IEMGO from Google Play (or search "IEMGO" in Google Play).
- Huawei phones: Download IEMGO from Huawei App Gallery (or search "IEMGO" in Huawei App Gallery).

IEM looks forward to better connectivity with its members through IEMGo and will continue to work towards further improvement and enhancement to the app in the future.

Besides IEMGo, members can also receive updates from IEM through social media platforms such as Instagram and Telegram. To keep members updated, circulars and news are posted on these platforms as well. ■

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CONDOLENCES

With deep regret, we wish to inform you that

Ir. Chan Swee Seng
(Past Chairman of Southern Branch sessions 1977/78 and 1978/79)

passed away on 11 April 2021. On behalf of the IEM Council and Management, we wish to convey our deepest condolences to the family.

CONDOLENCES

With deep regret, we wish to inform you that

Ir. Sekarajasekaran Arasaratnam

passed away on 7 May 2021. On behalf of the IEM Council and Management, we wish to convey our deepest condolences to the family.

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We thank all readers for their continuing support and valuable feedback.

WINNER OF Ir. TAN SRI YUSOFF IBRAHIM FYP COMPETITION 2020

by Ir. Ong Ching Loon
President, IEM

Martin Mo Shuen Ching of Curtin University (Sarawak Campus) is the Grand Prize winner of the prestigious Ir. Tan Sri Yusoff Ibrahim Final Year Project (FYP) Competition 2020.

His insightful FYP, A Methodology to Improve Production from Unconventional Reserves through Stimulation, was judged Overall Best out of a total of 36 entries during assessments in Rounds 1 and 2. He wins RM1,000 cash, a certificate and an invitation to publish in IEM Journal together with his thesis supervisor.

Running for the 4th consecutive year, this annual event is jointly organised by The Institution of Engineers, Malaysia (IEM) and the Institution of Engineering Technology, Malaysia Network (IET). The aim is to promote engineering research work among engineering students which will benefit mankind and it is hoped that our budding engineers will continue to excel and contribute towards nation building.

The competition has always received overwhelming response from local undergraduates as it is the best avenue to showcase the quality of one's FYP; winning the highly coveted accolade proves that one's FYP is indeed unrivalled in substance.

Named after the late Ir. Tan Sri Dr Haji Yusoff Ibrahim, founding President of IEM, the competition is opened to all accredited institutions of higher learning (IHL). Formerly the Director General of Public Works Department (JKR), Tan Sri Yusoff helmed IEM from 1959 to 1962. He was instrumental in pushing for the establishment of local professional examinations and is best remembered for his tireless contributions to ensure the smooth running of IEM in the early years.

Every year, IHLs may nominate their best FYP students from any engineering programme to take part in the competition. In 2020, there was a total of 36 submissions from six engineering fields. To keep the standard high, all submissions were subjected to rigorous assessment.

The assessment process comprised two steps. In Round 1, each submission was evaluated independently by two assessors drawn from a pool of academics and industry experts in the relevant fields. During this stage, judges looked for originality, practicality and contributions of the FYP. The content was given a weightage of 80% in accordance with the prescribed rubric.

The best 12 finalists were then invited to the Round 2 Assessment, where they made an oral presentation to a panel of six judges via video conferencing. Each finalist was given 10 minutes to show his/her oratorical skills, to which a weightage of 20% was allocated.

During his presentation, Martin Mo emphasised that "Unconventional shale reservoirs have been determined to be one of the major hydrocarbon sources. According to an estimation made in 2013, the technically recoverable reserves are 350 billion barrels of shale oil and 7,300 trillion cubic ft of shale gas. Improvements in horizontal drilling technology and the commercialisation of hydraulic fracturing have first made economical production from shale reservoirs possible in the North American shale gas play. However, not all shale reservoirs are a duplicate copy of the major shale plays, for example, the Bakken and Eagle Ford Shales. Hence a similar fracturing procedure from the region might not work for shales in other locations."

The Second Prize went to Jason Chia (MMU) and the Third Prize to Sham Khaled Elhosseny Ghazy Essawy (Nottingham). Four winners received Consolation Prizes, i.e. Ong Wei (TARUC), Oon Chee Yee (Monash), Chew Yuin Yee (UTAR) and Koay Hsien Wern (Nottingham). There were also 5 Finalists: Tay Chuan Zhi (Curtin), Lee Chuen Phin (Nottingham), Chin Zhin Hui (Monash), Ng Kah Hoe (UMP) and Tang Haw Yueh (Curtin). IEM wishes all winners the heartiest congratulations.

As a civil society organisation tasked with the promotion of science and engineering in any of its disciplines and to

facilitate the exchange of information and ideas, The Institution of Engineers, Malaysia is pleased with the active support from all participating IHLs. IEM will strive to work closely with all accredited IHLs, as this will contribute tremendously to sustaining a high standard in the engineering education of Malaysia, a signatory of the Washington Accord. ■

Prize	Name	University
Grand Prize	Martin Ho Shuen Ching	Curtin
Second	Jason Chia	MMU
Third	Sham Khaled Elhosseny Ghazy Essawy	Nottingham
Consolation	Ong Wei	TARUC
Consolation	Oon Chee Yee	Monash
Consolation	Chew Yuin Yee	UTAR
Consolation	Koay Hsien Wern	Nottingham
Finalist	Tay Chuan Zhi	Curtin
Finalist	Lee Chuen Phin	Nottingahm
Finalist	Chin Zhin Hui	Monash
Finalist	Ng Kah Hoe	UMP
Finalist	Tang Haw Yueh	Curtin

UPCOMING ACTIVITIES

UEDSIG Half-Day Webinar on "Technical Event on Hillslopes & Highlands Development - Approaches + Challenges Incorporating Technological Advancement in Environmentally Challenging Areas"

Date : 29 May 2021 (Saturday)
Time : 2.00 p.m. – 5.30 p.m.
Venue : Digital Platform
Approved CPD : Applying
Speakers : Ir. Dr Valen and Tew Kia Hui

WEBINAR - Half-Day Seminar on Good Practices for Construction of New Asphalt Pavement and Maintenance

Date : 5 June 2021 (Saturday)
Time : 9.00 a.m. – 1.00 p.m.
Venue : Digital Platform
Approved CPD : 4
Speaker : Ir. Pok Sum Loong

Webinar Course on "Human Centered Design in Project Management"

Date : 5 June 2021 (Saturday)
Time : 9.00 a.m. – 5.30 p.m.
Venue : Digital Platform
Approved CPD : Applying
Speaker : Assoc. Prof. Dr Abd Rahman bin Rahim

ENERGY EFFICIENCY

by Ir. Tan Yoke Lee

In the race to save Earth from accelerating climate changes, we have introduced renewable energy (RE) and tried to reduce our consumption of power supply without compromising on comfort by adopting energy efficient designs.

An energy efficient system is not a new concept. In fact, it is a mandatory requirement in developed countries such as USA. The most referenced and quite complete document on energy efficiency happens to be ASHRAE 90.1 (American Society of Heating, Refrigerating & Air-Conditioning Engineers) which dates back to 1999. The Malaysian version, MS1525 (Malaysian Standard), is the peer version of ASHRAE 90.1. However MS1525 is still not mandatory in the Malaysian context and the requirement in this standard is still rather loose and in the preliminary stage. It should be noted that the ASHRAE 90.1 is updated every 3 years while MS1525 has only been updated once since it was first established.

As such, this article will refer mostly to ASHRAE 90.1 (with reference to hot and humid climate zones in America such as Florida) for its recommendation as engineering practice in Malaysia.

ENERGY EFFICIENT SYSTEMS

There are countless ways to implement energy efficient systems. This article will cover energy efficient systems in water transfer, air transfer and air conditioning system.

1. **Pumping System:** It is not enough to have energy efficient pumps with the best design of casing, impeller, volute and motor of high efficiency if the pumping system is not well designed or constructed.

For a start, the pump room design is important. An undersized pump room can be detrimental to the pumping system, especially when elbow bends are installed too close to the pumps as this will cause system effect, thus changing the original intended pump curve (Figure 1). Examples of system effects are:

- The additional friction loss at the pump inlet caused by too many bends and elbows at the suction pipes may cause the net positive suction head available at pump to decline to the extent that it no longer meets the net positive suction head required. Under such circumstances, the pump may undergo cavitation where the pumped liquid is boiling at the pump impellers inlet and at discharge, the vapour transforms back to liquid, causing implosions of vapour bubbles and pitting of pump impellers. In addition, the pump will not be operating at stable conditions and energy wastage will be high.
- Similarly, too many bends and fittings near the pump discharge outlets will also cause energy wastage in terms of friction loss and distortion of ideal fluid dynamic patterns of pumped fluids, thus creating turbulence. The pump operation point may not be in the intended operating zone of design for best efficiency of pump.

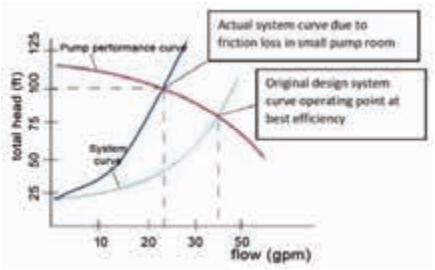


Figure 1

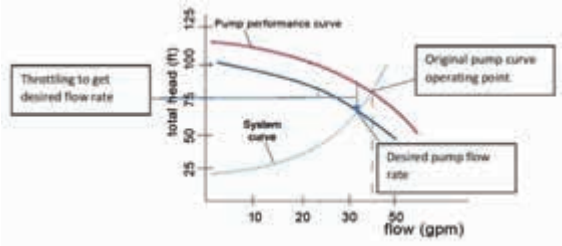


Figure 2

Apart from pump room design, the control of the pump relative to the plumbing system is also very important. Firstly, we would like to address the misconception that VSD (variable speed drive) pumps are more efficient than constant speed pumps.

The pump control must be suited to the system application and operation. For transfer of fluids from one location to another for storage purposes, the flow rate is not

critically important. So the pump should be allowed to operate at the flow rate at which the system head is present. This means that there is no need to throttle the pipe system to get the exact flow rate as we simply let the intersection of the pump curve and system curve decide on the operation point. Constant speed pump should be applied as VSD operating at maximum speed will incur losses due to drive losses.

For process pumps and dosing/feed pumps applications where the flow rate needs to be exact, it is no longer acceptable in ASHRAE 90.1 to throttle the pumps as shown in arrow (Figure 2) to get the desired flow rate. The flow rate can be obtained by varying the speed of the pump, thus changing the pump curve to get the desired flow rate at the pump head encountered in the system.

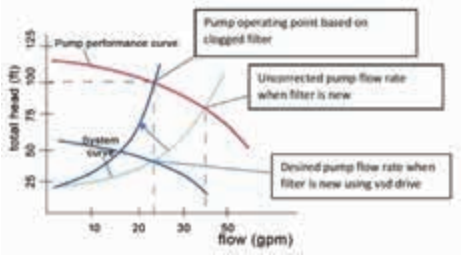


Figure 3

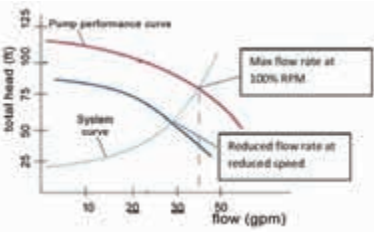


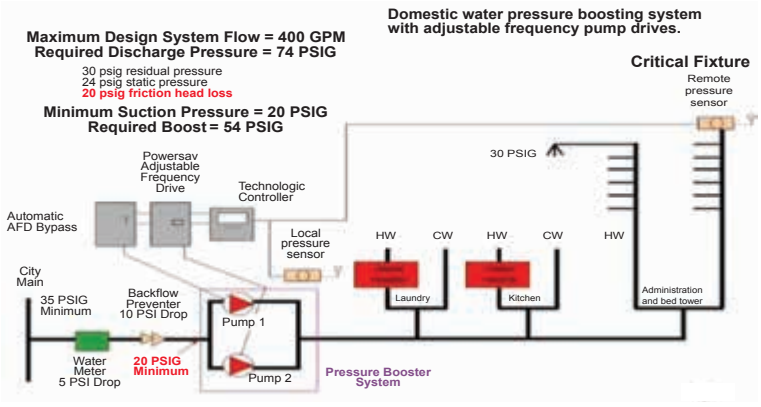
Figure 4

The same applies to swimming pool applications. The required circulation flow has more or less been decided on when designing a swimming pool in terms of the desired water changes per day. The standard flow rate is about 8-10 changes per day. However, the pressure head is dependent on friction loss which is less at the beginning of filter life. As filter gets clogged up, the pump head requirement will increase as the system curve shifts (Figure 3).

When we design the flow rate and pressure head of the pump, we will assume the worst condition at higher friction loss. This means when the filter is new, higher flow rate will be circulating in the pool. This is a waste of energy. The correct procedure would be to lower the speed of pump. The arrow shows the system curve shifting from a new filter to a clogged filter just before maintenance.

Another type of application for VSD is pressure boosting applications for fittings such as taps, shower heads, water closet flush valves, etc. In these applications, the demand flow rate is not constant but varies according to time of usage. When flow rate is varied, the pressure head requirement will also vary in accordance with the system curve. So the speed of the pump can be brought down to match the capacity (Figure 4).

Even when VSD has been applied to the pumping system, it does not mean that energy efficiency is achieved. The control of the VSD speed is also very important and this is normally decided by the location of the pressure transmitter. An incorrect location will mean less energy saved.



Effects of Sensor Location on Example System

	Local Sensor	Remote Sensor
Set Point	74 psig	30 psig
Control curve	Little change with flow	Significant head reduction at lower flows
Speed reduction achievable	10 percent	26 percent

Figure 5: From JMP Presentation on YouTube

Figure 5 shows how the location of the pressure transmitter can affect energy consumption of the pump. At reduced flow rate, the local pressure sensor near the pump will still account for friction loss at full flow (which is 20psig) while the remote pressure sensor will not need to account for the full flow friction loss. However, it must be noted that there is additional cost incurred to install the pressure sensor at remote due to extra control cabling. In fact, the remote pressure sensor is mandatory practice in ASHRAE 90.1.

2. **Fan System:** Similar applications that work for pumps will also work for fans which are used to transfer air. This article will only cover low pressure applications which excludes compressed air.

Fan rooms should be spacious to accommodate a straight length of duct before entrance to the fan and at discharge of the duct. When sharp elbows, turns, etc. are present near the fan, it will create a fan system effect. The air flow pattern will not be uniform at the discharge of the fan (Figure 6) but will be high velocity at the top and low at the bottom.

Most of the energy will be in the form of velocity pressure. As air travels down the duct, the velocity becomes more uniform and at the length of effective duct, the velocity is almost uniform and most of the energy will be in terms of static pressure which is desirable for movement/transfer of air. This phenomena is called duct static regain.

The effective duct length for low velocity system less than 2500fpm is about 2.5 times the duct diameter. Where velocity is higher than 2500fpm, effective duct length=fpm/1000 * duct diameter. Another issue with the system effect is that the fan will be discharging less flow rate at higher friction head now.

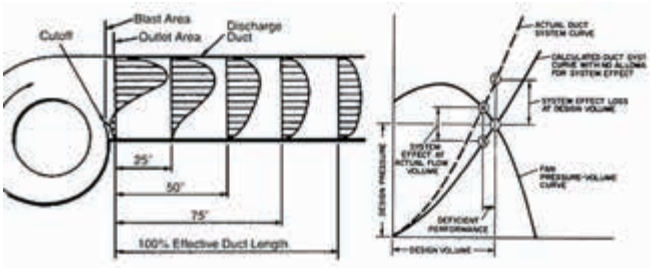


Figure 6: At fan discharge

Similarly, at the fan inlet, an uneven flow creates turbulence and loss, creating a system effect. A straight length without obstruction should be maintained at the fan inlet of about 2 wheel diameter (Figure 7).

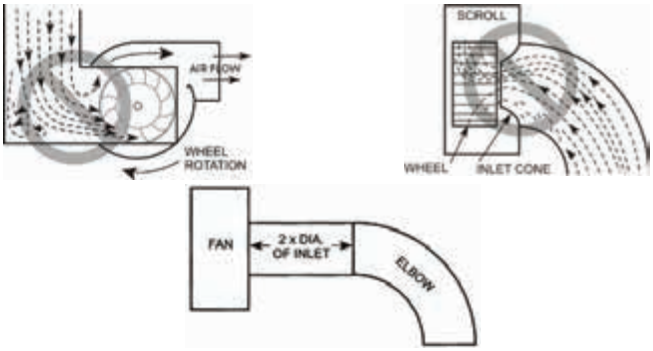


Figure 7

When the volume discharged by the fan needs to be controlled (which is most of the time for air-conditioning systems), variable speed fans should be used.

Temperature Control	Typical Zones	Minimum fan speed	Fan power at min speed	Fan control
Supply Air	Multiple	≤ 50% *	≤ 30%	Modulating
Room Temperature	Single	≤ 66% *	≤ 40%	Two-speed, Multi-speed or Modulating

Figure 8: ASHRAE 90.1- 2016 for fan motor greater than ¼ hp or DX system >65000btu/hr.

The old design of using a constant speed fan with volume control dampers is not efficient in terms of energy usage as the volume of air discharged to each room remains the same at all times and temperature control is based only on the modulation of the supply air temperature which is controlled by one thermostat for all zones and this is normally positioned at the return air duct. This means that some rooms will be hot and others too cold. This is no longer allowed in ASHRAE 90.1 standard.

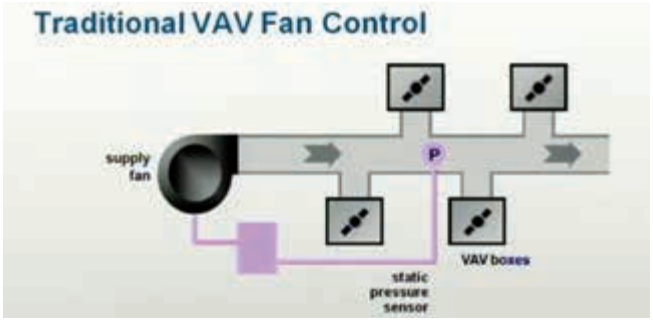


Figure 9: Duct static control (snapshot from trane presentation)

In later designs, variable speed fans are used. The system becomes slightly more efficient and more comfort is accorded to the various zones. The variable air volume damper position is adjusted in accordance with the thermostat setting in each room instead of a centralised supply air temperature control. The supply air fan speed then modulates such that the duct static pressure at 2/3 the duct length is maintained at a set point (Figure 9). There is no overcooling or hot spots as the temperature in each zone is controlled via its own thermostat.

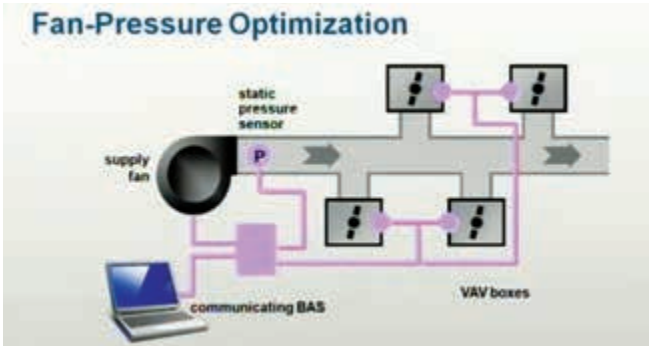


Figure 10: Fan pressure optimisation (snapshot from trane presentation)

In the latest design, the fan speed modulates to keep at least one variable air volume damper open at 100%. This design is very efficient. However, additional cost is incurred to set up the Building Management System and to poll the data of the position of each variable air volume damper (Figure 10).

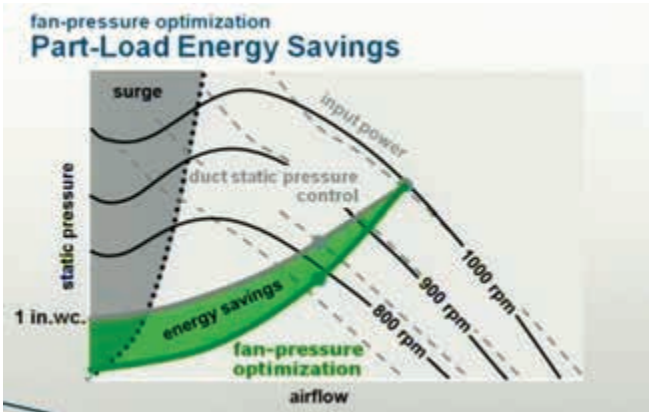


Figure 11: Snap shot from trane presentation

Figure 11 shows the system curve shifts from duct static pressure control to fan pressure optimisation. At full load, the fan is running at 1000rpm and there is no additional power saving. However, most of the time, the fan system runs at partial load. This concept is similar to the location of the pressure transmitter for the pump system to be located at the remote location.

3. **Chilled water control:** Another area where energy efficient design can be implemented is chilled water piping. There are two types of chilled water piping designs: Primary circuit only or primary-secondary-tertiary circuit combination. An illustration is shown below.

It should be noted that for primary circuit only, the pump shall be variable speed with a modulating valve installed at the larger fan coil unit or air handling unit. This will allow the flow rate of chilled water to vary according to the heat load (Figure 12). It is most important to note that when

implementing variable speed pump at the primary circuit, there is a minimum chilled water flow rate required for satisfactory chiller operation. This flow rate must be maintained.

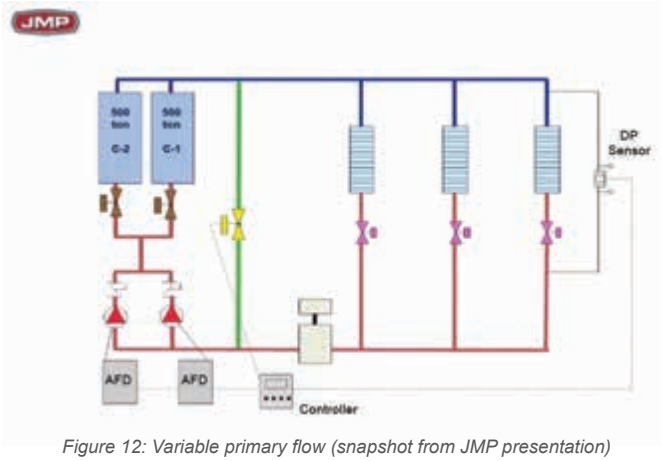


Figure 12: Variable primary flow (snapshot from JMP presentation)

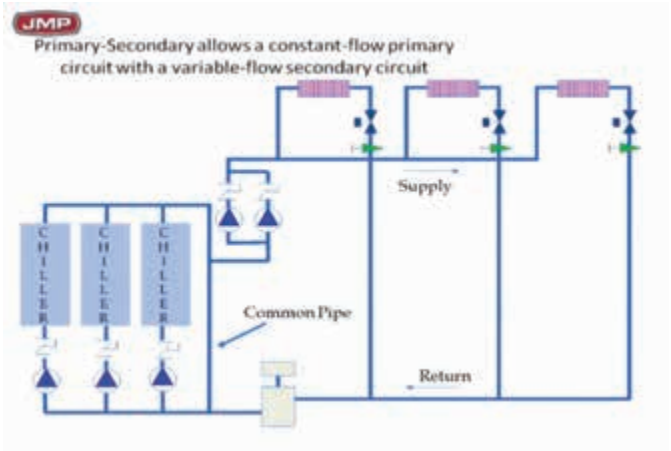


Figure 13: Primary- secondary (snapshot from JMP Presentation)

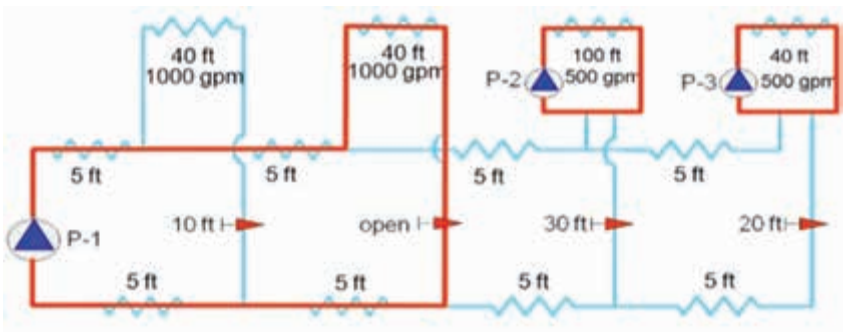


Figure 14: Secondary-tertiary (snapshot from JMP Presentation)

For a system with remote chiller from the fan coil or air handling unit, the preferred mode shall be primary secondary or primary-secondary-tertiary circuit. The pump on the primary circuit can be a constant speed pump in the chiller plant room as the pressure loss in countering friction loss is very low. The minimum flow rate for the chiller can be maintained easily.

The secondary circuit shall preferably be a variable speed pump which will adjust the flow rate according to the heat load requirement. A pressure sensor shall be located at the most demanding location. However, ASHRAE 90.1 edition 2010, allows that for a system load of less than 300 tonnes, the secondary pump can be constant but this is not recommended now since the VSD is getting cheaper.

In addition, whenever there is budget to implement DDC (direct digital control i.e. BAS system), we should be able to monitor the position of the modulating valve of the fan coil unit or air handling unit and vary the speed of the pump such that at least one modulation valve is totally opened. This concept is similar to fan pressure optimisation.

It is interesting to note that in the latest generation of chilled water system design, the pressure independent balancing and control valve at the air handling unit is replaced with a smaller tertiary pump, allowing only the correct amount of water to flow through the coil, thus overcoming the problem of low delta t (which is the greatest waste of pump and chiller energy in chilled water designs) and giving the greatest comfort to all zones.

CONCLUSION

There are many areas where energy efficient design can be implemented. In most circumstances, the amount of energy saved with an energy efficient design will far outweigh that achieved by selecting the most energy efficient pump, fan, motor, chiller, etc.

Energy efficient systems will mean less energy consumed and less carbon released by non-renewable energy sources. In turn, this will reduce our carbon footprint. ■

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Author's Biodata

Ir. Tan Yoke Lee graduated from University of Melbourne, Australia, in Mechanical Engineering. A member of both IEM and IFE UK, she is the head of engineering department at Jurutera Perunding Intelek Sdn. Bhd.

SAIGON CENTRAL POST OFFICE

Ir. Ong Guan Hock

Ir. Ong Guan Hock *is a committee member of Standing Committee on Information & Publications.*

The Saigon Central Post Office in Ho Chi Minh City (HCMC) was built in the 19th Century during the French rule in Indo-China. It is a good example of architecture that's quintessentially French in character but with a touch of Asian influences.

The building design is unique and the interior is beautiful and impressive. You'll feel the grandeur as soon as you step inside. You'll be awed by the tall arched ceilings, elegant marble flooring, finely crafted telephone booths (now used for ATM machines) and hand-painted wall maps. Designed by Alfred Foulfoux, it was constructed between 1886 and 1891 to replace an earlier structure that housed the post office.

The Saigon Central Post Office is a major tourist attraction in HCMC and is definitely a place not to be missed if you're visiting the city. ■

30TH ANNUAL PROF. CHIN FUNG KEE LECTURE

by Ir. Dr Chan Sin Fatt

Ir. Yau Chau Fong

Prof. Chuah Hean Teik

Academician Tan Sri Dato' Ir. Prof. Dr Chuah Hean Teik delivered the 30th Annual Professor Chin Fung Kee Memorial Lecture on 17 October 2020. Due to the Covid-19 pandemic measures, the lecture on Educating Future Engineers: Challenges & Opportunities, was delivered as a webinar. In view of the wide scope of the lecture, there was interest from all branches of engineering and 464 participants registered for the webinar. The annual Prof. Chin Lecture Series is jointly organised by IEM and The Universiti Malaya Engineering Alumni Association (2017), (UMEAA).

The event has an unbroken record of being held annually for the last 30 years and is now established as an important learned-society event. Its aims are to commemorate the life and contributions of Tan Sri Datuk Ir. Prof. Dr Chin Fung Kee to the engineering profession and to disseminate the latest engineering knowledge and expertise for the advancement of the profession. The full version of the 30th Prof. Chin Lecture will be published soon in the IEM Journal.

Prof. Chuah's lecture covered a wide field. He discussed trends and challenges the world faces, such as urbanisation and inequality in wealth distribution, clean water, food distribution, energy, global warming and climate change, ageing population and physical-space and cyber-space security.

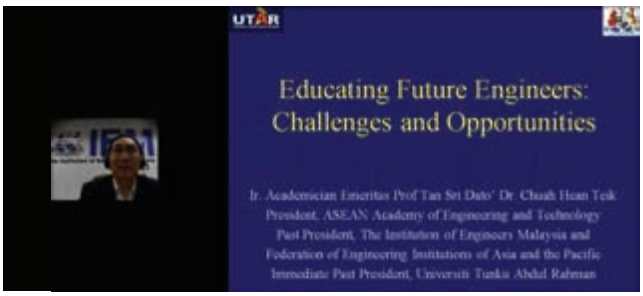
The new Digital Revolution or 4th Industrial Revolution (4IR), has caused anxiety in industry, academia and society as we worry about the future of our jobs and new technologies. Prof. Chuah provided American and Malaysian examples of these challenges and the limitations in STEM education. To deal with these challenges, he said we require new ideas and inventions which will only be possible if we have workers with excellent knowledge. A brand new set of technology breakthroughs will require different new skill sets, particularly STEM skill sets, in the engineering workforce.

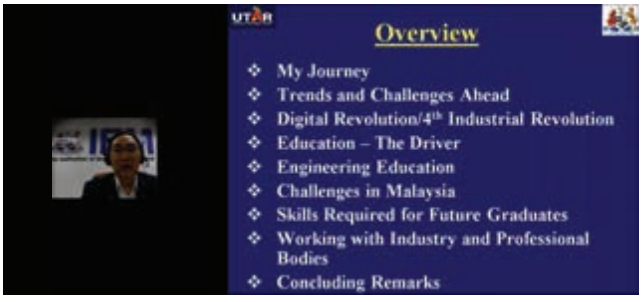
A good engineering workforce (engineer, engineering technologist and engineering technician) is considered to be the driver for success in any nation today. The lecture also touched on challenges that engineers will face in the future, vis-à-vis globalisation and mobility as well as skills that young engineering graduates should acquire to help them face these challenges.

In Prof. Chuah's opinion, it is important today for educators to train students who can embrace lifelong learning and professional skills with strong basic fundamentals of natural sciences and engineering as well as ready-to-evolve graduates instead of just ready-to-market graduates as many of them will be entering a whole new and unknown sea of employment.

Values and ethics should also not be forgotten either, in particular the three ICs: Integrity & Competence, Integration & Communication and Internationalisation & Cooperation.

The lecture was very well received as indicated by the lively discussion that followed, with many questions and comments on various aspects of the lecture. ■





1ST SYMPOSIUM FOR YOUNG TUNNELLERS OF ASIA

by Dr Boon Chia Weng

The 1st Symposium for Young Tunnellers of Asia (SYTA) was held on 12 September 2020 as a pre-event of the World Tunnel Congress 2020 (11-17 September 2020). It was jointly organised by The Institution of Engineers Malaysia (IEM), IEM Training Centre Sdn. Bhd. and IEM Academy Sdn. Bhd., with the support of the International Tunnelling & Underground Space Association Young Member group (ITAym).

A total of 65 participants, including the organising team, attended the digital symposium. The event started with a welcome speech by Dr Boon Chia Weng, the Organising Chairman, followed by a speech by Ir. Dr Ooi Teik Aun, the Organising Chairman of WTC 2020 and Chairman of the Tunnelling & Underground Space Technical Division (TUSTD), IEM, and finally another by Keith Bannerman, the Chairman of ITAym. There were 10 lectures presented.

1. Takuya Suzuki, Japan: Excavating in Weak Ground, Where Risk of Landslide is High. Mr. Suzuki talked about how support systems are tailored to the ground conditions, as soon as observations indicate signs of distress related to slope movement as well as how the shape of the invert can reduce the bending moments of the lining.
2. Yuma Suenaga, Japan: "Features of Urban-Ring Method Adopted for Construction of Underground Structures". Mr. Suenaga spoke on this innovative method of installing the retention system of a circular shaft and how it can be used in a congested environment where site laydown may be an issue. The reaction system for jacking the retaining system downward was also presented.
3. Abhijeet Kumar, India: "Challenges in Tunnelling – UGC02 Mumbai Metro Line 3". Mr. Kumar talked about new technologies on tunnelling logistics, innovative techniques to reduce the time for TBM assembly and launching, protecting third party stakeholders and groundwater challenges in the project. A holistic view of the project was presented.
4. Ankur Chauhan, India: "Tunnelling in Granite: Case Study of a Highway Project in Afghanistan". Mr. Chauhan spoke on how feasibility studies of rock support may be approached from geology characterisation and rock mass classifications.
5. Virender Kumar Sattawan: "Construction of INA Metro Station over Operational Twin Tunnels". Mr. Sattawan's talk was on challenges of construction sequence interfacing between a station and an adjacent tunnel and temporary works for the deep excavation.
6. Franklin To Kwok Leung, Hong Kong: "Comparison of Empirical and Numerical Approaches for Estimating Rock Support Pressure on Tunnel Lining". Mr. To showed how rock support pressures are estimated based on Tergazhi's Theory and made comparisons between rock mass classifications and finite element analyses. It was found that Terzaghi's solution was conservative.
7. Minh Ngan Vu, Vietnam: "Blow-out in Tunnelling and a Case Study in Ho Chi Minh Metro Line 1". Mr Minh showed how a blow-out can be predicted and compared the predictions against an actual case history.
8. Nalinii Ravichandran, Malaysia: "Ground Vibration Study in Karstic Limestone Formation for Controlled Blasting Works in Klang Valley". Ms. Nalinii talked on a few parameters which can influence vibration and the motivation of controlled blasting in an urban environment.
9. Sandeep Singh Nirmal, India: "Design of Steel Fibre Reinforced Concrete Segment with Curved Radial Joints". Mr. Nirmal shared design concepts in segmental lining design with fibre reinforced concrete and methods to check bursting loads.
10. Divik Bandopadhyaya, India, UK: "Tunnelling in an Urban Environment and Managing Third Party

Interfaces in London". Mr Bandopadhyaya spoke on the multitude of considerations in a project and the need for good stakeholder engagement. He also discussed the risks of encountering archaeological artefacts and landmines at historical sites.

In summary, the lectures presented were on challenges in geological conditions and innovations in construction processes such as the "urban ring method". Case histories presented were the Mumbai Metro Line 3, INA Metro and Ho Chi Minh Metro Line 1. Technical considerations involving rock classifications, rock pressures, ground vibration, tunnel lining design were also presented as well as the importance and need for managing third party interfaces.

After the lectures, Mr. Sandeep Singh Nirmal, Steering Board Member of ITAym (initiator of the SYTA together with Ir. Khoo Chee Min, past chairman of TUSTD), talked on future views of SYTA and said that the 2nd SYTA would be organised in India in 2021. Finally, Ir. Frankie Cheah, co-chair of SYTA, delivered the closing remarks and thanked the speakers for their insightful presentations.

Overall, the participants benefitted from the digital symposium, as the speakers presented a wide range of subjects relevant to the tunnelling industry. ■

Dr C.W. Boon (right) and Ir. Frankie Cheah

KICKSTARTING NEW SEMESTER WITH A NEW LINEUP

by Amanda Siaw

With the new semester, IEM-Monash Student Section (IEMMSS) started afresh with newly-formed committees. From organising documents to brainstorming for ideas a month before classes started, IEM Monash Student Section was thrilled to provide students with an extensive university experience.

Guided by the motto, Cultivating and Exposing Young Engineers to the Professional Engineering Field through Talks & Seminars from Industry Experts, it held numerous activities in the various engineering disciplines.

Through collaborations with other engineering clubs, an Engineering Exploration Week (EEW) was carried out on 1-5 March 2021, with the aim to introduce Monash students to engineering clubs and student sections.

IEMMSS held its EEW session on 2 March. The 2-hour session was divided into 2 sections to allow students to select which section to join in. First, IEMMSS president Zareh Kozanian introduced the goals of our club and talked about how club membership would benefit the students. Then publicity officer Jue Min presented past and future activities to spark an interest in students to join in our activities. To further attract the students, quiz games with attractive prizes and a lucky draw session were held. Finally, there was a Q&A session.

At the end of the day, 54 new members had signed up to join IEMMSS. Capitalising on existing social platforms, we have launched an Instagram page to update on future activities with the intention to reach out to more potential members. Do follow our Instagram page @IEMMSS_MONASH. ■

Winners of the quiz games

VISTA POINT AND HIKER'S PARADISE IN SEREMBAN

Ir. Dr Oh Seong Por

***Ir. Dr Oh Seong Por** is the immediate past chairman of IEM Negeri Sembilan Branch.*

Bukit Kepayang in the morning

Bukit Kepayang is the highest point within Seremban city limits. It is sandwiched between Seremban 2 township on the west and Taman Bukit Kepayang on the east. Composed of moderately weathered granite, it stands at 218m asl. With its gentle slopes, it was deemed ideal for cultivating rubber in the 1960s. However, demand for housing led to the construction of buildings in the area, leaving some rubber trees to co-exist with the secondary forest.

In 1998, when my family and I moved to my house that's a mere 300m from Bukit Kepayang, the hill was already popular with hikers. But I had never hiked there until 2006. My wife who had done so with a neighbour, encouraged me to do so. Now, it is part of my regular routine. The hill has many attractions.

Green Environment. Despite the housing developments, the hill remains relatively untouched and is covered with ferns, bamboo, palm, wild tropical flowering shrubs and lallang. There are also abandoned rubber trees and, if you look closely, you will see the fishbone-shaped tapping grooves, a technique introduced by the late H.N. Ridley, former director of the Singapore Botanic Garden (1888-1912).

Carnivorous Monkey Cup Plant traps insect

The habitat is conducive to birds and macaques. Of late, I see more juvenile macaques, a sign that the population is growing. Due to frequent feeding by hikers, the macaques have developed less fear of humans.

Varying Terrain. Most parts of the hill have gentle slopes for a safe, pleasant hike. Keen cyclists often attempt a steeper route to the top. The diverse terrain means a wide variety of trails and the choice depends on a hiker's physical fitness and capability. There are also challenging routes which may require using ropes or hands. Not surprisingly, Bomba used to conduct rescue drills here for its personnel.

Multiple Trails. There are 31 established trails with a total distance of over 7km, offering different levels of difficulty and named after the surrounding terrain. I am told it takes over 4 hours to complete all the trails. Normally, I will only attempt 3 trails and my record time is 40 minutes.

Panoramic Views. At the summit, one enjoys a breathtaking 360° view of Seremban 2, the housing area of Taman Bukit Kepayang, parts of the North-South Expressway and old Seremban town. Look west on a clear day and you may even see an oil tanker plying the Straits of Malacca or Port Dickson Power Station in the distance. With the right temperature and humidity conditions, thick fog may form near the summit, offering wonderful photography opportunities.

Hidden Garden and Hindu Temple. At the foot of Bukit Kepayang, next to a narrow road leading to the reservoir, is a small garden hidden by trees. Some elderly folks have cleared the bushes to plant hibiscus, sunflower, marigold, jasmine, natal lily, heliconia, chrysanthemum and rose as well as placed some old chairs and tables. They even planted lotus (*Nelumbo nucifera*) in a pond transformed from an old water retention pit. In the morning, I come to feed the koi and tilapia or photograph lotus flowers in bloom. I also look out for the rare monkey cup plant (*Nepenthes*).

At the top of the hill is the *Arulmighu Maha Sapthakannika Devi* temple. Before the pandemic, the temple management used to organise annual processions where devotees walked bare-footed up to the temple.

With all these attractions, Bukit Kepayang is a place for outdoor activities which promote healthy lifestyles and an awareness of the need to protect the environment. ■

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Tarikh: 8 April 2021

Kepada Semua Ahli,

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Berikut adalah senarai calon yang layak untuk menduduki Temuduga Profesional bagi tahun 2021.

Mengikut Undang-Undang Kecil IEM, Seksyen 3.8, nama-nama seperti tersenarai berikut diterbitkan sebagai calon-calon yang layak untuk menjadi Ahli Institusi, dengan syarat bahawa mereka lulus Temuduga Profesional tahun 2021.

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Ir. Dr David Chuah Joon Huang
Setiausaha Kehormat, IEM
(Sesi 2020/2021)

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UPCOMING ACTIVITIES

WEBINAR - Validating The Structural Behavior and Response of Burj Khalifa: The Creation of Real Time Full Scale Structural Health Monitoring Programs: A Real Time Structural Digital Twin – SERIES 1

Date : 9 June 2021 (Wednesday)
Time : 3.00 p.m. – 5.00 p.m.
Venue : Digital Platform
Approved CPD : 2
Speaker : Mr Ahmad Abdelrazaq'

Webinar Talk on "Food Industry- The Application of SKF Bearing Technology and Predictive Maintenance Strategy"

Date : 11 June 2021 (Friday)
Time : 3.00 p.m. – 5.00 p.m.
Venue : Digital Platform
Approved CPD : Applying
Speaker : Mr. Ong Beng Huat

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KEJURUTERAAN ELEKTRIKAL		
52907	ADRIAN PETER	BE HONS (UMS)(ELECTRICAL & ELECTRONIC, 2015)
57707	AFZAL ASYRAAF BIN NOH	BE HONS (UTM) (ELECTRICAL, 2015)
89379	CHEN KENG WEE	BE HONS (UTAR SG LONG) (ELECTRICAL, 2020)
89369	CHONG XIN YU	BE HONS (UTAR SG LONG) (ELECTRICAL, 2020)
76880	DUNCAN JOHN	BE HONS (UiTM) (ELECTRICAL, 2016)
78054	EVENNA ANAK LINGKING	BE HONS (UNIMAS) (ELECTRICAL & ELECTRONICS, 2018)
109727	LEE KAR HING	BE HONS (UTAR SG LONG) (ELECTRICAL, 2020)
102983	LIONG YU LING	BE HONS (UNI OF MALAYA) (ELECTRICAL, 2019)
49808	MOHD NASHMEN B. HASAN	BE HONS (UTHM) (ELECTRICAL, 2012)
79722	MUKISH KUMAR A/L MUNYADY	BSc (PURDUE UNI.) (ELECTRICAL, 2018)
73893	NOR KAMILAH BINTI AHMAD	BE HONS (MMU) (ELECTRICAL, 2018)
92381	ONG SHENG YONG	BE HONS (UNI OF MALAYA) (ELECTRICAL, 2019)
34603	SIM WAN LOONG	BE HONS (UPM)(ELECTRICAL & ELECTRONICS, 2012)
79725	YEW SOOK KWAN	BE HONS (UNITEN) (ELECTRICAL, 2019)
KEJURUTERAAN ELEKTRONIK		
44973	AHMAD SAFWAN BIN AHMAD KAMIL	BE HONS (UTM) (ELECTRICAL-MEDICAL ELECTRONICS, 2012)
52020	BILLCHEER GBRILL DUKE	BE HONS (UNIMAS) (ELECTRONIC-COMPUTER, 2017) ME (UNIMAS) (COMMMUNICATION SYSTEM, 2019)
90221	KOH JIUN HAO	BE HONS (UTAR KAMPAR) (ELECTRONIC, 2020)
86804	MOHAMAD AZRULAMIN BIN MOHD ADZUAN	BE HONS (UiTM) (ELECTRONIC, 2017)
51395	NUR IZANA BINTI AZIZAN	BE HONS (UTM) (ELECTRICAL-TELECOMMUNICATIONS, 2015)
105800	OOI KOK YONG	BE HONS (UMS) (ELECTRONIC-COMPUTER, 2019
90206	TAN LI KAR	BE HONS (UTAR KAMPAR) (ELECTRONIC, 2020)
89848	WOO WEN HUI	BE HONS (UTAR SG LONG) (ELECTRONIC, 2020)
KEJURUTERAAN INDUSTRI		
90217	LOI NAI KANG	BE HONS (UTAR KAMPAR) (INDUSTRIAL, 2020)
90227	TING CHAO YONG, EDWIN	BE HONS (UTAR KAMPAR) (INDUSTRIAL, 2020)
90191	WONG KER REN	BE HONS (UTAR KAMPAR) (INDUSTRIAL, 2020)
KEJURUTERAAN KIMIA		
45893	Dr LEONG SIM SIONG	BE HONS (USM) (CHEMICAL, 2013) PhD (USM)(NANOSCIENCE & TECHNOLOGY, 2018)
105343	GUNN FONG ERN, PRISCILLA	BE HONS (UTAR KAMPAR) (PETROCHEMICAL, 2020)
69437	HO MAY VERN, VICTORIA	ME HONS (THE UNI. OF NOTTINGHAM)(CHEMICAL, 2017)
105344	KHOO YEE TING	BE HONS (UTAR KAMPAR) (PETROCHEMICAL, 2020)
89333	LAW ZHI XUAN	BE HONS (UTAR SG LONG) (CHEMICAL, 2020)
96134	LIM SIEW CHE	BE HONS (UTAR SG LONG) (CHEMICAL, 2020)
107506	LIM XIAU CHIEN	BE HONS (UTAR KAMPAR) (PETROCHEMICAL, 2020)
103724	MARY THENG LINA	BE HONS (UTM)(CHEMICAL PROCESS, 2019)
89302	NALLIISHA A/P RAJESVARA RAO	BE HONS (UTAR SG LONG) (CHEMICAL, 2020)
99042	PANG YI WEN	BE HONS (UTAR SG LONG) (CHEMICAL, 2020)
89288	PHANG KAI SHENG	BE HONS (UTAR SG LONG) (CHEMICAL, 2020)
97391	SIAH CAI ZING	BE HONS (UTAR SG LONG) (CHEMICAL, 2020)
107508	YAP VENN HSIEN	BE HONS (UTAR KAMPAR) (PETROCHEMICAL, 2020)
KEJURUTERAAN PEMBUATAN		
93727	CHOO KEH CHUN	BE HONS (UTAR KAMPAR) (INDUSTRIAL, 2020)
89436	LIAN WAN YEE	BE HONS (UTAR KAMPAR) (INDUSTRIAL, 2020)
76995	MOHAMAD HAZIQ BIN AZEMAN	BE HONS(UiTM) (MECHANICAL-MANUFACTURING, 2018)
89860	ONG TAN JYN, MATTHEW	BE HONS (UTAR SG LONG) (MATERIALS, 2020)
KEJURUTERAAN MEKANIKAL		
78832	ADAM ALBAKRI BIN HISHAM ALBAKRI	BE HONS (UTP) (MECHANICAL, 2019)
67402	AHMAD ALMIZAN B. CHE OMAR	BE HONS (UiTM) (MECHANICAL, 2017)
76099	ASUNDARARAAJALOO A/L VATHIVELLU	BE HONS (UTHM) (MECHANICAL, 2018)
89397	AUNG JO JI	BE HONS (UTAR SG LONG) (MECHANICAL, 2020)
105281	AZZAMUDDIN BIN AZIZUDDIN	BE HONS (UiTM) (MECHANICAL, 2019)
80381	CHANG HONG PIN	BE HONS (UTAR SG LONG) (MECHANICAL, 2020)
96116	CHEE KONG MENG	BE HONS (UTAR SG LONG) (MECHANICAL, 2020)
22553	CHONG CHYI JIUNN	BE HONS (UNI. OF BRADFORD)(MECHANICAL, 2003)
89872	DING JUN WEI	BE HONS (UTAR SG LONG) (MECHANICAL, 2020)
69926	EUGENE ANAK JACKSON JOY	BE HONS (UNIMAS) (MECHANICAL & MANUFACTURING, 2017)

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