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IEM 54th Annual General Meeting and Annual Dinner and Awards Night 2013

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It's the IEM Annual General Meeting and Annual Dinner again

*by **Ir. Noor Hisham Yahaya***
Organising Chairman,
IEM Annual Dinner 2013

EVERY year in April, two significant IEM events are held namely the Annual General Meeting and the Annual Dinner.

Coincidently the 54th Annual General Meeting (AGM) was held on the same day as nomination day for the 13th General Elections. The fanfare on the streets of Jalan Sultan and closure of adjacent roads did not deter the members from attending the AGM.

Reports of the previous year's activities and financial accounts were presented at the AGM as well as the introduction of the new President and leaders for Session 2013/2014. IEM can expect to move forward with the times as highlighted in the Presidential Address.

With the end of the AGM, preparations commenced for the next highlight of the day, the IEM Annual Dinner. This is a time where all IEM members as well as other members of the engineering fraternity meet up to network and engage in informal discussions on a variety of issues affecting them.

The IEM Annual Dinner is always a time for IEM to award and recognize IEM members as well as members of the public who have contributed significantly towards the betterment of the Institution as well as to the nation.

For this 2013 Annual Dinner, the Mechanical Engineering Technical Division (METD) received the honour to organize the auspicious event in the IEM calendar. With the date, venue and Guest of Honour confirmed, the greatest challenges for the organizing committee was in ensuring that we could sell enough tables to bring in the funds and that the event would be memorable for all attendees. The committee had set a stretched target to sell 120 tables, but fell short by 5 when the final count indicated a commendable achievement of 115 tables.

Another target set by the committee was to pledge RM 100,000 from the proceeds of the Annual Dinner to the Wisma IEM Building Fund. Based on the final accounts, METD had managed to secure a profit of more than RM 100,000, thus fulfilling its pledge to IEM. As the saying goes, Janji di Tepati!

This achievement would not have been possible without the strong support from the sponsors, and I take this opportunity to sincerely thank all of them. I would also like to extend my humble thanks to my fellow committee members who had made great efforts to achieve METD's pledge to IEM. Not forgotten are the IEM Council and Executive Committee members who had given their utmost trust and encouragement to METD to organize one of the main events in the IEM calendar. The 2013 Annual Dinner is now over but the memories will surely live on … till we meet again at the 2014 IEM Annual Dinner! ■

The IEM 54th Annual General Meeting & Annual Dinner

by Ms. Reika Kua Kee Eng

THE IEM 54TH ANNUAL GENERAL MEETING

The IEM 54th Annual General Meeting (AGM) was held at Wisma IEM, Petaling Jaya, on 20 April 2013. The Annual General Meeting, one of the most celebrated annual events of The Institution of Engineers, Malaysia (IEM), had received overwhelming response from participants ranging from a diverse engineering background.

The 54th AGM commenced with a welcome address from Ir. Vincent Chen Kim Kieong, the President for Session 2012/2013. Soon after the welcome address, the AGM continued with the second item on the agenda of the day, which was the confirmation of the minutes of the 53rd AGM, during which several issues of concern were brought up. Subsequent to this, questions from the floor brought interaction among the participants of the meeting who also contributed to discussion on relevant issues.

Consequently, the 54th AGM was followed by a presentation of the Annual Report by the Honorary Secretary of IEM for Session 2012/2013, Ir. Prof. Dr Jeffrey Chiang Choong Luin. The meeting then continued with the presentation of the Annual Accounts by the IEM Honorary Treasurer for Session 2012/2013, Ir. Prof. Dr Lee Teang Shui.

Soon after Ir. Prof. Dr Lee presented the financial standing of IEM for Session 2012/2013, there was the awards presentation session for the IEM Technical Paper and IEM Women Engineer Award. Succeeding the awards presentation was the launching of IEM coffee table book, 'Engineering Heritage of Malaysia'. During the launch, IEM took the opportunity to express its gratitude to the main sponsor of this book, Brunsfield International Group, which was represented by Y.Bhg. Dato' Ir. Gan Tian Leong.

Last but not least, the meeting was followed by the Presidential Address for the Session 2013/2014 from the newly appointed President of IEM, Ir. Choo Kok Beng. The title of the Preseidential Address was "Forward Engineers Malaysia" which outlined his 7-year strategic plan for 2013-2020 to steer IEM towards achieving financial independence and sustainability.

The Imperial Ballroom was abuzz with good food and good company

All in all, the 54th Annual General Meeting of IEM was a great success. After the meeting had adjourned, participants of the AGM made use of the few hours interval to prepare themselves for the much anticipated IEM 54th Annual Dinner.

THE IEM 54TH ANNUAL DINNER

By half past seven, most of the invited guests and VIPs had filled up the reception area outside the Imperial Ballroom of One World Hotel, Bandar Utama, Petaling Jaya. The invited guests and VIPs enjoyed a cocktail reception and chatted lively with their friends and associates before the start of the event. At 8.00 p.m., all the guests proceeded to their assigned tables to be seated. The IEM 54th Annual Dinner and Awards Night 2013 officially kick-started with an opening gambit soon after the arrival of the Guest of Honour, Y.Bhg. Dato' Seri Ir. Hj. Mohd Noor bin Yaakob, the President of the Board of Engineers Malaysia (BEM). Consequently, a specially arranged presentation was held to signify the commencement of the dinner. All guests were treated to a sumptuous 9-course dinner during the 3-hour event.

The newly appointed IEM President for Session 2013/2014, Ir. Choo Kok Beng, was then invited by the Master of Ceremony to present his speech. In his speech, Ir.

The 54th Annual General Meeting in session

Ir. Choo Kok Beng presenting the Fellowship Certificate to Y.Bhg. Dato' Seri Ir. Hj. Mohd Noor bin Yaakob

Ir. Choo Kok Beng with the winners of the Presidential Award of Excellence. (L to R) Ir.Razmahwata Mohd Razalli (OGMTD), Ir. Lam Sing Yew (EETD), Ir. Prof. Dr Dominic Foo Chwan Yee (CETD), Ir. Noor Hisham Yahaya (METD, 1st Place), the President, Ir. Ong Sang Woh (CSETD) and Ir. Liew Shaw Shong (GETD)

Choo took the opportunity to welcome and thank the Guest of honour, Y.Bhg. Dato' Seri Ir. Hj. Mohd Noor bin Yaakob, as well as all the VIPs and invited guests for gracing the ocassion. Ir. Choo also expressed his gratitude to the former IEM President for Session 2012/2013, Ir. Vincent Chen, and the Council Members of 2012/2013 for their excellent work.

"Going forward, IEM will continue to engage closely with the engineering community in the coming session," said Ir. Choo. He added, "We are committed to continue driving new initiatives and programmes so as to add value to our membership and make impactful contributions to the engineering community". Before he ended his speech, Ir. Choo also thanked all the partners, sponsors, members of the organising committee, and the IEM Secretariat staff who had made the IEM 54th Annual Dinner and Awards Night 2013 a huge success.

Following the speech by the current President of IEM, the Guest of Honour was invited to present his speech. After thanking the IEM President, Immediate Past President, the Council Members, the organising committees and all the participants for making the event a successful one, Y.Bhg. Dato Seri Ir. Hj. Mohd Noor bin Yaakob also highlighted some of the amendments proposed by BEM to the Registration of Engineers Act 1967 which are important changes required to meet the current needs, challenges, and also the commitment made by the government to liberalise the professional services sector. "However, I believe that both IEM and BEM should leverage on each other's expertise and capability to synergise and enhance the image of the engineering profession in the country," he commented.

After his speech, a token of appreciation and the IEM Fellowship certificate were presented to Y. Bhg. Dato' Seri Ir. Hj. Mohd Noor by the IEM President, Ir. Choo Kok Beng. The dinner then continued with some very entertaining performances such as some traditional instrumental tunes performed with traditional musical instruments of the various ethnic groups, cultural dances and modern pop and ballad songs. The ballroom was filled with laughter and cheers from the guests.

Various distinguished awards were presented to well-deserving individuals and groups for their excellent performance and contributions to the engineering community and public. The award session started with the presentation of the IEM Gold Medal Awards, followed by the presentation of the Most Supportive Organisation/ Individual Awards, and the Presidential Awards of Excellence. Subsequently, the event continued with a mock cheque presentation of RM 100,000 for IEM Building Fund contributed by the Mechanical Engineering Technical Division. The contribution was raised from the table sale as well as other activities during the annual dinner. Soon after that, the invited guests were again entertained by some interesting dance and singing performances.

Some of the highlights of the night before the dinner ended were the Conferment of the IEM Special Merit Award 2013 to Minconsult Sdn. Bhd., Conferment of IEM Honorary Member to Y.Bhg. Dato' Prof. Dr Mohd. Noh bin Dalimin and also Conferment of IEM Honorary Fellows to the late Ir. Chan Khee Pok and the late Ir. Wong Kin Hong (received by their daughters on behalf of their late fathers respectively). Among other individuals who received the Conferment of IEM Honorary Fellow were Y.Bhg. Dato' Ir. Abdul Rashid bin Ahmad, Ir. Dr Ting Wen Hui, Y.Bhg. Datuk Ir. Prof. Dr Ow Chee Sheng, and Y.Bhg. Ir. Academician Prof. Dato' Dr Chuah Hean Teik.

Overall, the IEM 54th Annual Dinner and Awards Night 2013 was a huge success owing to the relentless efforts of the organising committee and the staff of IEM as well as the sponsors. ■

Mock cheque presentation of RM100,000 for IEM Building Fund contributed by the Mechanical Engineering Technical Division

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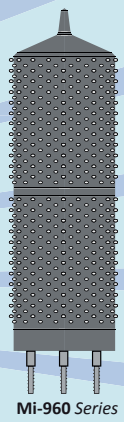

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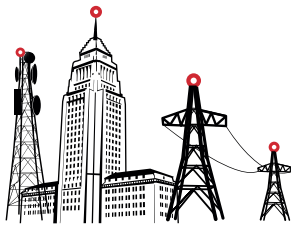

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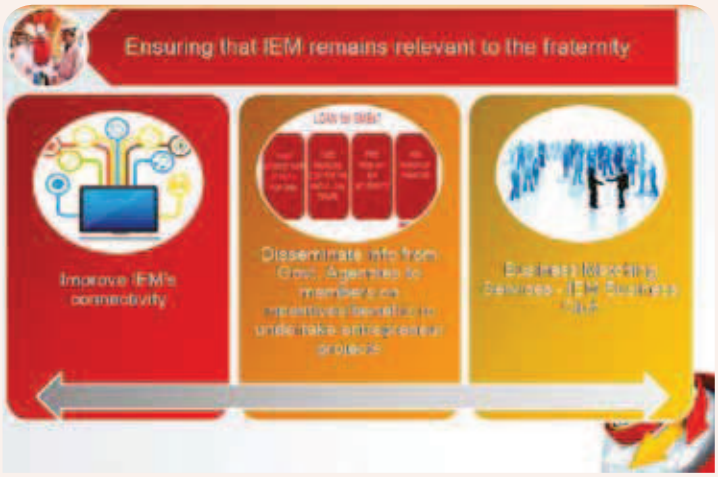
The following slides on the 54th Presidential Address were presented during the 54th Annual General meeting on 20th April 2013

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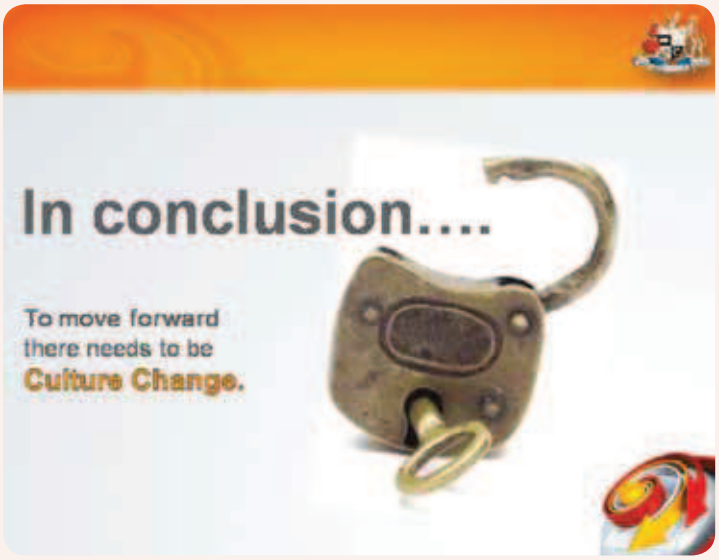
Reviewing the IEM Constitution
Branding the Image of IEM and its members
Empowering the Young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Embracing a More Dynamic Culture

by Reika Kua Kee Eng

FLEXIBILITY, open-mindedness and the willingness to adapt to changes are some of the essentials to realise any form of improvement in an organisation. And to make such improvement possible, the most important factor is the cooperation extended by every member of the organisation, as the members are the ones who will mobilise the plans to achieve the goals that have been set forth by the organisation. So how far are the members of IEM willing to go in order to seek the improvements that they have always been looking for?

> *"Many ... are simply skeptical [sic] that real change can occur. There is so much fear, so much mistrust that has built up over the years. But if we choose to be bound by the past, we will never move forward. And I want to particularly say this to young people of every faith in every country. You more than anyone have the ability to reimagine [sic] the world, to remake this world."* — Barack Obama (speech, 4 June 2009)

THE NEW PRESIDENT OF IEM

"Have a seat. Take some time to catch your breath before we start the interview session." Such were the very first remarks that came from Ir. Choo Kok Beng as I walked into his office, gasping after climbing a flight of stairs leading to his office. Despite his many remarkable achievements and high-ranking positions in various organisations both locally and regionally, Ir. Choo is humble, approachable and open-minded, but decisive and insightful all the same. Such are the traits possessed by Ir. Choo Kok Beng, the President of The Institution of Engineers, Malaysia (IEM) for session 2013/2014. Such profound leadership qualities, if coupled with the cooperation extended by every member and by all the divisions, council members and committees would serve as a powerful driving force for the Instituition and lead to the betterment of IEM in all aspects, ranging from its administration to operations, as well as its service to members and activities. This would then promote IEM's overall reputation and effectiveness.

I was debating with myself as to whether I should begin the introduction of this write-up with a major highlight of his many outstanding achievements or to begin describing the incoming President of IEM for session 2013/2014, Ir. Choo Kok Beng, from a more personal perspective. I chose the latter style of introduction without hesitation due to his open style of communication and his "down-to-earth" approach of issues. From my standpoint, getting to know the person beyond his notable achievements, and understanding what he has envisioned for IEM during his tenure of office, is of utmost important, as these would determine the direction that IEM would take in the immediate future and beyond. Thus, let us examine what the new President of IEM has planned for the Institution in the near future.

PROGRESSING TOWARDS A MORE DYNAMIC CULTURE

"Refreshing the existing IEM!" exclaimed the new IEM President excitedly. Such was his comment when he was asked about the future plans he has set forth for IEM. Ir. Choo further elaborated that he has envisioned IEM progressing towards adopting a more dynamic culture within its organisation. By a dynamic culture within IEM, Ir. Choo considers all IEM members to be part of the system, the problem and the solution, that will contribute towards the development of IEM.

"We should value the people (i.e. IEM members) who are the main force that would carry out the plans to improve IEM, in the aspects of administration, operations and its functionality, so that the overall processes and procedures can be simplified, resulting in improved efficiency and effectiveness," emphasized Ir. Choo. He further explained that trust, teamwork, engagement, and effective communication between all levels of IEM members would be inevitable to speed up the implementation of any activities or plans.

The new President of IEM also highlighted the importance of offering fair opportunities to all members of IEM. Although seniority and experience are some of the factors to be considered, other significant factors such as capability, creativity and innovativeness must not be overlooked.

He added, "The staff should be independent so that they can perform effectively with as little instruction as possible. This in turn will make everything work at a quicker pace, and thus, enable more plans or activities to be carried out within a shorter period of time." Therefore, Ir. Choo strongly believes that adopting a more dynamic culture within IEM is essential to enhance IEM as an organisation.

ENHANCING AND EXTENDING IEM'S SERVICES TO MEMBERS

Ir. Choo pointed out that about 80% of the current services

and activities of IEM are focused on the members within the Klang Valley. He remarked, "It has always been our aspiration to enhance and extend IEM's services to all our members across Malaysia. Hence, we need to reach out to all our members across the country at the shortest possible time." He further elaborated that once he takes office as the President of IEM, he will see to it that all activities, including training sessions, workshops, seminars, and so forth, are evenly held at all the branches throughout Malaysia, and not just within the Klang Valley.

In line with the aspiration to enhance IEM membership services, Ir. Choo also emphasizes the need to expedite the processing procedures of membership application. According to Ir. Choo, the current member admission process requires one month for approval. "If we could find a solution to automate the membership admission such as through online membership processing, it will cut down the processing time and procedures, which will greatly boost the effectiveness in terms of membership management," suggested Ir. Choo.

In addition to the above, Ir. Choo also expressed his desire to increase the interaction among committee members within every branch and also between all the branches across the nation.

GREATER RECOGNITION OF OUTSTANDING MEMBERS

"Sadly, there isn't much recognition given to those outstanding members of IEM who actually deserve to be recognised. I found it odd that numerous Malaysian engineers are internationally recognised and honoured, but not locally," remarked Ir. Choo. He stressed the importance of recognition as one of the motivating factors that will maintain the enthusiasm of engineers to push forward in providing greater services and innovation, and become the leaders in the engineering industry.

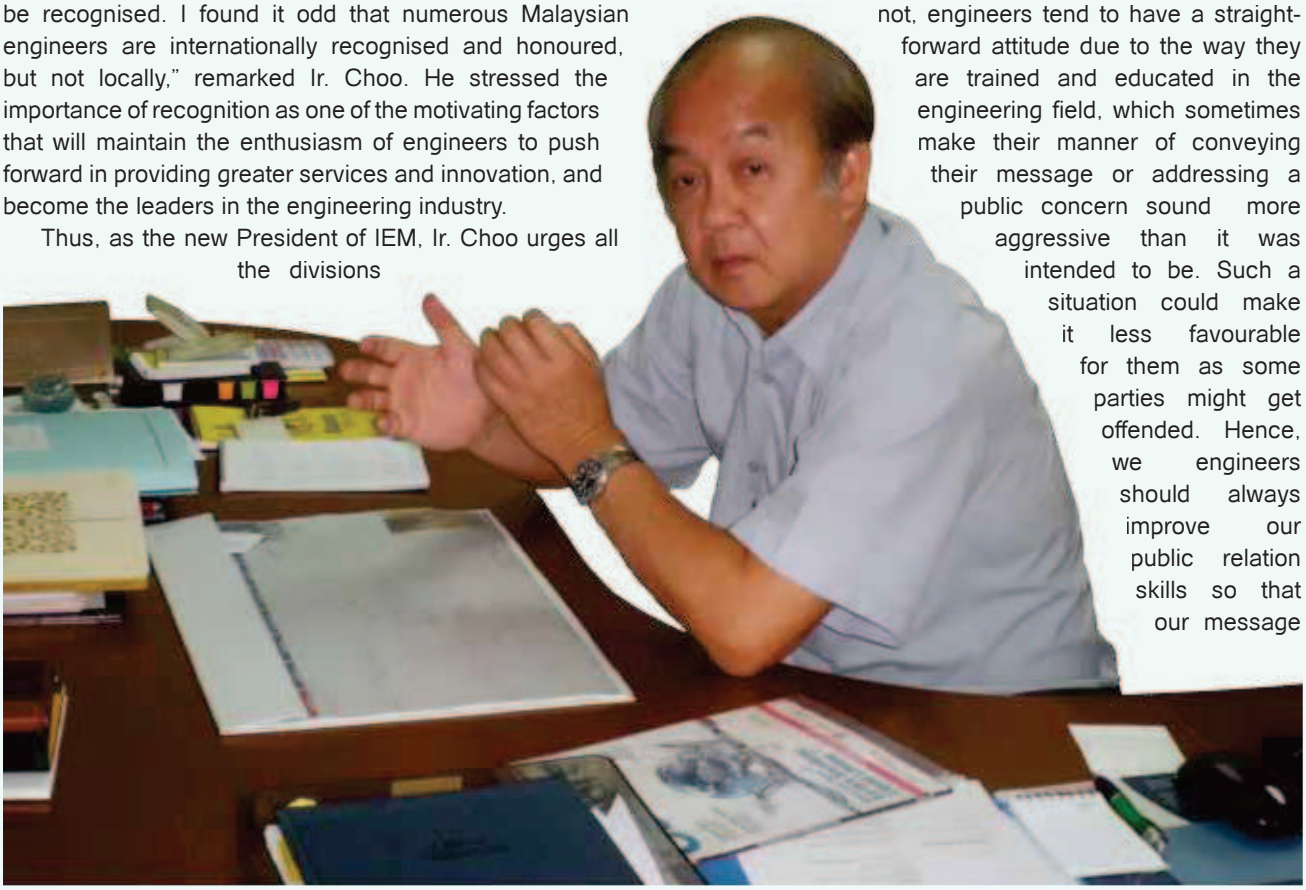
Thus, as the new President of IEM, Ir. Choo urges all the divisions and relevant committees to play a more active role in recognising the services and contributions of engineers regardless of whether they are veterans or new blood. According to the current practice, the Award Committee will hold its meeting once every 2 months. It would be great if the committee members could schedule their meetings more often in order to ensure that more deserving engineers would be recognised for their innovative efforts and contributions to society.

"I strongly recommend that fellow engineers be more proactive in terms of nominating commendable individuals for the related awards or recognitions. We shall not make the Award Committee bear such responsibility. In fact, we should encourage all divisions and other committee members to be more proactive when it comes to nominating the deserving engineers for awards or any form of recognitions," suggested Ir. Choo.

LET THE VOICE OF IEM BE HEARD

"We ought to speak loud enough to be heard, but in a gentle or diplomatic manner," commented the new IEM President, Ir. Choo. He continued, "To make our voice be heard does not mean that we have to be hard-lined. In short, we can express our opinions in a pleasant manner but still make an impact". Ir. Choo pointed out that there was a need for engineers to play their roles as a civil society, for the betterment of the public at large and for our country's development as a whole.

According to Ir. Choo, more often than not, engineers tend to have a straight-forward attitude due to the way they are trained and educated in the engineering field, which sometimes make their manner of conveying their message or addressing a public concern sound more aggressive than it was intended to be. Such a situation could make it less favourable for them as some parties might get offended. Hence, we engineers should always improve our public relation skills so that our message



can be put across effectively and thus generate the impact that is intended. "Perhaps, we could also leverage on the PR skills of the relevant media members to ensure that the voice of IEM is widely heard and generates the intended positive outcomes at the same time," said Ir. Choo.

PROSPECTS FOR 2013/2014

Before the interview session ended, the new IEM President said that he plans to visit all the IEM branches across Malaysia by July 2013 so that he could personally listen to what each branch actually requires, as this will certainly help him lay out a strategy that works in line with their needs and desired outcomes. When asked about the timeline required to implement all the plans that he has in store for IEM during his term of office, Ir. Choo confidently replied, "There is a very good chance to achieve the plans as set forth within the 2013/2014 term."

"I strongly believe that whatever plans that we have set out to achieve would eventually be the succession plan for our future leaders who would then continue to take on the initiatives and improvise on them for the betterment of IEM in every aspect!" concluded Ir. Choo Kok Beng, the President of IEM for session 2013/2014. ■

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IEM PAST PRESIDENTS

This is a compilation of articles under the Sub-Committee on Documentation and Recording of IEM Historical Events

NO history is complete without the people behind it. Similarly, IEM has had numerous dedicated and selfless leaders and members who had made many sacrifices to nurture and build up the Institution to what it is today — a proud symbol of all engineers in Malaysia.

In its 54 years of existence, IEM has had the services of 30 Presidents from various engineering disciplines.

The founder President was Allahyarham Tan Sri Ir. (Dr) Haji Yusoff Haji Ibrahim who served a four-year term. He was succeeded by another able leader, Allahyarham Ir. Raja Tan Sri Zainal bin Raja Suleiman, who was then the General Manager of Lembaga Letrik Negara (LLN).

29 other Presidents came after him and each in his own way left an indelible mark on the IEM and helped shape its destiny. These former leaders of IEM were:

No.	Name	Session
1.	Allahyarham Tan Sri Ir. (Dr) Haji Yusoff bin Haji Ibrahim	1959/62
2.	Allahyarham Raja Tan Sri Ir. Zainal bin Raja Sulaiman	1962/64
3.	Late Ir. Thean Lip Thong	1964/66
4.	Late Tan Sri Datuk Ir. Prof. Chin Fung Kee	1966/68
5.	Late Ir. Ow Yang Hong Chiew	1968/69
6.	Late Ir. Chan Peng Khuen	1969/70
7.	Y.Bhg. Tan Sri Dato'Ir. (Dr) Abu Zarim bin Haji Omar	1970/72
8.	Late Academician Tan Sri Ir. (Dr) J.G. Daniel	1972/74
9.	Allahyarham Tan Sri Datuk Ir. Haji Halaluddin bin Mohd Ishak	1974/75
10.	Late Ir. Chan Khee Pok	1975/77
11.	Allahyarham Tan Sri Datuk Ir. Mahfoz bin Khalid	April - December 1977
12.	Allahyarham Ir. Tuan Haji Mohd Razali bin Bidin	1977/79
13.	Late Ir. Wong Kin Hong	1979/81
14.	Ir. Chiam Teong Tee	1981/82
15.	Allahyarham Tan Sri Datuk Ir. Haji Mohd Hassan bin Abdul Wahab	1982/84
16.	Y.Bhg. Dato' Ir. Pang Leong Hoon	1984/86
17.	Ir. Tuan Haji Abdul Rahman Yaacob	1986/88
18.	Y.Bhg. Academician Dato' Ir. Lee Yee Cheong	1988/90
19.	Allahyarham Dato' Ir. Mustafa bin Ahmad	1990/92
20.	Ir. Chong Pick Eng (P.E. Chong)	1992/93
21.	Y.Bhg. Dato' Ir. Abdul Rashid bin Ahmad	1993/95
22.	Ir. Dr Ting Wen Hui	1995/97
23.	Ir. Tuan Haji Mohd Mazlan bin Md. Ismail Merican	1997/99
24.	Y.Bhg. Academician Datuk Ir. (Dr) Haji Ahmad Zaidee bin Laidin	1999/01
25.	Ir. Dr Gue See Sew	2001/03
26.	Y.Bhg. Dato' Ir. Prof. Abang Abdullah bin Abang Ali	2003/05
27.	Y.Bhg. Datuk Ir. Prof. Dr Ow Chee Sheng	2005/07
28.	Y.Bhg. Dato' Paduka Ir. Prof. (Dr) Haji Keizrul bin Abdullah	2007/09
29.	Y.Bhg. Academician Dato' Ir. Prof. Dr Chuah Hean Teik	2009/11
30.	Ir. Vincent Chen Kim Kieong	2011/13

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Condition Monitoring of Power Cables

by Ir. Mohd Raffi bin Samsudin, Dr Ir. Ahmad Basri Abdul Ghani, Ir. Huzaini Shafie Abd. Halim, Ir. Radzlan Hisham, Ir. Zairul Aida Abu Zarim, and En. Wan Zakaria Wan Kamarudin

INTRODUCTION

Polymeric power cables are widely used in the power transmission network. The use of these types of cables is increasing worldwide due to their higher performance as well as environmental concerns. The most popular type of polymeric power cable is the cross-linked poly-ethylene (XLPE). The XLPE cable is the successor of the paper insulated lead covered (PILC) cables.

The laying of power cables is very expensive and it involves approval from many local authorities. Thus it is very important to ensure that the assets operate reliably over its lifespan. A cable, which has been laid, will undergo pre-commissioning tests to identify and mitigate any form of manufacturing or installation defects. Once the cable has been energised, the insulation will age, and in addition, the presence of abnormal stresses such as thermal, mechanical and electrical (e.g. lighting and switching), above its design stresses, will further expedite the degradation of the insulation.

The most common causes of power cable failures are third-party digging, overheating, poor installation of accessories, moisture ingress and cable manufacturing defects. Damage caused by third-party digging can be prevented through the installation of cable markers along the cable routes, so that any person at work in the locality will be aware of the presence of the power cable underneath. In addition, law enforcement by the local authority such as the requirement to perform the utility mapping within the proposed work area for digging or piling work will help minimise accidental damage to the power cables.

On the other hand, the developing fault of overheating, poor installation of accessories, moisture defects and manufacturing defects can be identified by using proper condition monitoring techniques and the output data can be used to evaluate and assess the health of the power cable.

CONDITION MONITORING OF POWER CABLES

The condition monitoring of a power cable is very important because it will enable the utility to carry out mitigation action before it breaks down. The common techniques for condition monitoring of power cables are Visual Inspection, Infrared Thermography, Ultrasound, Insulation Resistance, Dielectric Dissipation Factor and Partial Discharge. In addition, other factors such as the age of the cable, operation and maintenance history would also provide additional information on the health of the power cable.

1. Visual Inspection

The visual inspection of XLPE power cables is more focused on the termination at the transformers and switchgears. This is performed in order to check for the signs of dust accumulation, surface tracking and insulation degradation.

2. Infrared Thermography

Infrared thermography is performed in order to check for the signs of overheating at the cable termination. A loose termination will have a higher contact resistance which will eventually cause a higher resistive loss at the termination. The localised hotspots will lead to accelerated degradation of the insulating material of the power cable. In addition, a degraded insulation which has higher losses can be detected by this method.

The difference between the measured temperature of a termination with the ambient temperature or the adjacent termination is used to decide on the severity of the hotspot.

3. Ultrasound

Ultrasound detection can be used to detect the “noise” in the breaker compartment as well as the cable termination compartment. It provides a safe measurement distance without the direct exposure to the live parts. The detected noise is the symptom of developing fault such as corona, tracking, arcing and mechanical looseness. The level of noise and the frequency of occurrence are used to determine the severity of fault.

4. Insulation Resistance

Insulation Resistance testing is one of the most traditional testing techniques for power cables. It is performed by applying a DC voltage source through the cable insulation. The applied voltage may vary based on the voltage rating of the cable. The insulation resistance is the ratio of the applied voltage to the residual current through the insulation. For XLPE cables, the ratio between the resistance at 1 minute and 0.5 minute is used to assess the condition of the cable. This ratio is known as Dielectric Absorption Ratio (DAR).

5. Dielectric Dissipation Factor

The dielectric dissipation test is done to assess the condition of the XLPE. A degraded or contaminated XLPE will have a higher loss factor, and thus, it can be revealed through this test. The insulation integrity of the XLPE cable is influenced by the presence of moisture and/or water tree as well as aging. Figure 1 shows the typical water tree in the XLPE cable.

Figure 1: Typical Water Tree in Power Cables

6. Partial Discharge

Partial discharge in power cables may happen due to a few reasons such as sharp edges, voids and embedded metal. Partial discharges in power cables are similar to cancer in the human body, where earlier treatment can actually save the life. A partial discharge source in power cable can further deteriorate the insulation which will eventually develop into arcing. The arc will further damage the insulation and finally, it will cause the system to trip.

The level of partial discharge is measured in pC (pico-Coulumb) and Table 1 summarises the PD level and the proposed action for XLPE cable. Meanwhile, Table 2 summarises the PD level and condition indicators for XLPE termination.

Table 1: PD Level and Proposed Action for XLPE Cables

PD Level (pC)	Proposed Action
0-250	Discharge within acceptable limit.
250-350	Some concern, monitoring recommended.
350-500	Some concern, regular monitoring recommended.
>500	*Major concern, repair of replace.*

TABLE 2: PD Level and Condition Indicators for XLPE Terminations

PD Level (pC)	Condition
0-500	Good
500-2500	Fair
>2500	Bad

7. Case Study

An underground power cable segment was selected from Site A, for the condition monitoring purpose. The above-mentioned methodology was used to assess the condition of the cable. The insulation resistance and partial discharge tests were carried out to assess the condition of the cables. The tests revealed that some partial discharge activities have occurred at the cable joints. The post-mortem and repair work were performed. Table 3 summarises the PD level and DAR readings obtained before and after the repair.

Table 3: PD Level and DAR Readings Before and After The Repair

	Red		Yellow		Blue	
	Before	After	Before	After	Before	After
Ground Noise [pC]	142	3	162	27	148	51
PDIV [kV RMS]	5.1	5.7	6.4	8.2	4.5	6.3
PDEV [kV RMS]	5.6	5.6	5.6	-	5.9	8.2
PD max. Uo [pC]	17200	234	107	0	580	95
No. of PD events Uo [N]	34	2	4	0	27	1
PD max. 1.3Uo [pC]	**42100**	**590**	**145**	**74**	**3050**	**110**
No. of PD events 1.3 Uo [N]	24	13	8	1	17	2
Dielectric Absorption Ratio (DAR)	**1.32**	**1.58**	**1.15**	**1.23**	**2.2**	**1.12**

The joints were retrieved from site and a post-mortem was performed. Figure 2, Figure 3 and Figure 4 show some developing faults in the joints. The PD was mainly observed at the ferrule which caused insulation burning.

After the repair work was done, the PD was repeated. The amount of PD was reduced significantly at the same location. This concludes that the condition assessment performed at Site A had managed to save the utility from a breakdown loss.

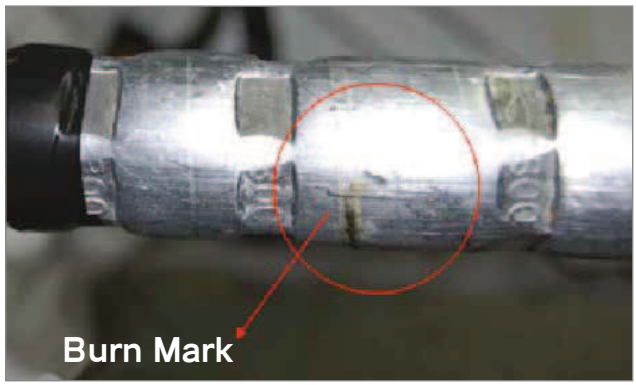


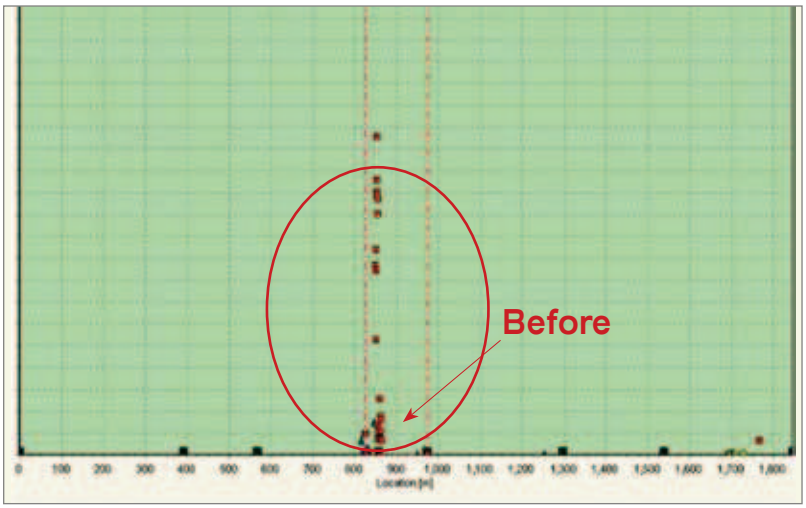
Figure 2: Burn mark at the ferrule (R-phase)

Figure 3: Burn mark at the insulation (Y-phase).

Figure 4: Burn mark at the insulation (B-phase).

CONCLUSION

Proactive power cable management is necessary to prolong the lifespan of the cable, as the test results can be used to generate the condition index of each cable. The condition index of a power cable will enable better planning on the cable loading and replacement regime. The information obtained from the condition monitoring methodology can also be used for better maintenance planning and management, hence reducing power outages and ensuring the continuity of supply. In addition, the knowledge of the health of the power cable is very crucial, so that a quick counter-measure can be taken against any overload condition. ■



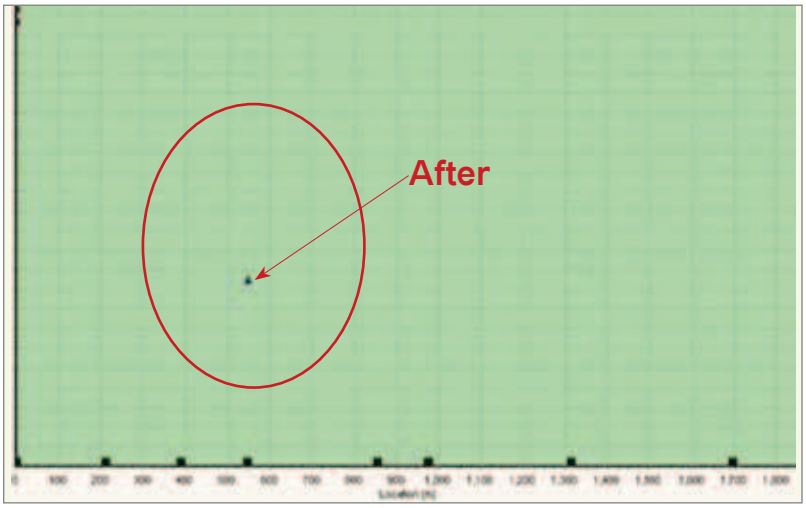


Figure 5: PD level before and after the repair

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Shale Gas: Controversies Explained

by Engr. Khor Cheng Seong

THE shale gas revolution has transformed the global energy scene, especially in the United States of America (USA). Today, shale gas is responsible for about 34% of the total natural gas production of USA with an expectation that it could reach as high as 60% by 2035 - an amazing feat given that its contribution was only 1% a decade ago. This rise to prominence has also resulted in the USA trumping Russia as the world's largest gas producer. Closer to home, our national oil company, PETRONAS, has recently acquired a company with shale gas assets in Canada. There is however no known shale gas resource in Malaysia.

WHAT IS SHALE GAS?

Shale is the original source rock for oil and gas, where vegetation and microorganisms have been deposited. Shale can contain oil or gas and, particularly in the USA, shale oil is also important. Despite its new-found value and role, shale gas has not been shy of controversies. In the carbon-constrained world that we live in now, it has its own share of detractors.

WHAT IS THE FRACKING PROBLEM?

A major issue concerns the environmental and possible seismic impacts of shale gas production. At the centre of attention is hydraulic fracturing, also known as hydrofracturing or simply fracking, which is one of the two main technologies that have been instrumental in economising shale gas extraction, the other being horizontal drilling. Figure 1 shows a schematic of typical shale gas production operations.

WHAT DOES FRACKING DO?

Fracking conventional oil reservoirs (which are mainly made up of porous sandstone) to improve production has been a common practice for many years since its introduction around 1903 and commercialisation around 1949. It is usually performed in a way so as not to frack the shale rock, which is the cap rock acting as a seal to trap the oil or gas underneath (and of several orders of magnitude less porous).

Fracking shale is more difficult since it is stronger and less brittle. Only in the last 10 to 20 years have the techniques been developed to enable shale to be fracked with confidence. The aim is to fracture the shale (which may not be very deep) but not the surrounding strata. If this can be achieved, the risk of direct leakage of methane or fracking fluid through the cracks to drinking water sources (e.g. aquifers) near the surface should be minimal. Like most of the other concerns raised, it is a matter of good management in designing the fractures properly. Developers have very detailed knowledge of the strata immediately around the well, though knowledge of the field as a whole is less detailed, but the quality of seismic data continues to improve over time.

Each well has several concentric tubes that form the well casings, more as it gets closer to the surface, and these are grouted in with concrete. This should prevent any leakage of methane gas or petroleum liquids to the surface around the well. However, cracks do occur in the grouting with time and with impact of the fracking. Thus, it is important to have a good quality grouting and regular monitoring.

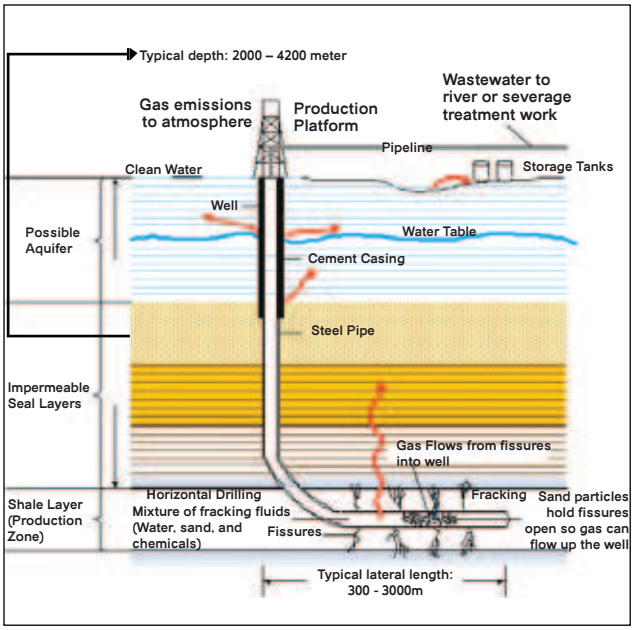

Figure 1: Schematic of shale gas production operations with horizontal drilling and fracking

IS FRACKING FLUID HARMFUL TO HEALTH?

Fracking fluid consists mainly of a water-soluble polymer gel called guar which is derived from wheat, and is harmless, and even safe if one accidentally consumes it. However, to improve its viscosity, small quantities of "cross-linkers" are added into it which sometimes include toxic metals such as

chromium, zirconate, or titanium; at one time, even napalm. But there are a lot of other options, and it is generally believed that it is quite possible to use only harmless materials.

IMPACT OF FRACKING ON WATER RESOURCES

A lot of water is needed in fracking, and it returns to the surface heavily contaminated. Most are treated, while some can be re-used but only after blending with clean water since it is so contaminated. Cleaning the returning water up to usable standards would be costly.

Possible water pollution due to fracking is perhaps the issue that has received the widest public attention. However, no conclusive result has yet to be found from available studies that fracking causes methane contamination of drinking water. Although such a possibility remains, other ways that methane from shale gas wells could end up in groundwater (which is the main source for drinking) include leaky well casings due to poor well design and operation, gas migration due to leakage from abandoned wells, and even naturally occurring methane. In any case, it is clear that good well design practices are crucial (Osborn *et al.*, 2011).

METHANE EMISSIONS FROM GAS PRODUCTION

A second major issue in shale gas production pertains to uncontrolled (or fugitive) emissions of methane gas through leakage and venting. Methane is the main content of the shale gas produced and is a greenhouse gas (GHG) with global warming potential. The concern is to what extent the fugitive emissions result in higher lifecycle GHG emissions (or GHG footprint) for shale gas production as compared to conventional natural gas. The next question is whether or not the fugitive emissions are more than the proven carbon emission savings from the use of shale gas rather than coal. The latter, if affirmed to be true, renders shale gas as not cleaner burning than coal (on a lifecycle basis).

The issue gained attention in a 2010 report by the Environmental Protection Agency of the USA (EPA, 2010) that approximately doubled the EPA's earlier estimates back in 1997 on methane emissions from the oil and gas industry. The main components of this very large increase were the estimated methane releases from gas well venting for liquids unloading, which were the gases needed to remove (or blow down) liquids that gradually build up and block flows in the wells.To elaborate, wells have to be vented when the well is completed in order to remove mainly the fracking fluids, and after a period of production, to remove liquids and rubbish that may have accumulated around the well. Moreover, methane venting is needed if the well is to some extent "wet", i.e., containing petroleum liquids besides gas. Technically, it would be quite possible to design a processing equipment using the so-called green technologies so that the methane is captured and separated for commercial use rather than vented to air. But this would also be quite costly.

In December 2011, the USA Argonne National Laboratory published its analysis of GHG emissions from the gas industry using the new EPA data. They concluded that 1.19% of shale gas production and 1.93% of conventional gas production escaped to the atmosphere (Burnham *et al.*, 2012). The findings suggest that less methane may be vented from shale gas production than that of conventional gas. This is because the shale deposits being developed are typically dry and do not yield much in the way of liquids. This is quite plausible: the shale deposits themselves vary all the way from dry gas to wet gas and shale oil.

SHALE GAS VERSUS COAL: WHOSE GHG EMISSIONS ARE HIGHER?

The Argonne study also found that considering a 100-year time scale for greenhouse impact, that the GHG footprint of shale gas is about 60% that of coal. They acknowledged a significant range of uncertainty, but not sufficient to achieve anything like parity between shale gas and coal.

On the contrary, an earlier study by researchers at Cornell University (Howarth *et al*., 2011) came to rather different conclusions that shale gas emissions are comparable to those from coal, exceeding them in their upper limit case on a 100-year time frame, while being substantially greater than coal on a 20-year time scale. Such finding went on to undermine the logic of shale gas use as a bridging fuel over the coming decades as we transition towards a low-carbon way of life.

The Argonne study criticised Howarth et al. on several grounds. These include their estimates of total lifetime production per well, emissions during delivery, emissions during flowback of fluids out of the well to the surface, and the allowance made for emissions reduction through recovery technology. Since then, numerous reports have been published with most bordering on the side of Argonne's findings.

Nevertheless, as the industry is relatively still in its infancy phase, it is difficult to draw hard conclusions. Clearly, methane emissions are much more significant than had been realised. They may significantly erode the mitigation advantages of both conventional and unconventional gas over coal. But the uncertainties are considerable and more studies are required. Of course, historical data of USA is not necessarily indicative of what would happen in new shale gas plays, or in the USA in the future for that matter. A further report is due from the EPA later.

TECHNOLOGIES TO REDUCE EMISSIONS

The current state of debate brings us to what may be the most important point for practitioners and investors alike. Plainly, there are technologies for reducing these emissions, which are widely known as reduced emissions completions (REC).

Apparently the USA Natural Gas STAR programme aims to do this and, according to Argonne, it was due to the total methane reductions claimed under this programme exceeded hitherto reported emissions that the EPA revised its inventory. According to the United Kingdom's joint Royal Society and Royal Academy of Engineering (2012) report on shale gas production, "… Green completion technologies [for shale gas production] could allow emissions levels similar to those associated with natural gas extraction. The EPA has issued federal regulations making green completion technologies mandatory for hydraulic fracturing of all gas wells in the USA from 2015 onwards." It goes on to recommend the consideration of similar regulation for the UK.

However, an interesting question that arises is how realistic it is to assume that these green technologies could make a big difference to methane emissions from future shale gas production in the USA, the UK, or China, the latter of which boasts of the largest shale gas resources in the world.

One rather bleak postscript: methane emissions from coal mining are, of course, also a rather complex element in the equation. According to Argonne, methane recovery from coal mines has been increasing rapidly in the USA until the early 2000s' but has now levelled off due to lower gas prices, which have offset coal use.

CONCLUSION

There are environmental and GHG emission concerns associated with shale gas production, but they are not dissimilar from conventional oil and gas production or any other industry for that matter. Proper well design and construction are crucial, so are the good production practices to ensure well integrity, coupled with prudent management of wastewater and other wastes alike. The environmental impacts can be mitigated with existing technology as with the emissions. Regular monitoring and implementation of suitable regulations are necessary to avoid significant local environmental damage.

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Engr. Khor Cheng Seong, is a lecturer in the Chemical Engineering Department of Universiti Teknologi PETRONAS. He holds a master's degree in chemical engineering from the University of Waterloo, Canada. His research interests are in modelling and optimisation of the design and planning for sustainable energy and water systems. He is currently pursuing his PhD studies at Imperial College London, UK.

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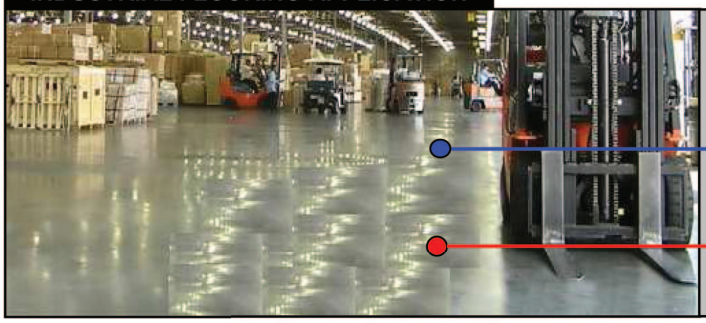

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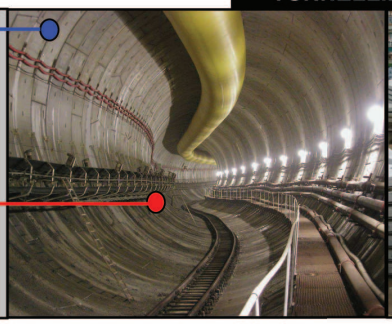

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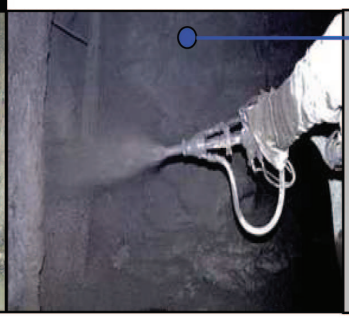

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CE

The Glass Factor in Bird Mortality

The advances in glass technology and production have made it possible for architects and engineers to construct all-glass buildings. Unfortunately, such buildings tend to be a major hazard to birds. It's time our building architects and engineers incorporate bird-friendliness into their designs. According to a renowned bird conservationist from Portland, Oregon in the United States, by simply incorporating visual markers into the most predictable hazardous parts of a building, we can easily prevent the unwanted deaths of birds. Research overseas indicates that unmarked glass on buildings is a major contributor of bird mortality. Only through research and proper monitoring of such incidents can we put in place workable preventive measures to protect our birds from flying into glass. We depend on birds for critical ecological functions. They consume vast quantities of insects and play a vital role in regenerating habitats by pollinating plants and dispersing seeds. Before many more "glass buildings" sprout up in our urban and suburban areas, it is time the authorities consider coming out with guidelines similar to the Guideline for Bird Friendly Building Design developed by New York City Audubon Society for the attention and benefit of our architects, planners, designers and house owners.

(Sourced from The Star, 12 April 2013)

Rethinking The Lithium-ion Battery Revolution Over Cost and Safety

For nearly two years, a team of former Chevrolet Volt and Toyota Prius engineers has been working on the next big thing in electric cars: the latest version of the 154-year-old lead-acid battery. Their aim is to build a battery strong enough to power a wider range of vehicles, something they think the current cutting-edge technology, lithium ion, cannot do cheaply, particularly given recent safety scares. The focus of Energy Power Systems on a technology older than the automobile itself illustrates the difficulty with lithium-ion batteries. While widely used in everything from laptops to electric cars and satellites, a number of high-profile incidents involving smoke and fire have been a reminder of the risks and given them an image problem. Many experts now believe it will take at least another decade for lithium-ion technology to be readied for widespread adoption in transportation. Interviews with two dozen battery executives, experts and researchers, including the founder of Securaplane, which made Boeing's battery charger, reveal an industry in which some are having second thoughts about using lithium-ion, and are instead looking to enhance previous technologies or to leap ahead. The lead-acid battery research is aiming for improved power in a smaller package.

(Sourced from The Star, 10 April 2013)

Felda Approves Construction of Racing Circuit in Jengka

Felda has approved the construction of a racing circuit in Jengka in a bid to produce a competitive second-generation of Felda settlers, as well as to enable them to enjoy recreational activity and interact with each other in a healthy environment. Chairman of Felda, Tan Sri Isa Samad said the racing circuit, which will be built at a cost of RM1.9 million, was expected to boost rural economy and increase the income of local residents, besides being a platform to search for new talents in motoring sport. He said that the circuit, covering an area of 5.3 hectare, would be used as the venue for drag race and sprint test, hence, combating social problems related to illegal racing among Felda youths. – BERNAMA

(Sourced from New Straits Times, 13 April 2013)

Boeing Talking to Malaysian Aerospace Industry Players on Technology Transfer

Global aircraft maker, Boeing, is talking to Malaysian aerospace industry players on technology transfers. An announcement to this effect is expected in the next few weeks. The Malaysian government is considering buying new multi-role jet fighters to replace the ageing Russian-made MIG-29s fighter jets. Malaysia's aerospace industry stands to reap immense benefits from the Hornet Industry Team (HIT) if the Royal Malaysian Air Force buys the Super Hornets. Boeing was also in discussions with the Malaysian government about how the company could partner with the local aviation industry on potential aerospace jobs. As Boeing was a diversified company, it could offer various areas of partnerships. Malaysia stands a good chance in identifying specific strategic interests and is keen to learn more about the aerospace sector to develop the industry. Malaysia's aerospace industry could work on two specific areas, namely composites and engineering. — BERNAMA

(Sourced from Aviation News, Bernama, 28 March 2013)

Environmental Courses: Link Between Engineers and Architects

Malaysia needs home-grown experts to advise sprawling townships and commercial industries on greening their edifices, a process that is currently dependent on professionals from developed countries such as the United Kingdom and United States. Thus, Universiti Kuala Lumpur (UniKL) has teamed up with the University of Applied Sciences Rosenheim from Germany (UAS RO) to offer the Master of Engineering Technology (Green and Energy-Efficient Buildings) to students in Malaysia. The international post-graduate programme, conducted at UniKL's Malaysian Institute of Chemical and Bioengineering in Malacca, is the first and only German-Malaysia green building master's programme in the country. This course warrants the implementation of an innovative, environmentally friendly-based programme according to the latest German technology in line with Malaysian requirements. Graduates of the programme almost automatically become specialists in green building, energy and management, and they serve as a link between engineers and architects in the local and international construction industry.

(Sourced from the New Straits Times, 21 April 2013)

SAFE TEA TIME

Business Crisis and Continuity Management

by Ir. Shum Keng Yan

LET us first define the umbrella of Business Crisis and Continuity Management (BCCM). The following elaboration will not be strictly based on any one authority for the methodology, as some of them work really well while some others take up a lot of resources that might actually cripple the response (hint: you might have read about a multi-national firm's recent recovery from disaster).

Let us take a look at a simplified BCCM continuum:

Business Crisis and Continuity Management (BCCM)			
Before	During	After	
Contingency Planning	Emergency Response	Business Continuity	
	Crisis Management	Business Recovery	Business Resumption

The above continuum will be explored in discrete articles in the coming months. Hence, there will be some overlapping points which will be highlighted during the phase of crisis up to the business resumption phase.

Before a crisis occurs, an organisation should set up a contingency plan as this would enable the organisation to deploy an immediate response, also known as emergency response or incident response, at the onset of the crisis.

Subsequently, during the final phase of the crisis, the business continuity plans should be executed. This would involve business recovery (disaster recovery) and finally, business resumption. The readers are reminded to compare the terms and find out what they mean in their own organisations.

Like any other management system, you have to first put a "Person-in-Charge" to oversee the system. Nothing can really happen without a Person-in-Charge. The Person-in-Charge should be a relatively logical and composed person who can decide and execute the plans with minimal and ever-changing information.

Not all senior management staff can fall into this category, as the pressure "to do the right thing" can paralyse even the most senior member of an organisation. Couple this with the threat of a job loss and litigation risk on the perceived "bad" decision, and you will find that not many are willing to take on this role. One of the hardest challenges is to face the criticism made by outsiders who are looking at the decisions without a thorough understanding of the situation when such crucial decisions were made.

If you have found your great BCCM leaders, do tell us more about them. Just drop me an email to share your experience: ***pub@iem.org.my***.

Failing to plan is planning to fail. Just take your very first step and appoint a proper "Person-in-Charge"!

Ir. Shum Keng Yan is a chemical engineer and a certified accident prevention and safety practitioner. He advises on EHS in the chemical, fast-moving consumer goods, heavy metal manufacturing and building services industries across Asia Pacific and beyond. He regularly delivers talks at conferences, forums and universities.

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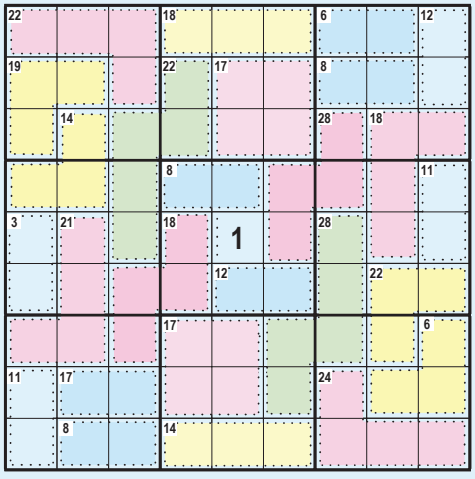
by Mr. Lim Teck Guan

Fill in the remaining 80 squares with single digits 1-9 such that there is no repeat of the digit in every Row, Column and Block of nine squares. The number at the top left hand corner of the dotted cage indicates the total for the digits that the cage encompasses.

For tips on solving, visit *www.1sudoku.com.my*

(Solution is on page 50 of this issue.)



A Trip to the Penjom Gold Mine

OIL, GAS AND MINING TECHNICAL DIVISION

by Engr. Rudisham Marjohan

BACKGROUND OF THE PENJOM GOLD MINE

Through the organising effort of Ir. Azwira Azmi, the Oil, Gas and Mining Technical Division (OGMTD) had successfully carried out a one-day technical visit to the Penjom Gold Mine on 28 April 2012, as part of its planned activities for the year. The delegation was made up of 11 members which included the members of the OGMTD committee, secretariat and other members of IEM from various engineering disciplines. A bigger number had earlier registered for the visit. However, as a large public rally had been scheduled on the same day, some participants had withdrawn their participation at the very last minute due to safety concerns.

The Penjom Gold Mine (coordinates N 4^0 07' 58.10" and E 101^0 59' 39.11") is located approximately 170km North East of Kuala Lumpur, in the district of Kuala Lipis, Pahang. It is accessible through the Federal Route 8 connecting the town of Bentong to Gua Musang with the turn-off to the mine just 8km short before the town of Kuala Lipis itself. The largest gold producer in the country, the site has had a long history of mining which first began in the 19th century. However, in recent times, production re-commenced in the now called Penjom Gold Mine in December 1996 under the previous ownership. It is currently owned by an Indonesian-based company, J Resources Nusantara, while the operation of the mine is carried out through a locally registered company called Specific Resources Sdn. Bhd.

The production method utilised at this mine is open-pit mining with blasting being the main method of rock-breaking. Mineral processing makes use of the Resin-In-Leach (RIL) process and gravity separation to recover the gold. The mine is expected to operate until 2017 based on the current reserve estimates. Current gross reserve is estimated at 586,000 oz of gold while gross resources stand at 1,051,000 oz of gold at a cut-off grade at 0.5 g/t. Year 2011 production (before auditing) was reported to be at 54,108 oz.

THE JOURNEY TO PENJOM GOLD MINE

The bus departed at 7.15 a.m. from Wisma IEM, Petaling Jaya. Other than a slight detour due to some road closures, the entourage proceeded uneventfully across town towards the Karak highway. After a short stop for a quick breakfast at a petrol station before the Bentong toll plaza, the bus continued its journey non-stop at the proper posted speed limit all the way to the planned destination. There was no problem with directions as some members of the group were quite familiar with the area, apart from being aided by signboards along the road. Upon reaching the entrance to the mine site, arrangements were made with the security personnel to secure all necessary PPE for the delegates before proceeding to the main building.

BRIEFING AND PRESENTATION

On arrival at the main building, the visitors were greeted by En. Mohd. Zakaria Endut, who is the mining geologist and who would act as our guide for the day. The delegates were ushered into a training hall where some refreshments were served. A brief introduction was made, followed by a safety briefing and a welcoming speech given by En. Mohd. Zakaria. This was reciprocated by a short appreciation speech by Engr. Rudisham on behalf of the IEM's OGMTD and the group. En. Mohd. Zakaria then proceeded with a very interesting presentation on the mine site that was well-received, before the group adjourned to the mine for a guided tour.

Reaching the main entrance to the mine site

Delegates were treated to a very informative presentation on the mine by En. Mohd. Zakaria

TOURING THE MINE SITE

After the presentation, delegates boarded the bus again for the mine tour. The gravel road network within the mine site was well-constructed and properly-maintained, and with the prevailing good weather on that day, it did not necessitate the use of a four-wheel drive vehicle to get around.

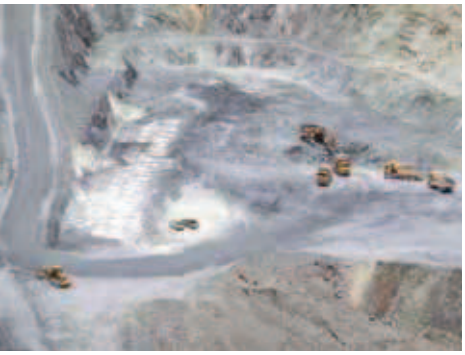
The first order of the day was to get to the mining pit which was located towards the other end of the property limit. As the bus progressed, the delegates had the opportunity to observe the daily activities at a mine site while passing by the workshop and vehicle maintenance areas, the storage areas and the core handling yards. The delegates also had a chance to witness the hustle and bustle of miners working with the tools of their trade. As the vast pit came into view, it became the most commanding sight as the bus travelled along the side of it.

The entourage was brought to the northern section of the pit wall where an observation post was located. From here, viewing the mining pit which was currently more than 200m deep was a magnificent sight. Delegates had the chance to note down salient points and observe some geological features as described earlier by En. Mohd. Zakaria during his presentation. He also took the time to explain the different parts of the pit, geology and the activities that were taking place at the pit. The abundance of pyrite or commonly called "fool's gold" amongst the debris surrounding the observation post piqued the interest of almost everyone as the mineral was often mistaken as gold.

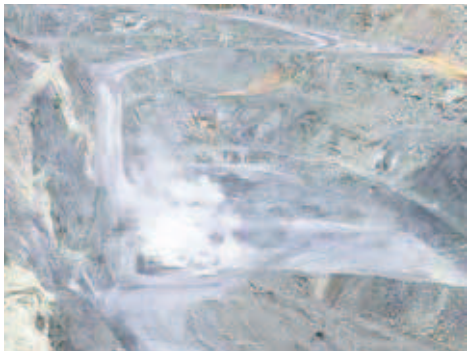
As the delegates were admiring the view of the pit, it was learnt that a section of the pit has already been prepared for blasting which was scheduled to take place later in the afternoon. It was an opportunity not to be missed and the delegates voted to wait a little longer to witness this rare occasion. The presence of a committee member, Ir. Look Keman, who is a well-known blasting expert and a group of engineers from the mine, whose task was to record and monitor the blast, among the delegates at the observation post made the wait a tolerable one as lively discussions on the topic of blasting filled up their time.

The view of the mining pit from the observation post looking south. Exploration drilling activities using an inclined drilling rig can be seen on one of the eastern benches as seen in the bottom left hand corner of the photo

Approximately 550,000 bench cubic metres of ore per month is mined this way with a strip ratio of ore to waste at about 1:25. The mine operates with a total of 810 personnel where 99% of them are Malaysians. It deploys quite an arsenal of mining equipment with a fleet of forty-nine 30t haulage and dump trucks, nine 65t excavators and five units of blast-hole drilling machines being the main machineries. All in all, about 500 holes can be blasted on any given day if required. To date, 1,270,462 oz (39,516kg) of gold from 9,384,373 tonnes of ore has been mined under the current management.



Final preparation of the bench being carried out for blasting and the blast holes can be clearly seen



Moments after blasting

VISIT TO THE PROCESSING PLANT

After this exciting event, the delegates assembled and boarded the bus again to return to the main building for the next stop, namely the processing plant. The processing plant was a mere walking distance from the main building passing through another set of security filter.

The plant has the capacity of processing 740,000 tonnes per annum of ore, out of which about 60,000 oz of gold can be produced yearly. It is equipped with a jaw crusher, three units of ball mills, two concentrators,

eight leaching tanks, six batches of leaking tanks and shaking tables, amongst its main processing equipment. There are two main processing methods deployed here; namely the gravity methods to handle the coarse particles and the chemical methods to treat fines.

Broken ore from the pit is dumped into the ore bin which feeds into the jaw crusher. From here, by conveyors the crushed ore is fed into the ball mill and grounded. The mill's discharges then goes through a cyclone where the heavies or underflow will be routed to the scalping screen and from there on to the concentrator. Concentrates produced from the concentrator are then fed to the shaking table where gold nuggets are recovered.

The overflow or fines from the cyclone is treated chemically with a method called Resin-In-Leach (RIL) gold recovery process. The cyclone overflow goes through a screen and then into blanking cells where it is conditioned with lime. These are then transferred into the RIL tanks where cyanide is added. From here, resins loaded or pregnated with gold from the RIL tank is screened and then sent to the resin stripping column while the barren solution is discharged to the plant tailings. Gold from the pregnant solution that comes out of the resin stripping column is then recovered by electro-winning method. The gold nuggets that were recovered earlier through the gravity method are then smelted together with the gold recovered by electro-winning. This molten mix is then poured into a mould that produces 10 to 15kg of gold bullion with 99.99% Au content.

The mine has also been implementing a progressive mine rehabilitation method and has often been cited by the mining authorities in the country as a model of a successful progressive mine rehabilitation programme.

Towards the end of the tour at the processing plant, delegates paid a visit to the Gold Room. This is where the nuggets are recovered and smelting is done. Unfortunately, there was no smelting done at the time of the visit, and therefore, no gold bullion was in sight. However, the delegates were delighted to see some tiny gold nuggets recovered from the shaking tables.

Part of the processing plant site showing the crusher, conveyor and milling sections

The shaking table used to collect gold nuggets or coarse gold particles

VISITING THE LABORATORY AREA

From the Gold Room, delegates proceeded back to the training hall where lunch was served. During lunch, members of the group took the opportunity to inquire more information and seek further clarification from En. Mohd. Zakaria on the mining and processing of gold. In the air-conditioned comfort of the training hall, a short appreciation ceremony was also held with Ir. Look Keman presenting an IEM memento to En. Mohd. Zakaria and J Resources Nusantara.

After lunch, delegates were brought to the laboratory area which sits in the main complex. Delegates then had the chance to witness some of the tests carried out and how assaying was done to the samples collected from the mine or exploration sites. This included the Fire Assay process and the Aqua Regia technique to determine the weight and amount of gold including its quality from the samples taken. Part of the Fire Assay procedures involved heating the material in a furnace. The more than 1,200^{0}C of heat generated from the furnace could be felt by all the delegates even though they were standing some distance away.

RETURNING TO WISMA IEM

Ir. Look Keman on behalf of the IEM OGMTD presenting a token of appreciation to En. Mohd. Zakaria

IEM delegates with En. Mohd. Zakaria taking a group photo to commemorate the occasion

At the end of the tour, En. Mohd. Zakaria took the delegates to the Mine Planning unit to have a feel of how the whole mining activities were planned to meet the desired objectives and to achieve efficiency. The group then assembled again in the front yard of the main building to take a group photo before boarding the bus to head for home. The bus left the mine site at 4.30 p.m. and safely reached Wisma IEM just before 8.00 p.m. It had been a successful outing despite the small number of participants. ■

Engr. Rudisham Marjohan, a mining engineer from Technical University of Nova Scotia, Canada, had served many years in the exploration and mining of gold and iron in Malaysia and Indonesia. He is now involved with subsea/deepwater processing technologies within the oil and gas industry.

The author wishes to express his gratitude on behalf of the participating delegates to Ir. Azwira Azmi and the secretariat for organising this trip, to J Resources Nusantara and to En. Mohd. Zakaria Endut in particular, for his willingness to spend the day with the delegates on his day off.

CONGRATULATIONS

The IEM Council would like to congratulate Datuk Ir. Rosaline Ganendra for being awarded the "*Bella Business Award*" for her outstanding contributions to women in business by raising the standing of women in the business arena, and making them strive to achieve their true potential. The award was presented at The Bella Night held on 2 March 2013 – the first ever women's awards show in Malaysia.

Datuk Ir. Rosaline (2nd from left) with the other winners.

CONGRATULATIONS

The IEM Council would like to congratulate the following members:

Dato' Ir. Prof. Dr Othman bin A. Karim, on being conferred the "Darjah Setia Bakti Negeri Sembilan (D.B.N.S.)" which carries the title Dato' in conjunction with the 65th Birthday of Yang di-Pertuan Besar Tuanku Muhriz Tuanku Munawir on 14 January 2013; and

Dato' Ir. Hj. Wan Husin bin Wan Embong, on being conferred the "Darjah Dato' Paduka Mahkota Terengganu (D.P.M.T.)" which carries the title Dato' in conjunction with the 50th Birthday of Kebawah Duli Yang Maha Mulia Sultan Terengganu on 20 July 2012.

NEW APPOINTMENTS

Y.Bhg. Academician Dato' Ir. Prof. Dr. Chuah Hean Teik has been appointed FEIAP President for 2012/2013

Ir. Tan Yean Chin has been re-appointed as FEIAP Secretary-General, 2013/2014

Ir. Choo Kok Beng has been appointed as Chairman of IPE/ APEC Registration Committee, 2013/2014

Y.Bhg. Dato' Ir. Lim Chow Hock was appointed as AFEO Secretary General as of 1 January 2013

Y.Bhg. Dato' Ir. Dr Andy Seo Kian Haw was appointed as AER Head Commissioner from 1 January 2013

Note:
***FEIAP** – Federation of Engineering Institutions of Asia and the Pacific*
***AFEO** – ASEAN Federation of Engineering Organisation*
***AER** – ASEAN Engineering Register*
***IPE** – International Professional Engineer*
***APEC** – Asia Pacific Economic Cooperation*

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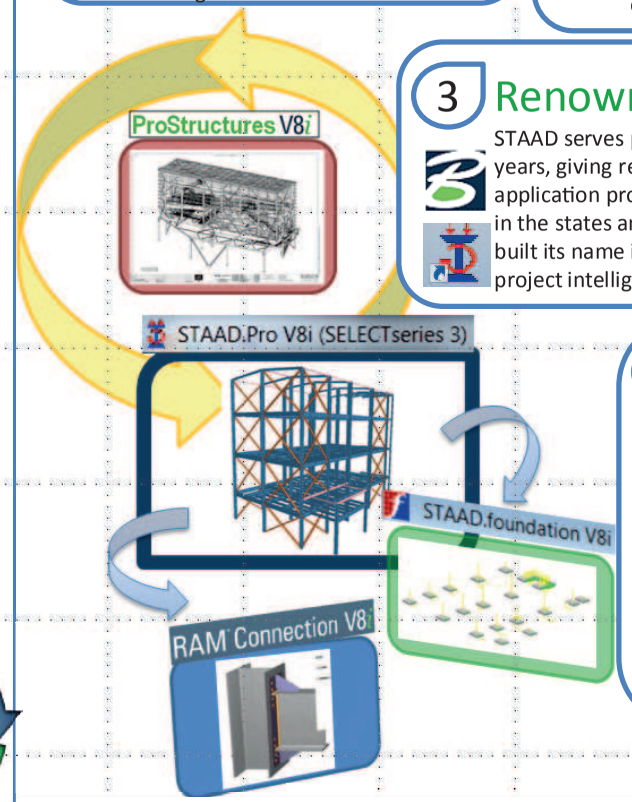

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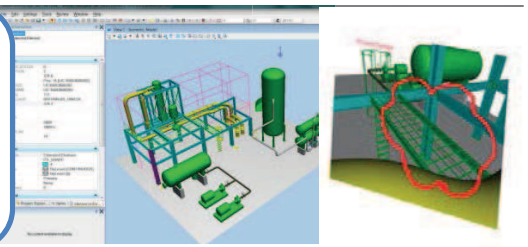

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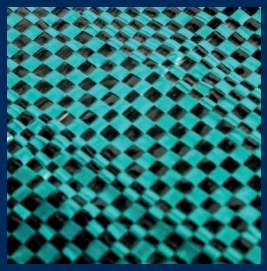

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Geogrid for Working Platform Construction

GEOTECHNICAL ENGINEERING TECHNICAL DIVISION

by Engr. Richard Ong Tiam Hwa

AN evening talk entitled, "Geogrid for Working Platform Construction" was held on 3 September 2012 at the Auditorium Tan Sri Prof. Chin Fung Kee, Wisma IEM. The talk was delivered by Engr. Richard Ong and attended by an audience of 36 people.

The speaker started his talk with the presentation of some photographs on the effects of poor working platforms on piling rigs and cranes. A series of photographs illustrating the difficulties of mobilising cranes to salvage sinking and collapsing piling rigs or cranes on poorly prepared working platforms were shown.

Based on a news report in the United Kingdom, Engr. Richard Ong highlighted that one third of the accidents in the piling industry resulted from the defects in the working platform. These accidents could be avoided if proper design of the working platform, which is normally constructed of granular material, had been conducted prior to deploying the tracked plant to the project site. A reference was then made to the Building Research Establishment's (2004) report BR470 on Working Platforms for Tracked Plant. This report provides guidance on working platform design and construction with the aim to improve safety without undue expenditure. Within the report, there is a section dedicated to the use of geosynthetics in working platform design and construction. Subsequently, the speaker discussed about the use of geogrid in working platform construction.

The speaker introduced the mechanisms by which the inclusion of a geogrid may improve the performance of an unbound aggregate layer over soft soil. When granular particles are compacted over geogrid, they partially penetrate and project through the apertures and are mechanically confined by the geogrid to create a stiff composite layer. This interlocking mechanism leads to the quality of the lateral confinement which varies over its thickness as shown in Figure 1.

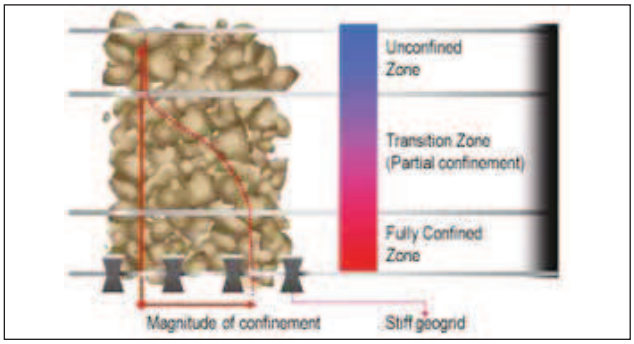

Figure 1: Interlocking mechanism of stiff geogrid providing lateral confinement

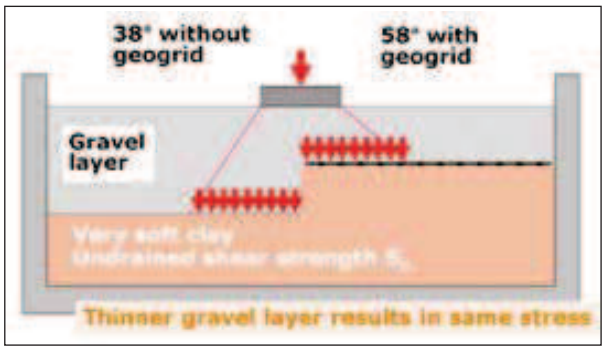

Figure 2: Increase of load spread angle with the use of geogrids

Subsequently, the speaker presented the findings of two research papers conducted on the effectiveness of inserting geogrid into granular load platforms. The research by Milligan and Love (1985), which investigated the interlocking mechanism and load spread via models of static foundation over granular layer with and without geogrid over soft clay, showed that the performance of a geogrid stabilised granular layer was significantly better than a granular layer without geogrid due to the increase of the load spread angle as shown in Figure 2. Similarly, a recent large-scale laboratory test by Watts and Jenner (2008) to assess the performance of a geogrid stabilised granular working platform concluded that the use of two layers of geogrids significantly increased the bearing capacity of working platforms due to the improved load spread achieved by using geogrids.

From the findings of this large-scale laboratory research, the speaker went on to provide two case studies which highlighted the real world application of geogrids in working platform construction. The first case study presented was the construction of a geogrid stabilised working platform for an offshore jacket fabrication yard in Johor which was constructed to support a 225-tonne crawler over soft clay subgrade in 1987. The second case study presented was the construction of a geocell mattress with geogrid stabilised granular layer adopted in the construction of a working platform to support the movement of heavy crawler cranes with loadings of up to 500 kPa in Vung Tau, Vietnam. The speaker ended the evening talk with a remark that the working platform for a tracked plant can be designed with or without geogrid. ■

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[3] Watts, K. and Jenner, C. G. (2008), "Large-scale laboratory assessment of geogrids to reinforce granular working platforms", Proc. EuroGeo4 Conf., Scotland, UK, Paper #222.

Engr. Richard Ong Tiam Hwa is currently a committee member of IEM Geotechnical Engineering Technical Division (GETD). He is Area Manager - Asia of Tensar International Limited.

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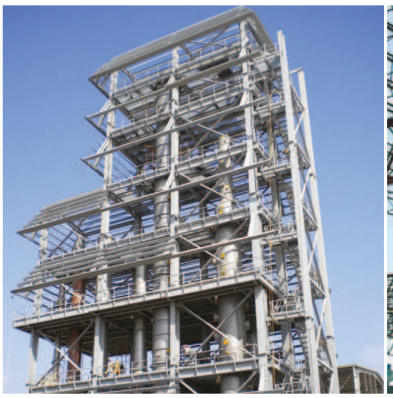
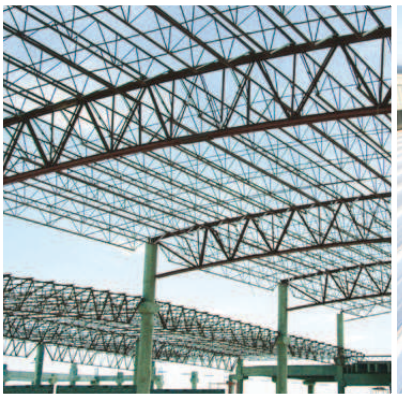
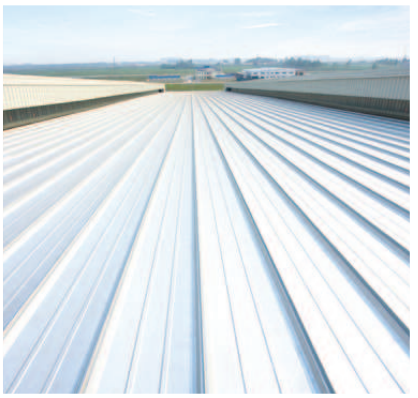

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Talk on 'The Route To Becoming A Professional Engineer' at UTM Razak School, Kuala Lumpur

by Engr. Dr Habibah Haron @ Norehan Haron

SUB-COMMITTEE OF WOMEN ENGINEERS

ON the 10 October 2012, IEM Women Engineers (IEM WE) was invited to Universiti Teknologi Malaysia (UTM) Razak School to share with the participants the requirements and career path to becoming a professional engineer. A total of 22 academic staff consisting of both male and female academicians attended the talk which was held at the Seminar Room in the UTM Razak School, Kuala Lumpur campus.

IEM WE was represented by Ir. Raftah binti Mahfar and Engr. Dr Habibah @ Norehan binti Haron who took the opportunity to introduce and promote the activities of this sub-committee. Meanwhile, Ir. Prof. Dr Abu Bakar Bin Mahat represented IEM to deliver a briefing on the route to becoming Professional Engineers. The programme was a success as it managed to attract all the female participants to join WE as members. Many of the participants had also submitted their application forms to be IEM members during this event. ■

The academic staff posing with the speakers for a group photograph.

A token of appreciation was presented to Ir. Raftah binti Mahfar at the end of the talk.

A token of appreciation was presented to Engr. Dr Habibah @ Norehan binti Haron before the event ended.

Engr. Dr Habibah @ Norehan Haron, is a Senior Lecturer at UTM Razak School of Engineering and Advanced Technology. The interests of her research are namely focused in the areas of Engineering Education, Manufacturing Engineering, and Industrial Engineering.

OBITUARY

With deep regret, we wish to inform that **Dato' Ir. Prof. Dr Mohamed Dahalan bin Mohamed Ramli** had passed away on 7 November 2012. On behalf of the IEM Council and management, we wish to convey our deepest condolences to his family.

The Effects of the Global Financial Crisis on the Australian Building Construction Supply Chain

by Ir. Chew Weng Yuen

ENGINEERING EDUCATION TECHNICAL DIVISION

THE Engineering Education Technical Division had co-organised a talk entitled, 'The Effects of the Global Financial Crisis on the Australian Building Construction Supply Chain' with the Engineers Australia Malaysia Chapter, and the Institution of Mechanical Engineers Malaysia Branch, on 30 October 2012, at the C & S Room, 2nd Floor, Wisma IEM. The talk was delivered by Dr Chan Toong Khuan who is a senior lecturer at the University of Melbourne, Australia.

A total of 31 participants had attended the talk. Dr Chan started the talk with a brief overview of the Global Financial Crisis (GFC) which is commonly believed to have begun in July 2007 with the loss of confidence by US investors in the value of sub-prime mortgages.

OVERVIEW OF THE AUSTRALIAN ECONOMY

Dr Chan then proceeded to show the changes in the Australian gross domestic product (GDP), building starts and building volume for each quarter between 2005 and 2010 as extracted from the Australian Bureau of Statistics (ABS 2010, ABS 2011). It was recorded that the Australian GDP declined in the fourth quarter of 2008. From the fourth quarter of 2007 to the fourth quarter of 2008, building commencements fell by 22% due to an increase in unemployment rate and reduced confidence in the market. Office properties experienced a 20.6% decline in revenues for the financial year 2007-2008 and the retail market was also affected, resulting from reduced consumer spending.

The Australian Government's response to the GFC was then highlighted in the talk. In October 2008, the Reserve Bank of Australia (RBA) Board had cut interest rates by 100 basis points to 6% whilst the Australian Government announced that it would guarantee all Australian bank deposits, and also an AUD10.4 billion stimulus package including AUD1.5 billion to support housing construction.

In December 2008, it brought forward the commencement of large-scale infrastructure projects worth AUD4.7 billion and in February 2009, a second stimulus package worth AUD42 billion was launched where 70% of the package were to be spent on schools (AUD14.7 billion), social and defence housing (AUD6.6 billion), energy efficiency measures (AUD3.9 billion), and AUD890 million on road, rail and small-scale community infrastructure projects. The third phase of the infrastructure programme worth an additional AUD22 billion was announced in May 2009. As a result, there was a large increase in building starts in the third and fourth quarters of 2009.

Dr Chan lamented the difficulty in categorising Australian companies that truly operate in Australia alone and also that truly represent a given sector of the supply chain. Notwithstanding this, he had managed to select 16 companies for the study.

CONTRACTION IN BUILDING CONSTRUCTION

The financial data of the four sectors of the building construction supply chain between the periods of 2006 and 2010 was highlighted. It was shown that in terms of revenue, property developers and A-REITs showed significant declines in 2008 and 2009, and in the case of developers, continuing into 2010. The building material sector showed a marginal contraction of 2.8% in 2009 followed by a further reduction of nearly 7% in 2010. In contrast, revenues for building contractors continued to increase, albeit by only 1.6% in 2009 and 0.8% in 2010 despite the slump in building starts in late 2008 (builders are not immediately affected by a downturn due to continuing construction projects awarded a couple of years earlier). It was pointed out that the stimulus packages had maintained building starts at a level of AUD81.5 billion and 75.6 billion in 2008 and 2009 respectively. In terms of net assets, the building contractors have more than doubled theirs as compared to 2006 with other sectors averaging an increase of 50%.

BUILDING COST STRUCTURE

Dr Chan went on to examine the industry cost structure by comparing input costs to revenue for each sector. For the material supplier sector, the cost structure is heavily weighted with a significant cost of input materials (represented by the cost of goods sold, COGS) and operating expenses. It was shown that the COGS and expenses have remained fairly consistent at 56% to 58% and 29% to 30% respectively, leading up to the GFC. The most significant effect is the drop in profit from 8% in 2007 to 1% in 2010.

For the building construction sector, COGS represents close to 90% of the total revenue with profits accounting for 3-4% pre-GFC. The study indicated that all the inputs have remained relatively stable with evidence of profits being squeezed. The interest expense for the building construction sector is lowest amongst all four sectors at less than 0.1%, indicating that companies in this sector have insignificant bank loans.

For property developers, the cost structure consists of 70% for cost of goods and another 12% to 15% for operating expenses. Interest payments amount to approximately 3% of the total revenues. It was pointed out that in terms of profit, property developers have reported large deviation in

excess of 12% profit pre-GFC to losses amounting to approximately 20% of revenue in 2009.

The A-REITs do not report COGS. As this sector is heavily reliant on debt to finance the purchase of real estate assets, interest payments are relatively higher for this sector, i.e. close to 10% of total revenues. A-REITs were amongst the most severely affected with a reported cost structure nearly three times that of the total revenue for 2009, although it showed the highest profit margins with pre-GFC profit levels at 66% of the total revenue.

EFFECTS OF THE GLOBAL FINANCIAL CRISIS

In 2008 financial year, a decline was observed when the effects of the GFC started to affect the bottom line with a loss of 27%, and continuing the decline with a loss amounting to nearly 200% of the total revenue in 2009. It was explained that the GFC has a two-fold effect on the A-REITs: a loss of confidence in the property market that caused real estate valuation to plunge and massive write-down of assets values; and a drop in the occupancy causing a sharp decline in revenue.

Dr Chan continued by briefly vetting through the financial ratios of the companies that were being studied. He mentioned that it is generally accepted that ratios measuring profitability, liquidity, activity, leverage and solvency are used to gauge corporate performance. It was further clarified that the financial ratios were weighted based on the annual revenues of the respective companies.

A tabulation of 'Z score' obtained from a distress analysis carried out on the companies in the four sectors was highlighted. It was shown that building contractors and building material suppliers in Australia were financially sound and were able to withstand the impact of the GFC whereas property developers and A-REITs were the most vulnerable.

SUMMARY OF FINDINGS

All four sectors examined were susceptible to the GFC. The building material suppliers were the least affected as these companies have remained profitable and solvent throughout the period examined. They benefited substantially from the building economic stimulus package provided by the Australian government. Nett assets of these companies continued to grow. As these companies were also in the business of manufacturing products for other sectors of the economy, they also have customers in other sectors of the economy and thus were only marginally affected by the decline in construction demand in 2008. The activity ratio for these companies remained relatively constant over the period.

The building contractors also benefited substantially from the building economic stimulus package provided by the Australian government. However, Dr Chan expressed that there was a high likelihood that the findings might have been different if the study period had been extended beyond 2010 as the projects under the stimulus package would have been completed. The nett assets of the building contractors had doubled from 2006 to 2010 indicating that substantial additional investments were made into these companies. Despite this, the profit margins were low at 3% to 4%, and were further depressed by competition for jobs leading up to the GFC. These companies had a debt ratio of 60% and thus were able to repay their debts.

The property developers and the A-REITs were the most affected sectors in this GFC where severe drop in profitability was reported in 2009 when developers and A-REITs showed losses amounting to 25% and 105% of revenue, respectively. The GFC eroded the peak market capitalisation of Australian REITs from AUD147 billion in 2007 to AUD74 billion at the end of the 2010 financial year. The steep decline of asset values during the GFC was magnified by the high gearing employed by the A-REIT sector. The level of debt had reduced slightly to 0.33 in 2010, indicating a more conservative and managed approach to gearing in this sector after the GFC.

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CASE STUDIES AND IMPORTANCE OF DATA

After the summary, Dr Chan proceeded to illustrate four case studies involving Australian companies that were badly affected by the GFC. He also showed as a postscript, a number of companies in the study sample that were reported to be in financial distress and had failed in 2012.

Dr Chan said that he hoped the findings from the study would reveal how ratio analysis, changes in the cost structure and financial distress could be used to examine the severity of the impact of the GFC on the Australian building construction supply chain. He also hoped that the findings would help investors, managers and construction professionals in devising strategies for prudent financial management and for weathering future financial crises.

There were active discussions and questions raised by the participants throughout the talk as Dr Chan encouraged a more interactive session. The talk ended with the presentation of a memento to Dr Chan and a round of applause from the participants. ■

Note: The above report was prepared with the help of the presentation slides and the paper of the same title that had been published in the Australasian Journal of Construction Economics and Building, 12 (3) 16-30, 2012. The material is used with the kind permission of Dr Chan Toong Khuan.

The author graduated with a Bachelor of Engineering (Civil) from RMIT University (1986) and an MBA (Technology Management) from Deakin University, Australia (2001). He has acquired more than 22 years of experience in the construction industry, being involved in the design, planning and coordination, project management and construction of buildings, dams and major infrastructure works.

ASEAN FEDERATION OF ENGINEERING ORGANIZATIONS (AFEO)

CAFEO 31st Conference of ASEAN Federation of Engineering Organisations (2013)

Theme: ASEAN Community Countries on Green Infrastructure Implementation
Date: 10 - 14 November 2013
Venue: Hotel Borobudur, Jakarta

IEM will be sponsoring 6 authors to present their papers at this event. The abstract/ paper submission must meet the timeline indicated below.

TECHNICAL PAPER SUBMISSION SCHEDULE

- Submission of Abstracts by May 15, 2013
- Notification of Acceptance by June 10, 2013
- Submission of Final Manuscripts by July 15, 2013
- Notification of Acceptance by September 20, 2013
- Submission of Abstracts is to be accompanied by CV and photo of author.
- Length of Abstracts should not be more than 200 words.

CORRESPONDENCE

For further information regarding the Conference and the submission of papers please contact the secretariat, Ms. B.E. Ooi at:
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E-mail: afeo@iem.org.my

ANNOUNCEMENT

Non IEM Event

15 June 2013

Larian Kitar Semula 2013

Venue	: Padang Merbuk, Kuala Lumpur
Time	: 8.30am to 2.30pm
Organisers (PPSPPA)	: Perbadanan Pengurusan Sisa Pepejal & Pembersihan Awam
E-mail	: noraziah@sisa.my / haliza@sisa.my
Website	: www.ppsppa.gov.my/larian

A Visit to Malaysian Palm Oil Board (MPOB) Headquarters, Bandar Baru Bangi

Ir. Prof. Dr Thomas Choong Shean Yaw

CHEMICAL ENGINEERING TECHNICAL DIVISION

A group consisting of 25 IEM members and non-members led by Ir. Prof. Dr Thomas Choong Shean Yaw (committee member) and Ms. Kek Mei Tzy (secretariat) from the Chemical Engineering Technical Division (CETD) visited the Malaysian Palm Oil Board (MPOB) Headquarters on 28 August 2012. The highlight of the day was the visit to the margarine and biodiesel pilot plant.

The oil palm industry is now one of the main pillars of Malaysian economy. MPOB is the custodian of the oil palm industry in Malaysia and is entrusted with the responsibility to meet new challenges through excellence in research and development (R&D) and services. MPOB has more than three decades of concerted effort in research and development related to palm oil industry. MPOB's commitment has been recognised and rewarded through numerous awards, such as the latest 2010 Frost & Sullivan Award for Excellence in Research and Innovation.

Despite the rather heavy downpour, most of the participants arrived at MPOB on time. We were warmly received by En. Jamil and the rest of the representatives from various divisions of MPOB. We were first briefed about MPOB, followed by a Q&A session. We then spent about 30 minutes in the margarine pilot plant, where a very comprehensive and interesting explanation was given by Dr Miskandar Mat Sahri. MPOB has successfully developed an impressive margarine which can be used at temperature below 20° C.

After leaving the margarine pilot plant, we moved to the palm biodiesel pilot plant. MPOB has more than twenty years of experience in palm biodiesel research. We were briefed on various technical aspects of the pilot plant by Mrs. Nabilah Kamaliah Mustafa and Dr Harisson Lau. Subsequently, we were given an opportunity to tour the palm biodiesel pilot plant. Thereafter, we spent about 30 minutes at the Palm Gallery and Souvenirs Shop, where a good collection of books and products related to palm oil are displayed and sold.

The visitors being briefed at the biodiesel pilot plant

At the end of the tour, we were treated to refreshments, courtesy of MPOB. A token of appreciation was also presented to En. Jamil by the Session Chairperson, Ir. Prof. Dr Thomas Choong, before the session ended. ■

Briefing on various technical aspects by representatives from MPOB

Ir. Prof. Dr Thomas Choong Shean Yaw, is a professor of chemical engineering at the Department of Chemical and Environmental Engineering. He is now the advisor of Chemical Engineering Technical Division.

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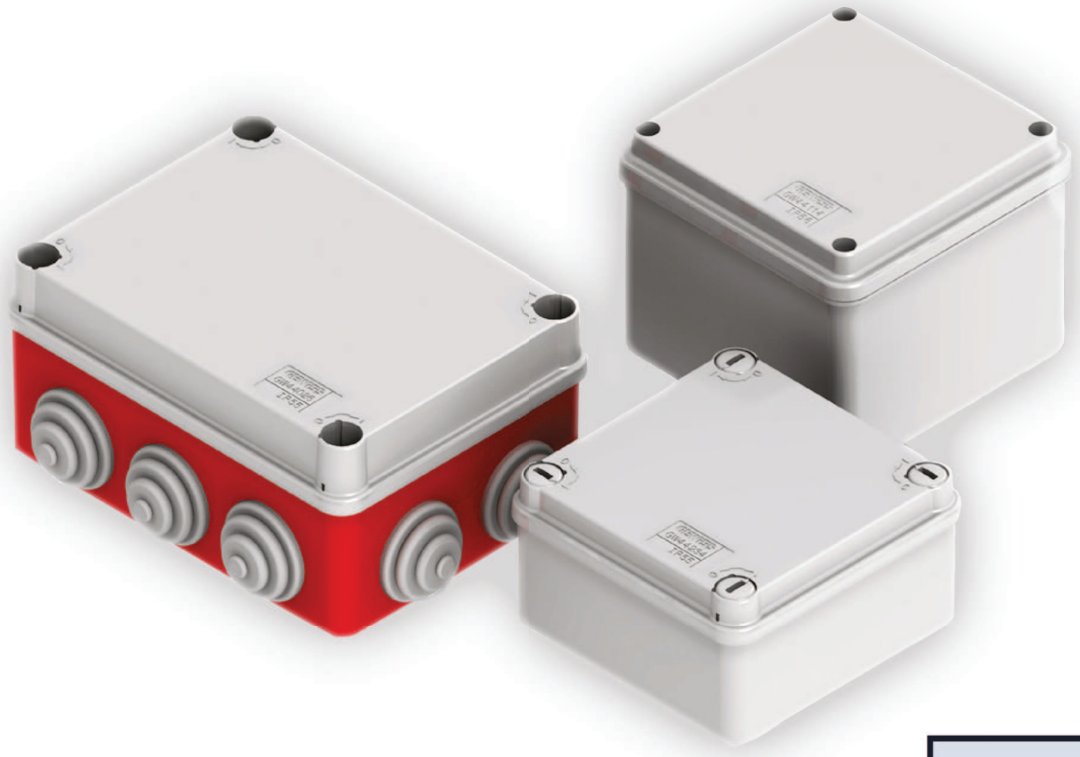

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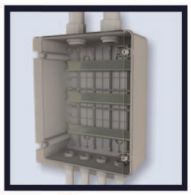

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Engineering Invention and Innovation Expo 2012

YOUNG ENGINEERS SECTION

by Ir. Lee Cheng Pay and Engr. Vivekasugha Alif Gunaalan

OUR YOUNG ENGINEERS HAVE DONE IT AGAIN!

The first Engineering Invention and Innovation Expo (EINIX) was successfully held on 15 and 16 September 2012. EINIX was organised by the Young Engineer Section (YES). The Institution of Engineers, Malaysia (IEM), in conjunction with Engineering Week 2012 which was held at one of the world's largest shopping malls, the 1Utama Shopping Centre!

The Expo was conducted as a competition, bearing the theme of "Engineering Innovation for Sustainable Living" where 18 teams were selected out of the 39 submissions to showcase their great inventions to the public. The teams were from UCSI, Universiti Teknologi MARA (UiTM), Universiti Kebangsaan Malaysia (UKM), Universiti Malaya (UM), Universiti Tenaga Nasional (UNITEN), Universiti Teknikal Malaysia Melaka (UTeM), Universiti Teknologi Malaysia (UTM), Universiti Teknologi PETRONAS (UTP), Kolej Damansara Utama (KDU) and International Islamic University Malaysia (IIUM).

The event started at 10.00 a.m., the same time as the shopping centre opened for business. At 1.00 p.m. sharp, the judging panel, led by Y.Bhg. Dato' Paduka Ir. Hj. Keizrul Abdullah, started their evaluation by visiting each booth and quantifying the inventions of the participants. The panel of judges comprised the following eminent personalities:

Dato' Paduka Ir. Hj. Keizrul bin Abdullah	Past President, IEM
Ir. Choo Kok Beng	Deputy President, IEM
Ir. Elias bin Saidin	Council Member, IEM
Ir. Assoc. Prof. Dr Jimmy Mok Vee Hoong	Council Member, IEM
Ir. Assoc. Prof. Dr Lariyah binti Mohd Sidek	Representative from TNB (EINIX Partner)
Ir. Leong Siew Meng	Representative from MGBC (EINIX Supporting Body)
Dr Kok Swee Leong	Chairman, IET YPS (EINIX Supporting Body)
Engr. Issac Lim	Representative IMechE YPS (EINIX Supporting Body)

The event was officiated by Y.Bhg. Dato' CK Teo, Director of Bandar Utama City Corporation, at 2.00 p.m., accompanied by IEM Deputy President, Ir. Choo Kok Beng. The Committee expressed its thanks to Dato' for his generosity in sponsoring the event venue at 1Utama Shopping Centre.

The judging continued while the event proceeded with an hour long talk, entitled "Renewable Energy Initiatives in UNITEN" by Dr Adlansyah bin Abd. Rahman, followed by Assoc. Prof. Ir. Dr Lariyah binti Mohd Sidek's presentation entitled, "Green Technology for Sustainable Living". The knowledge-sharing by both speakers was definitely very beneficial to the participants and also to members of the public.

The shoppers crowded the exhibition area throughout the day as this was the first time that a competition by a professional body was held in a shopping mall such as the 1Utama Shopping Centre.

The exhibition resumed the next morning at 10.00 a.m., followed by the launch of "Engineering Clubs at Schools" at 2.00 p.m. We were pleased to have SMK Teknik Kuala Lumpur as the first school that had participated in the engineering club initiative. Credit should be given to the efforts by members of IEM-UTP Student Section who were willing to take up the challenge to organise the engineering club event and facilitate the setting up of the club. During the launch, Ir. Choo Kok Beng, Deputy President of IEM, emphasized that it was important to cultivate the engineering interest amongst students in order to promote and produce more engineers in the future for the continued improvement and development of the country. It was a memorable moment for all those who were involved in IEM Engineering Week as well as EINIX. The Engineering Week Closing Ceremony and EINIX Award Ceremony held at 6.00 p.m. concluded this successful event.

RESULTS OF EINIX 2012:

Prize	Title	University
Champion	Vermi Battery	UTP
1st Runner Up	Smart Motorcycle Safety Vest (SMS-V)	UTeM
2nd Runner Up	Smart Pico Hydro Generation System (Spico)	UTeM
Consolation	Newly Nanolubrication System in CNC Machining Processes for Better Product Quality, More Power Savings, and Less Oil Consumption and Pollution	UM
	SEER-iPLAT	UTM
	Design and Development of PV/Nanoparticles-enhanced Phase Change Material for Thermal Energy Storage	UTP
Most Interactive Team	Prototype Marine Wave Powered Beacon for Sea Navigation	UNITEN
Most Attractive Booth	Window Farming	UiTM

The Engineering Week Chairman's closing speech, by Ir. Yau Chau Fong, marked the end of EINIX 2012 and also the Engineering Week 2012. A recollection of the one-year planning and implementation effort which had led to the smooth running of the entire week by the organising committee was captured during his speech. Appreciation was given to all the Committee Members, Sponsors, supporting bodies, IEM Council Members, YES committee members, IEM Secretariat as well as those who were involved directly or indirectly during the event.

We would like to thank all our valued sponsors who had made this event possible. IEM looks forward to receiving their continuous support in future.

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The organising committee also wishes to thank all supporting organisations which had enabled us to run the event smoothly:

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2	The Institution of Engineering and Technology (IET)
3	Ministry of Science, Technology and Innovation (MOSTI)
4	Malaysia Green Building Federation (MGBC)
5	Majlis Rekabentuk Malaysia (MRM)
6	Malaysian Invention and Design Society (MINDS)
7	Universiti Tenaga Nasional (UNITEN)
8	Universiti Teknologi Petronas (UTP)
9	Universiti Kebangsaan Malaysia (UKM)
10	INTI International University

For YES, the success of EINIX 2012 does not signify the end but the beginning of similar initiatives in the future. YES wishes to encourage more inventions from the young engineers. *YES, let's make it happen again!* ■

Ir. Lee Cheng Pay graduated from University of Malaya with an Electrical Engineering Degree and is currently working as the Senior Electrical Engineer at AD Consultants Sdn. Bhd. He was the Organising Chairman of EINIX 2012 and also the Honorary Secretary of the Young Engineer Section, IEM.

Engr. Vivekasugha Alif Gunaalan graduated from Universiti Tenaga Nasional with an honours degree in Bachelor of Electrical Power Engineering, and is currently working as an Electrical Engineer at the Transmission Division, Tenaga Nasional Berhad. He was the Secretary/Treasurer of EINIX 2012 and also a Committee Member of the Young Engineers Section, and Electrical Engineering Technical Division, IEM.

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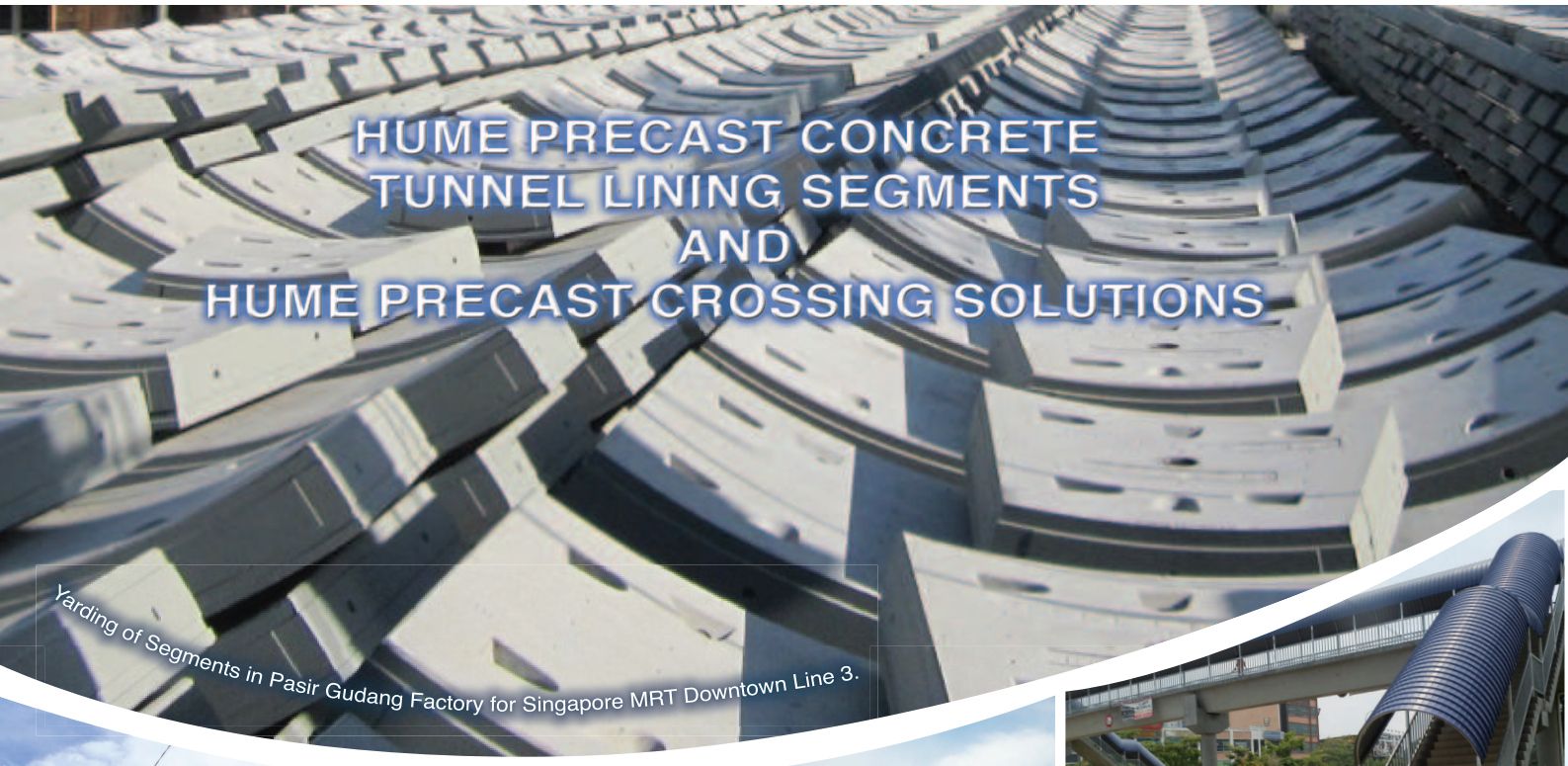

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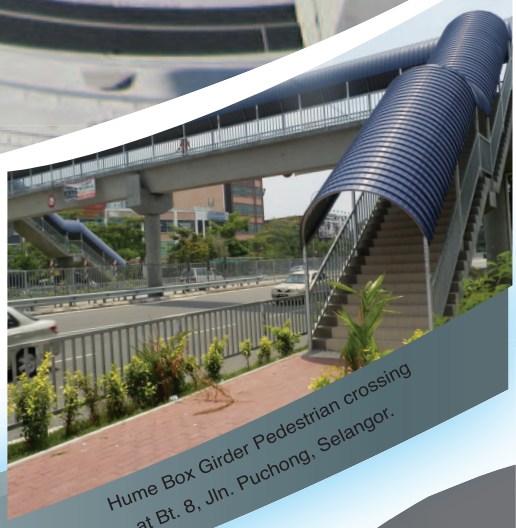

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2012 Telford Premium Prize

THE Telford Premium Prize was instituted in 1835 following a bequest made by Thomas Telford, the Institution of Civil Engineers' first President (1820) and was awarded to the best paper published by The Institution of Civil Engineers, United Kingdom. Three Malaysian engineers have won the prestigious 2012 Telford Premium Prize at the recent Awards Ceremony held on 12 October 2012 in London. The prize was awarded for a paper written by Ahmad, K., Taha, M.R., & Kassim, K.A. entitled, "Electrokinetic Treatment on a Tropical Residual Soil", which had been published in the journal, Ground Improvement, Proceedings of the Institution of Civil Engineers UK, ICE, Vol. 164, 1: 3-13. ■

Left to right: Prof. Dr Mohd. Raihan Bin Taha (Head of the Civil and Structural Engineering Department, Universiti Kebangsaan Malaysia), Prof. Dr Khairul Anuar Bin Kassim and Associate Prof. Dr Kamarudin Ahmad (both from the Faculty of Civil Engineering, Universiti Teknologi Malaysia), and Mr. Richard Coackley (President of ICE).

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The book may be purchased during office hours from the IEM Secretariat, or alternatively you could return the completed order form via post, fax or email.

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The Bridges of Constantine

by Ir. Chin Mee Poon
www.facebook.com/chinmeepoon

NO, Constantine is not in Turkey, Greece or Italy. It is actually situated in the north-eastern part of Algeria and was the first Algerian city we had visited during our one-and-a-half month trip to Algeria and Tunisia between November and December 2012. I was deeply impressed by this city inhabited by a population of 450,000 people. Set on a plateau 640m above sea level around a deep ravine formed by the Rhumel River, the city's numerous bridges and viaducts spanning the chasm has given rise to its apt nickname of "City of Bridges".

Constantine has an extremely long history. It was first established by the Phoenicians and was ruled successively by Numidia, the Roman Empire, the Byzantine, the Arabs, Almohad & Hafsid, the Ottoman Empire and then the French. It got its present name when the city was rebuilt in 313 AD and was named after the Roman Emperor, Constantine the Great.

The gorges carved by the Rhumel River and its tributaries have almost vertical sides dropping more than 100m to the floor. Roads follow the contours and cut into the cliffs, and many buildings sit right on the edges of the sheer cliffs. Above all, the bridges that adorn the scene bring out the magnificence of the entire view. They are in fact a major pull factor for tourists. As a bridge engineer, I was so excited when I first caught sight of a suspension bridge flying across a deep ravine high above us when we first arrived there at dusk. I immediately requested our driver to stop the vehicle so we could capture some photographs.

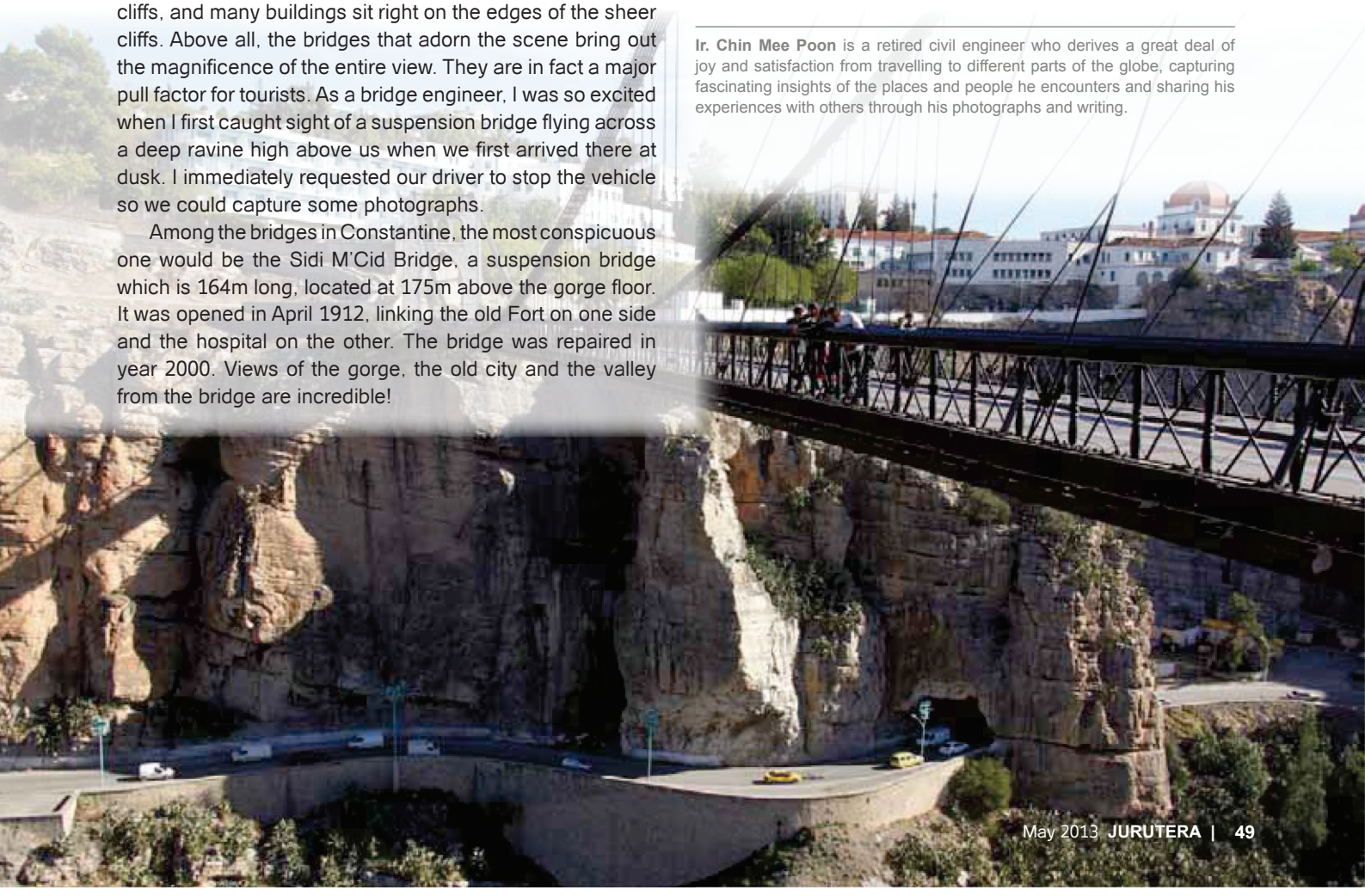
Among the bridges in Constantine, the most conspicuous one would be the Sidi M'Cid Bridge, a suspension bridge which is 164m long, located at 175m above the gorge floor. It was opened in April 1912, linking the old Fort on one side and the hospital on the other. The bridge was repaired in year 2000. Views of the gorge, the old city and the valley from the bridge are incredible!

Aside from the Sidi M'Cid Bridge, some other notable bridges include the El Kantara Bridge, Mellah Slimane Bridge and Sidi Rached Bridge. The El Kantara Bridge is one of the oldest in the city, having Roman origins as an aqueduct. It was destroyed and rebuilt many times and took its present form in 1863. It is 128m long and rises 125m above the gorge.

Meanwhile, the Mellah Slimane Bridge is a suspension bridge for pedestrians, linking the railway station and the centre of the old town. Completed in 1925, this bridge is 125m long, 2.5m wide and rises 100m above the water. On the city side, the bridge is substantially lower than the street level, and a steep staircase and a lift bridge the vertical gap between the two.

The Sidi Rached Bridge took 5 years to construct. When it was opened in April 1912, it was the highest bridge in the world. This bridge, consisting of 27 arches, is 450m long and links the railway station with the old city. When it is viewed from a distance, the bridge projects a truly magnificent sight. ■

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



PROFESSIONAL INTERVIEW

Date: 8 April 2013

To All Members,

CANDIDATES APPROVED TO SIT FOR YEAR 2013 PROFESSIONAL INTERVIEW

The following candidates have been approved to sit for the Professional Interview for 2013.

In accordance with Bylaws 3.9, the undermentioned names are published as having applied for membership of the Institution, subject to passing the year 2013 Professional Interview.

If any Corporate Member of the Institution has any reason as to why any of the candidates is not a fit and proper person for election, he should communicate in writing to the Hon. Secretary. Such communication should be lodged a month from the date of publication.

Ir. Prof Dr Jeffrey Chiang Choong Luin
Honorary Secretary,
The Institution of Engineers, Malaysia
Session 2013/2014

NEW APPLICANTS

Name	Qualifications
CIVIL ENGINEERING	
CHOO MUN FEI	BE HONS (UPM) (CIVIL, 2007)
NGUEE CHIN SENG	BE HONS (UTM) (CIVIL, 05) ME (UTM) (CIVIL-STRUCTURE, 06)
ELECTRICAL ENGINEERING	
KHAIRUL AZMI BIN ZAMRI	BE HONS (MMU) (ELECTRICAL,2008)
MOHD SUHAIDI BIN WAHIB	BE HONS (UiTM) (ELECTRICAL, 06)
ZAINAL BIN SHAMSUDDIN	BSc (WIDENER) (ELECTRICAL, 90)
ELECTRONIC ENGINEERING	
LEE LIAN HONG	BE HONS (MMU) (ELECTRONICS, 05) MSc (MMU) (ELECTRONIC, 11)
LIM TIEN SZE	BE HONS (UTM) (ELECTRICAL - INSTRUMENTATION & CONTROL,99) MSc (UTM) (ELECTRICAL,02) PhD (MMU) (ELECTRICAL,09)
MECHANICAL ENGINEERING	
AHMAD KAMAL ARIFFIN BIN MOHD. IHSAN	BE HONS (UKM) (MECHANICAL, 90) PhD (WALES) (MECHANICAL, 96)
FUAD NOR BIN JAPAR	BE HONS (UTM) (MECHANICAL, 06)
LIM AIK SENG	BSc (OKLAHOMA STATE) (MECHANICAL, 95)
MOHAMED YAZID BIN ISMAIL	BE HONS (NEW SOUTH WALES) (MECHANICAL, 05)
MATERIALS ENGINEERING	
STANLEY BALANG AK PETER JANG	BE HONS (UM) (MATERIALS, 02)

Solution for 1Sudoku published on page 27 of this issue.

1Sudoku

22 7	6	5	18 8	9	1	6 4	2	12 3
19 8	2	4	22 6	17 5	3	8 1	7	9
9	14 3	1	4	2	7	28 6	18 5	8
4	7	3	8 2	6	9	8	1	11 5
3 2	21 9	8	18 7	1	5	28 3	4	6
1	5	6	3	12 8	4	2	22 9	7
3	4	2	17 5	7	8	9	6	6 1
11 5	17 8	9	1	4	6	24 7	3	2
6	8 1	7	14 9	3	2	5	8	4

TRANSFER APPLICANTS

M'ship No.	Name	Qualifications
CHEMICAL ENGINEERING		
33757	LOW YAM KIM	BE HONS (UM) (CHEMICAL, 06)
48475	TEOH HUI CHIEH	BE HONS (UKM) (CHEMICAL, 01) ME (UKM) (CHEMICAL, 04)
CIVIL ENGINEERING		
45278	CHONG YAN VUN	BE HONS (UNISEL) (CIVIL, 08)
37040	FONG YEE PENG	BE HONS (UTM) (CIVIL, 07)
27587	HAW SENG POH	BE HONS (UTP) (CIVIL, 06)
10969	MOHAMAD BIN IBRAHIM	BSC (PURDUE) (CIVIL, 84)
33080	MOHD SAIFUL BAHRI BIN MOHD ARIFFIN	BE HONS (UITM) (CIVIL, 08)
16030	MOHD. ZAMRI BIN ALIAS	BSC (COLORADO) (CIVIL, 89)
24064	NG MIN LI	BE HONS (UM) (CIVIL, 07)
15157	NOOR HASLINA BINTI HARON	BSC (THE GEORGE WASHINGTON) (CIVIL, 88)
20860	ONG CHIN WOOI	BE HONS (UM) (CIVIL, 00)
38845	TAY TSHUNG WANG	ME (PORTSMOUTH) (CIVIL, 08)
47076	WONG CHIEN SOON, KELLY	BE HONS (UNITEN) (CIVIL, 04) ME (UTM) (CIVIL, 12)
45340	WOO PEGGY	BE HONS (LEEDS) (CIVIL & STRUCTURAL, 03)
ELECTRICAL ENGINEERING		
28067	KHAIRUL ANWAR BIN A. RAZAK	BE HONS (UITM) (ELECTRICAL, 2006)
27188	MOHAMMAD HAZMIN BIN NOOR MAHADI	BE HONS (UTM) (ELECTRICAL, 2009)
57049	MOHD FALAAH BIN MOHD MANAP	BE HONS (UM) (ELECTRICAL, 07)
49272	PANG KEE CHEN, WILSON	BE HONS (NOTTINGHAM) (ELECTRICAL & ELECTRONIC, 06) MSC (NOTTINGHAM) (ELECTRICAL, 07)
ELECTRONIC ENGINEERING		
23649	FOO DING KHEN	BE HONS (UTM) (ELECTRICAL-TELECOMMUNICATIONS, 02)
24838	GOBI A/L VETHARATNAM	BE HONS (UM) (ELECTRICAL, 98) MSC (MMU) (ELECTRICAL, 03) PHD (MMU) (ELECTRICAL, 11)
26510	MOHAMMAD FAIZAL BIN AHMAD FAUZI	BE HONS (LONDON) (ELECTRICAL & ELECTRONIC, 99) PHD (SOUTHAMPTON) (ELECTRONIC, 04)
COMPUTER ENGINEERING		
18605	MOHD RIZON BIN MOHAMED JUHARI	BE (TOKUSHIMA) (ELECTRICAL & ELECTRONIC, 93) ME (TOKUSHIMA) (ELECTRONIC, 95) PHD (OITA) (MATERIALS SCIENCE & PRODUCTION, 02)
HIGHWAY ENGINEERING		
16532	NORDIN BIN MAASUM	ADVANCE DIPLOMA (UITM) (CIVIL, 1995)
MECHANICAL ENGINEERING		
22468	LIM MENG HEE	BE HONS (UTM) (MECHANICAL, 00)
24440	NG CHONG JIN, BENJAMIN	BE HONS (UNITEN) (MECHANICAL, 03)
26376	LIM WAI LING	BE HONS (UKM) (MECHANICAL, 05)
29831	CHOW HOE SENG	ME (DURHAM) (MECHANICAL, 05)
31754	SHAMSUL IRWAN BIN ISMAIL	BE HONS (UITM) (MECHANICAL,02)
36962	MOHD SHARUL @ AHMAD KHAIRUL BIN SULIAN	BE HONS (UTM) (MECHANICAL, 03)
38335	WONG YIING	BE HONS (UTM) (MECHANICAL, 05)
42429	RIZAIDI BIN ROHIM	ME (LONDON) (MECHANICAL, 05)
48443	MOHD FAIRUZ BIN MOHD	BE HONS (UNITEN) (MECHANICAL, 06)
48486	ROSMAHADI BIN ALI	BSC (THE GEORGE WASHINGTON) (MECHANICAL, 92)
49971	MOHD IBRAHIM ARIF BIN ZAINUDDIN	ME (SHEFFIELD) (MECHANICAL, 07)
51306	NG WEI KIT	BE HONS (UM) (MECHANICAL, 08)
33818	TAN PEY HWAN	BSC (MICHIGAN TECHNOLOGICAL) (MECHANICAL, 97)
49982	MOKHTAR BIN AWANG	BE (DETROIT MERCY) (MECHANICAL, 94) MSC (WEST VIRGINIA) (MECHANICAL, 02) PHD (WEST VIRGINIA) (MECHANICAL, 07)
51698	TAN BOON TIONG	BE HONS (UM) (MECHANICAL, 09)
57590	MOHD AFIAN BIN MOHD IZHAR	BE HONS (UNITEN) (MECHANICAL, 01)
MINERAL RESOURCES ENGINEERING		
49585	MOHD HAFIZU BIN MOHD MUSTAPHA	BE HONS (USM) (MINERAL RESOUCES, 06)

ADMISSION / ELECTION / TRANSFER

The IEM Council, at its **386th** meeting on **18 March 2013** approved the admission / election / transfer of a total of **1264** members, consisting the following:

DISCIPLINES	MEMBERSHIP GRADES							
	FELLOW	MEMBER	GRADUATE	INCORPORATED	AFFILIATE	ASSOCIATE	STUDENT	TOTAL
Aeronautical								
Aerospace			2				22	**24**
Agricultural								
Automotive								
Biochemical								
Biomedical			1					**1**
Biotechnology								
Building Services								
CAD/CAM								
Chemical		1	15				101	**117**
Civil	2	29	83				208	**322**
Communication								
Computer								
Computer Systems								
Computer & Communication			1					**1**
Construction								
Control System								
Electrical & Electronic							4	**4**
Electrical		21	67				139	**227**
Electronic		3	27				138	**168**
Electronic & Instrumentation System								
Electromechanical								
Energy								
Environmental							1	**1**
Food & Process								
Geotechnical		1						**1**
Highway								
Industrial			1					**1**
Information System								
Information Technology								
Instrumentation								
Instrumentation & Control		3	1					**4**
Manufacturing		1	6				2	**9**
Manufacturing System								
Marine								
Materials			2				33	**35**
Metallurgy								
Mechanical		21	90				180	**291**
Mechatronic			2				14	**16**
Metallurgy			1					**1**
Microelectronic								
Mineral								
Mineral Resources							15	**15**
Mining								
Naval Architecture								
Petroleum								
Polymer							24	**24**
Production								
Structural			1					**1**
Telecommunication								
Water Resources		**1**						**1**
TOTAL	**2**	**81**	**300**	**-**	**-**	**-**	**881**	**1264**

The Members' names and qualifications are detailed below. The Institution congratulates the members on their admission / election / transfer.

Ir. Prof Dr Jeffrey Chiang Choong Luin
Honorary Secretary, The Institution of Engineers, Malaysia

MEMBERSHIP

Note: *This is a continuation of the list which was first published on page 51 of the April 2013 issue.*

ADMISSION TO THE GRADE OF GRADUATE

M'ship No.	Name	Qualification
ELECTRICAL ENGINEERING		
56329	UMMI HANIM BT MAT NAYAN	B.E.HONS.(UTHM) (ELECTRICAL, 12)
56330	UNGKU NORBAIZURA BT UNGKU MOHD NOOR	B.E.HONS.(UTHM) (ELECTRICAL, 12)
56620	VELMURUGAN A/L GOVINDASAMY	B.E.HONS.(UTM) (ELECTRICAL, 02)
56624	VOON JIN YI, ADELINE	B.E.HONS.(CURTIN) (ELECTRICAL, 07)
56331	WADHAH ABDO MOHAMMED AL-ASHWAL	B.E.HONS.(UTHM) (ELECTRICAL, 12)
56332	WAN AZHAR BIN WAN OTHMAN	B.E.HONS.(UTHM) (ELECTRICAL, 12)
56333	WAN IBTISAM BT HAJI WAN OMAR	B.E.HONS.(UTHM) (ELECTRICAL, 12)
56334	WAN MOHD IZWANI BIN WAN YUSUF	B.E.HONS.(UTHM) (ELECTRICAL, 12)
56335	WAN MUHAMAD HANIF B. WAN KADIR	B.E.HONS.(UTHM) (ELECTRICAL, 12)
56336	WONG KENG BONG	B.E.HONS.(UTHM) (ELECTRICAL, 12)
56582	ZAID BIN YAAKOB	B.E.HONS.(UTM) (ELECTRICAL, 07)
57553	ZAINAB BINTI ABDULLAH	B.E.HONS.(UTM) (ELECTRICAL, 01)
56337	ZAINAB BINTI ABU RAIRAH	B.E.HONS.(UTHM) (ELECTRICAL, 12)
56518	ZUBAIR BIN THOLUDIN	B.E.HONS.(UTM) (ELECTRICAL, 06)
ELECTROMECHANICAL ENGINEERING		
57512	MOHD YUSOF BIN IHKASAN	B.E.HONS. (LOUGHBOROUGH) (ELECTROMECHANICAL, 97)
ELECTRONIC ENGINEERING		
56565	AHMAD MUKHLIS BIN MAT DAUD	B.E.HONS.(MMU) (ELECTRONIC, 04)
56574	AHMAD SHARIFUDDIN BIN MAMAT	B.E.HONS.(UTM) (ELECTRONIC, 05)
57039	AMIRUL SYAFIQ BIN SADUN	B.E.HONS.(UTHM) (ELECTRONIC, 09)
56596	ARIFF PUTRA BIN MUSTAFAR	B.E.HONS.(UTEM) (ELECTRONIC, 07)
57041	ARIZADAYANA BINTI ZAHALAN	B.E.HONS.(USM) (ELECTRONIC, 01)
56570	AZEERA BINTI AZIZ	B.E.HONS.(UITM) (ELECTRONIC, 03)
56630	BONG SOON WEI	B.E.HONS.(UNIMAP) (ELECTRONIC, 11)
56502	CHI CHOONG TIAN	B.E.HONS.(UNIMAP) (ELECTRONIC, 11)
56568	FADZLY BIN MOHD ZAIN	B.E.HONS.(UTHM) (ELECTRONIC, 08)
57037	FATMA SYAZANA BINTI ZAINI	B.E.(NIIGATA) (ELECTRICAL, 06)
56576	HALIMAHTON BINTI DEWA	B.E.HONS.(UTM) (ELECTRONIC, 00)
56594	HAZANIM BT ZULKARNAIN @ ZULZALIL	B.E.HONS.(IIUM) (ELECTRONIC, 08)
57131	HAZLI RAFIS BIN ABDUL RAHIM	B.E.HONS.(UTEM) (ELECTRONICS, 05)
56514	ILI NAJAA AIMI BINTI MOHD NORDIN	B.E.HONS.(UTM) (ELECTRONIC, 11)
57044	ILI SALWANI BINTI MOHAMAD	B.E.HONS.(UKM) (MICROELECTRONIC, 08)
57549	INTAN IZAFINA BINTI IDRUS	B.E.HONS.(USM) (ELECTRONIC, 07)
56588	ISHARIZAL BIN ISHAK SA'AHAK @ ISHAK	B.E.HONS.(UTM) (ELECTRONIC, 06)
57559	ISMA SHAMSURIA BINTI ISMAIL	B.E.HONS.(KUITTHO) (ELECTRONIC, 03)
56571	JALIL BIN LIAS	B.E.HONS.(UITM) (ELECTRONIC, 03)
57045	LAM ZI YI	B.E.HONS.(MMU) (ELECTRONICS, 07)
57036	LAU YEW NEN	B.E.HONS.(UNIMAS) (ELECTRONIC, 04)
56517	LIM KING HANN	M.E.HONS.(NOTTINGHAM) (ELECTRONIC, 07)
56501	LIM WEI JER	B.E.HONS.(UNIMAP) (ELECTRONIC, 11)
56615	MARMEEZEE BIN MOHD. YUSOFF	B.E.(HIROSHIMA) (ELECTRONIC, 05)
57558	MD NAZRI BIN DARLU	B.E.HONS.(KUITTHO) (ELECTRONIC, 03)
57575	MOHD AFENDY BIM MAT ARID	B.E.HONS.(UTM) (ELECTRONIC, 06)
57134	MOHD ALIMULLAH BIN ISHAK	M.E.HONS.(NOTTINGHAM) (ELECTRONICS, 08)
57540	MOHD FAKHRURRAZI BIN MOHD SALLEH	B.E.(VANDERBILT) (ELECTRONIC, 05)
57132	MOHD NORZIKRI BIN KAMARUDDIN	B.E.HONS.(UTM) (ELECTRONIC, 09)
56593	MOHD RADZI BIN TARMIZI	B.E.HONS.(USM) (ELECTRONIC, 08)
57042	MOHD RUZAINI BIN ROSLI	B.E.HONS.(UITM) (ELECTRICAL, 10)
56513	MOHD SUKRI BIN ABD RAHMAN	B.E.HONS.(UTM) (ELECTRONIC, 09)
57574	MOHD YASSIN BIN YUNOS @ SUDIN	B.E.HONS.(UITM) (ELECTRONIC, 04)
56589	MUHAMAD MUKHLIS BIN AHMAD	B.E.HONS.(UTM) (ELECTRONIC, 06)
56584	MUHAMED FAUZIE BIN NOH	B.E.HONS.(UTM) (ELECTRONIC, 08)
57555	MUHAMMAD AMIR BIN AS'ARI	B.E.HONS.(UTM) (ELECTRONIC, 06) ME(UTM)(ELECTRICAL& ELECTRONIC, 09)
56595	MUJAHIDUN BIN MASHURI	B.E.HONS.(UNIMAP) (ELECTRONIC, 07)
57552	NADIAH BINTI ZUL-QARNAIN	B.E.HONS.(UTM) (ELECTRONIC, 09)
57514	NASHRUL ADZIM BIN NASHRUDDIN	B.E.HONS.(UTEM) (ELECTRONIC, 09)
56569	NOOR NADIAH BT MOHD AZALI	B.E.HONS.(UTHM) (ELECTRONIC, 08)
56506	NORAINI BINTI OTHMAN	B.E.HONS.(UKM) (ELECTRONIC, 00)
57038	NORFIRDAUS BIN MD NOR	B.E.HONS.(UTM) (ELECTRONIC, 09)
56590	NORIZAM BIN MOHAMED YUSOFF	B.E.HONS.(UPM) (ELECTRONIC, 02)
56585	NORSHAHIDA BINTI SABA	B.E.HONS.(UTM) (ELECTRONIC, 08)
56618	NURLIYANA BINTI ABDUL HAFIZ	B.E.HONS.(UTM) (ELECTRONIC, 09)
56617	PRICILLA THINA A/P THINAKARAN	B.E.HONS.(UTM) (ELECTRONIC, 09)
56516	RAFHANAH BINTI ROSHDI	B.E.HONS.(UTM) (ELECTRONIC, 10)
56567	RUSLINDA BT RUSLEE	B.E.HONS.(UTHM) (ELECTRONIC, 07) M.E.(UTHM) (ELECTRICAL, 09)
57040	SAIFUL SALIHIN BIN MOHD YASSIN	B.E.HONS.(UTM) (ELECTRONIC, 03)
56587	SAMSURI BIN AB. GHANI	B.E.HONS.(UTM) (ELECTRONIC, 08)
57043	SANNA BINTI TAKING	B.E.HONS.(UKM) (ELECTRONIC,01) MSC(UKM) (MICROELECTRONICS,03)
57020	SARAVANAN A/L THANDAVAN	B.E.HONS. (NORTHUMBRIA) (ELECTRONIC, 01)
56515	SHAHRULHANA BINTI JOHARI	B.SC.(ALABAMA) (ELECTRONIC, 99)
56613	SHARIFAH JUNITA BT SYED IDRUS	B.E.HONS.(USM) (ELECTRONIC, 99)
56597	SHARIHA BINTI ABDUL RAHIM	B.E.HONS.(USM) (ELECTRONIC, 04) M.SC.(UITM) (TELECOMMUNICATION, 11)
57566	SHARUDIN BIN MOHAMAD ZAIN SOO	B.E.HONS.(MMU) (ELECTRONIC, 05)
56504	STEVEN A/L TANISELASS	B.E.HONS.(UNIMAP) (ELECTRONIC, 08)
56616	SUDESH NAIR A/L MUKANDAN	B.E.HONS.(MMU) (ELECTRONIC, 11)
56583	SYABAN BIN SHAMSULKAMAR	B.E.HONS.(UTM) (ELECTRONIC, 08)
57572	SYALWANI BINTI KAMARUDIN	B.E.HONS.(UNIMAP) (ELECTRONIC, 09)
56500	TAN TZE RENN	B.E.HONS.(UTAR) (ELECTRONIC, 11)
56503	TIONG KWONG HO, VINCENT	B.E.HONS.(UNIMAP) (ELECTRONIC, 11)
56566	UBAIDULLAH BIN AZIZ	B.E.HONS.(UKM) (ELECTONIC, 99)
56505	WAN MOKHDZANI BIN WAN NOR HAIMI	B.E.HONS.(UNIMAP) (ELECTRONIC, 08)
56614	YURAIMY YAKIMIN BIN ABDUL TALIB	B.E.(MURORAN INSTITUTE) (ELECTRONIC, 07)
56580	ZAKINAH BINTI PAUZI	B.E.HONS.(UTM) (ELECTRONIC, 01)
56577	ZALINA BINTI ZULKABLI	B.E.HONS.(UTM) (ELECTRONIC, 03)
ENVIRONMENTAL ENGINEERING		
57538	MUHAMMAD EFFI BIN ABD HALIM	B.E.(MANCHESTER) (ENVIRONMENTAL, 08) MSC(SALFORD) ((ENVIRONMENTAL, 10)
57096	SHAHIZATUL NAFIZA BINTI MOHD ALI	B.E.HONS.(MALAYA) (ENVIRONMENTAL, 11)
MANUFACTURING ENGINEERING		
56507	AZIANASHIMA HEEDAYU BINTI ZAINAL	B.E.HONS.(UTEM) (MANUFACTURING) M.E.(UPM) (MANUFACTURING, 11)
57576	MUHAMMAD ASHRAF BIN FAURI @ FAUZI	B.E.HONS.(UIAM) (MANUFACTURING, 10)
57032	YEN KIN SAM	B.E.HONS.(USM) (MANUFACTURING, 07)
MATERIALS ENGINEERING		
56600	MILKCUES JASPER	B.E.HONS.(USM) (MATERIALS, 99)
57133	NG CHUN MING, EDDIE	B.E.HONS.(UTAR) (MATERIALS, 12)
57128	NURUL NADZIRAH BINTI ISMAIL	B.E.HONS.(UNIMAP) (METARIALS, 11)
56509	SITI NABIHAH BINTI OTHMAN	B.E.HONS.(USM) (MATERIALS, 10)
MECHANICAL ENGINEERING		
57125	ABDUL TAIB BIN MAERRAD	B.E.HONS.(UNISEL) (MECHANICAL, 11)
57113	ADZUIEEN BINTI NORDIN	B.SC.HONS.(UTM) (MECHANICAL, 02)
56541	AHMAD FAUZI BIN JANTAN	B.E.HONS.(UITM) (MECHANICAL, 05)
57025	AHMAD NORSYAHMEY BIN RAMLI	B.E.(EHIME) (MECHANICAL, 07)
56338	AHMAD SYUKRI BIN KASIM	B.E.HONS.(UTHM) (MECHANICAL, 12)
56339	AHMADI BIN AHMAD	B.E.HONS.(UTHM) (MECHANICAL, 12)
56340	AIMI ASRINI BINTI JEMURI	B.E.HONS.(UTHM) (MECHANICAL, 12)
57108	AIZUDDIN BIN SUPEE	B.E.HONS.(UTM) (MECHANICAL, 08)
56341	AKMALUDDIN BIN YUNOS	B.E.HONS.(UTHM) (MECHANICAL, 12)
56527	AMIR BIN YUSOFF	B.E.HONS.(UTHM) (MECHANICAL, 10)
56342	ANAS BIN ABDUL HALIM	B.E.HONS.(UTHM) (MECHANICAL, 12)
56343	ARUN A/L RAJENDRAN	B.E.HONS.(UTHM) (MECHANICAL, 12)
57562	AZAHARI BIN MAHADI	B.E.HONS.(UKM) (MECHANICAL, 02)
56344	BAINUN AKMAL BINTI MOHD ATAN	B.E.HONS.(UTHM) (MECHANICAL, 12)
56345	BOBBY ANAK JOHN	B.E.HONS.(UTHM) (MECHANICAL, 12)
57123	CHAI JAY HAN	B.E.HONS.(UTAR) (MECHANICAL, 11)
57122	CHAN BOON KOK	B.E.HONS.(MMU) (MECHANICAL, 09)
56445	CHE ZAHANURI BIN BAHARUDDIN	B.E.HONS.(UTHM) (MECHANICAL, 12)
56346	CHE ZAIRUL HAKIMI BIN CHE AB GHANI	B.E.HONS.(UTHM) (MECHANICAL, 12)
56531	CHIN KARL WAI	B.E.HONS.(BIRMINGHAM) (MECHANICAL, 01)
56347	CYRIL TENG YI LERN	B.E.HONS.(UTHM) (MECHANICAL, 12)
56348	DARWIS BIN LABARONKO	B.E.HONS.(UTHM) (MECHANICAL, 12)
57533	FAIRUS BIN SALIM	B.E.HONS.(UTHM) (MECHANICAL, 08)
57111	FAIRUZ HAZRIN BIN YUSOP	B.E.HONS.(UTP) (MECHANICAL, 08)
57115	FAIZUL EZMAT BIN ABDUL HAMID	B.E.HONS.(UTHM) (MECHANICAL, 10)
57121	FAREED BIN JAAFAR	B.E.HONS.(UTHM) (MECHANICAL, 02)
56349	GOH CHUN SHIAN	B.E.HONS.(UTHM) (MECHANICAL, 12)
56609	HANA AZURA BINTI HARUN	B.E.HONS.(UTP) (MECHANICAL, 10)
56535	HANAFI BIN SUHADA	B.E.HONS.(UTM) (MECHANICAL, 09)
56350	HANIF NUR BIN NGAMIDON	B.E.HONS.(UTHM) (MECHANICAL, 12)
56629	HEE CHEE-KIONG	B.SC.HONS.(MISSISSIPPI) (MECHANICAL, 94)
56351	HEMARANI A/P DORAIRAJU	B.E.HONS.(UTHM) (MECHANICAL, 12)
56352	HISHAMUDDIN BIN HASBULLAH	B.E.HONS.(UTHM) (MECHANICAL, 12)
56353	ISMAIL BIN MAT ARSHAT	B.E.HONS.(UTHM) (MECHANICAL, 12)

56354	ISMAIL BIN ROSLAN	B.E.HONS.(UTHM) (MECHANICAL, 12)
56355	IZZAT IZZUAN BIN ISMAIL	B.E.HONS.(UTHM) (MECHANICAL, 12)
56478	JUMARI BIN PORMAN	B.E.HONS.(UTM) (MECHANICAL, 06)
56356	KAVIARASAN A/L MURUGAYA	B.E.HONS.(UTHM) (MECHANICAL, 12)
56357	KHAIRIL BIN CHE MAT	B.E.HONS.(UTHM) (MECHANICAL, 12)
56358	KHAIRUL IDHAM BIN MOHSIN	B.E.HONS.(UTHM) (MECHANICAL, 12)
57023	KHAIRUL NIZAM BIN SA'ID	B.E.HONS.(UTHM) (MECHANICAL, 12)
56359	KOH CHOON WEI	B.E.HONS.(UTHM) (MECHANICAL, 12)
56360	KUGANESH A/L SANKARAN	B.E.HONS.(UTHM) (MECHANICAL, 12)
56542	KUMARESAN MAGAWARAN	B.E.HONS.(UTEM) (MECHANICAL, 10)
56483	LEW CHOON FATT	B.E.HONS.(MMU) (MECHANICAL, 12)
56361	LIANA NABILA BINTI MOHD SHAH	B.E.HONS.(UTHM) (MECHANICAL, 12)
56539	LIM CHEE HONG	B.E.HONS.(UNIMAP) (MECHANICAL, 09)
57536	LIM FEI HOU	M.E.HONS.(LEEDS) (MECHANICAL, 11)
57112	LIM SEE MENG	B.SC.HONS.(UTM) (MECHANICAL, 98)
56446	LOH CHUN CHIA	B.E.HONS.(UTHM) (MECHANICAL, 12)
56544	MAHFUZAH BINTI HAJI ABD SALAM	B.E.HONS.(UTHM) (MECHANICAL, 10) M.E.(UTHM) (MECHANICAL, 12)
56362	MAK WAI LOON	B.E.HONS.(UTHM) (MECHANICAL, 12)
56363	MARTINUS MITAN	B.E.HONS.(UTHM) (MECHANICAL, 12)
56364	MARZILAH BINTI YAACOB	B.E.HONS.(UTHM) (MECHANICAL, 12)
56447	MIOR HILMI BIN ADZHAR	B.E.HONS.(UTHM) (MECHANICAL, 12)
56365	MOHAMAD AMIRUDIN BIN HAJI AHAMED SAZALI	B.E.HONS.(UTHM) (MECHANICAL, 12)
56366	MOHAMAD FIKRI B. MD YUSOF	B.E.HONS.(UTHM) (MECHANICAL, 12)
56367	MOHAMAD IMRAN BIN HAMEDIN	B.E.HONS.(UTHM) (MECHANICAL, 12)
56368	MOHAMAD NAQIB BIN MOHAMED	B.E.HONS.(UTHM) (MECHANICAL, 12)
56369	MOHAMED AZMIE BIN ABDULLAH	B.E.HONS.(UTHM) (MECHANICAL, 12)
56606	MOHAMED FAHAMI BIN SULAIMAN	B.E.(NAGAOKA) (MECHANICAL, 03)
56370	MOHAMMAD TAUFEK BIN ROSLEE	B.E.HONS.(UTHM) (MECHANICAL, 12)
56371	MOHAMMED AMIN BIN SHAFIE	B.E.HONS.(UTHM) (MECHANICAL, 12)
57519	MOHD AFIAN BIN MOHD IZHAR	B.E.HONS.(UNITEN) (MECHANICAL, 01)
56372	MOHD AKHMAL B.JAHADIN	B.E.HONS.(UTHM) (MECHANICAL, 12)
56373	MOHD ALI AZHAR BIN ABD HALID	B.E.HONS.(UTHM) (MECHANICAL, 12)
56374	MOHD AZREEN BIN ABDULLAH	B.E.HONS.(UTHM) (MECHANICAL, 12)
56375	MOHD AZRUL BIN MD SHAMSUDDIN	B.E.HONS.(UTHM) (MECHANICAL, 12)
56376	MOHD FAHMI BIN OTHMAN	B.E.HONS.(UTHM) (MECHANICAL, 12)
56377	MOHD FAIZ BIN ROSMIN	B.E.HONS.(UTHM) (MECHANICAL, 12)
56448	MOHD FAKRUL ROZY BIN MOHAMAD ZAHAM	B.E.HONS.(UTHM) (MECHANICAL, 12)
56378	MOHD FARHAN BIN HUSIN	B.E.HONS.(UTHM) (MECHANICAL, 12)
56449	MOHD FIRDAUS BIN ZAKARIA	B.E.HONS.(UTHM) (MECHANICAL, 12)
56379	MOHD FIRDUS BIN AZAM	B.E.HONS.(UTHM) (MECHANICAL, 12)
56380	MOHD FITRI BIN MOHD JAMIL	B.E.HONS.(UTHM) (MECHANICAL, 12)
56381	MOHD HADI BIN ISMAIL	B.E.HONS.(UTHM) (MECHANICAL, 12)
56612	MOHD HAFIDZAL BIN MOHD HANAFI	B.E.(FUKUI) (MECHANICAL, 10)
57535	MOHD HAFIZ BIN MOSLIM	B.E.HONS.(UTM) (MECHANICAL, 08)
56484	MOHD HASBUL HISYAM BIN HARUN	B.E.HONS.(UTM) (MECHANICAL, 11)
57101	MOHD HAZWAN BIN BURHANUDDIN	B.E.HONS.(UPNM) (MECHANICAL, 11)
56383	MOHD KHAIRIL BIN ANUA	B.E.HONS.(UTHM) (MECHANICAL, 12)
56605	MOHD KHAIRIL HELMI BIN TARMIZI	B.E.(KYUSHU) (MECHANICAL, 08)
56384	MOHD KHAIRUDDIN BIN NAWI	B.E.HONS.(UTHM) (MECHANICAL, 12)
56382	MOHD KHAIRUL ANBIA BIN CHI ADAM	B.E.HONS.(UTHM) (MECHANICAL, 12)
56385	MOHD KHAIRUL ANWAR BIN MOHAMMAD	B.E.HONS.(UTHM) (MECHANICAL, 12)
57105	MOHD KHAIRUL ZAKI BIN ABDULLAH	B.E.HONS.(UTM) (MECAHNICAL, 08)
56386	MOHD LOKMAN BIN MOHAMAD ZAIN	B.E.HONS.(UTHM) (MECHANICAL, 12)
56387	MOHD MUSTAQIM BIN ABDUL NAJIR	B.E.HONS.(UTHM) (MECHANICAL, 12)
56538	MOHD NOOR ASRIL BIN SAADUN	B.E.HONS.(UTEM) (MECHANICAL, 09)
56476	MOHD NOR FADHZLY BIN MOHD SALLEH	B.E.HONS.(UITM) (MECHANICAL, 07)
57102	MOHD RADZI BIN SHAH BUDIN	B.E.HONS.(USM) (MECHANICAL, 06)
57104	MOHD REDWAN BIN JAAFAR	B.E.HONS.(UTM) (MECHANICAL, 08)
56610	MOHD SAIDUN SUMADI	B.E.HONS.(LONDON) (MECHANICAL, 96)
56388	MOHD SALMAN BIN SHAFIE	B.E.HONS.(UTHM) (MECHANICAL, 12)
56479	MOHD SALMI BIN BAHAROM	B.E.(WOLLONGONG) (MECHANICAL, 88)
56450	MOHD SHAFIK BIN AHMAD SAFAIE	B.E.HONS.(UTHM) (MECHANICAL, 12)
56389	MOHD SHAFIQ BIN ALIP	B.E.HONS.(UTHM) (MECHANICAL, 12)
56390	MOHD SHAFIQ BIN ZOLKARNAIN	B.E.HONS.(UTHM) (MECHANICAL, 12)
56391	MOHD SYAHIR BIN RAMLEE	B.E.HONS.(UTHM) (MECHANICAL, 12)
57109	MOHD SYAHMI BIN RAMLI	B.E.HONS.(UTP) (MECHANICAL, 09)
57518	MOHD YUNUS BIN MOHD ISA	B.E.HONS.(UTM) (MECHANICAL, 08) MSC(NORTHUMBRIA) (MECHANICAL, 10)
56392	MOHD ZAIDI BIN ARSAT	B.E.HONS.(UTHM) (MECHANICAL, 12)
56393	MOHD ZAMREE BIN SININ	B.E.HONS.(UTHM) (MECHANICAL, 12)
56394	MOHD ZULFAHMIE BIN HARUN	B.E.HONS.(UTHM) (MECHANICAL, 12)
57024	MOHD ZULHAIRI BIN ZULKIPLI	B.E.HONS.(UTHM) (MECHANICAL, 06)
56395	MOHD ZULHASYREE BIN MOHD ZULKIFLI CHENG	B.E.HONS.(UTHM) (MECHANICAL, 12)
56396	MOHD. FITRI BIN WANNGUH	B.E.HONS.(UTHM) (MECHANICAL, 12)
56534	MOHD. SHAIFULLAH BIN ABDULLAH	B.E.HONS.(UTM) (MECHANICAL, 10)
56397	MUHAMAD HANIF BIN ADNAN	B.E.HONS.(UTHM) (MECHANICAL, 12)
56398	MUHAMAD HISYAM BIN HAMZA	B.E.HONS.(UTHM) (MECHANICAL, 12)
57106	MUHAMAMD AZHAR BIN ASHARI	B.E.HONS.(UTHM) (MECHANICAL, 08)
56399	MUHAMMAD AZAN BIN GHANI	B.E.HONS.(UTHM) (MECHANICAL, 12)
56451	MUHAMMAD AZLAN BIN BAKAR	B.E.HONS.(UTHM) (MECHANICAL, 12)
56540	MUHAMMAD FADZIL BIN SULAIMAN	B.E.HONS.(UITM) (MECHANICAL, 07)
56400	MUHAMMAD FIRDAUS BIN CHAMARI	B.E.HONS.(UTHM) (MECHANICAL, 12)
56401	MUHAMMAD HAFIZUDDIN B MOHD DAUD	B.E.HONS.(UTHM) (MECHANICAL, 12)
56402	MUHAMMAD HAIRI BIN A.HAMID	B.E.HONS.(UTHM) (MECHANICAL, 12)
56533	MUHAMMAD HARITH BIN NGAH	B.E.HONS.(UTM) (MECHANICAL, 10)
56452	MUHAMMAD IRSYAD BIN IBRAHIM	B.E.HONS.(UTHM) (MECHANICAL, 12)
56403	MUHAMMAD NAQIUDDIN BIN ALIAS	B.E.HONS.(UTHM) (MECHANICAL, 12)
56453	MUHAMMAD SHAHFIRUL BIN MAT ALI	B.E.HONS.(UTHM) (MECHANICAL, 12)
57099	MUHAMMAD SYAFIQ FARID BIN ZAKARIA	B.E.HONS.(MALAYA) (MECHANICAL, 10)
56404	MUHAMMAD SYAZANI B. MOHD YUSOFF	B.E.HONS.(UTHM) (MECHANICAL, 12)
56405	MUHAMMAD SYAZWAN BIN AZMI	B.E.HONS.(UTHM) (MECHANICAL, 12)
56406	MUHD AFFAN BIN MOHMAD	B.E.HONS.(UTHM) (MECHANICAL, 12)
56407	NAJIBAH BINTI AB LATIF	B.E.HONS.(UTHM) (MECHANICAL, 12)
57525	NG JU YUAN	B.SC.(OHIO) (MECHANICAL, 04)
56408	NIWAT A/L FROOM	B.E.HONS.(UTHM) (MECHANICAL, 12)
56409	NOOR IZZATIE HUSNA BINTI NOOR RAHMAN	B.E.HONS.(UTHM) (MECHANICAL, 12)
56474	NOOR MUSYADI BIN MOHAMAD	B.E.HONS.(UNITEN) (MECHANICAL, 07)
56410	NOOR QURATUL AINE ADNAN	B.E.HONS.(UTHM) (MECHANICAL, 12)
56411	NOR AMIRAH BINTI ABD SAHAMAD	B.E.HONS.(UTHM) (MECHANICAL, 12)
56412	NOR HAZWANI BINTI ABDULLAH	B.E.HONS.(UTHM) (MECHANICAL, 12)
56537	NORAZLAN B MD. WARAP	B.E.HONS.(UTHM) (MECHANICAL, 09) M.E.(UTHM) (MECHANICAL, 12)
57114	NORSHEILA BINTI BUYAMIN	B.E.HONS.(UTM) (MECHANICAL, 09)
56413	NUR ASYIKIN BINTI TOMI	B.E.HONS.(UTHM) (MECHANICAL, 12)
57119	NUR AZLINA BINTI ARDI	B.E.HONS.(UTHM) (MECHANICAL, 12)
56529	NUR SALLAM BIN BAHARI @ AZIZ	B.E.HONS.(UTHM) (MECHANICAL, 11)
56414	NURADHIHA BINTI AMER	B.E.HONS.(UTHM) (MECHANICAL, 12)
56415	NURAINI BINTI MHD NOOR	B.E.HONS.(UTHM) (MECHANICAL, 12)
56454	NURRUL RAHMAH BINTI MOHD YUSOFF	B.E.HONS.(UTHM) (MECHANICAL, 12)
57107	PANIRCHELVAN A/L RAMANATHAN	B.E.HONS.(UMP) (MANUFACTURING, 10)
56416	PEROWANSA BIN PARUKA	B.E.HONS.(UTHM) (MECHANICAL, 12)
56417	RADIN KHAIRUL FARAH BINTI RADIN KAMARUDDIN	B.E.HONS.(UTHM) (MECHANICAL, 12)
56418	RAHMAN WATI BINTI OMAR	B.E.HONS.(UTHM) (MECHANICAL, 12)
56419	RAHMAT JANINI BIN SALLEH	B.E.HONS.(UTHM) (MECHANICAL, 12)
56481	RAJA KHAIRUL AFNIZAN BIN RAJA ZAINAL ABIDIN	B.E.HONS.(UTM) (MECHANICAL, 08)
56482	RAJA MOHD SALLEH BIN RAJA BAHTIAR	B.E.HONS.(UNIMAP) (MECHANICAL, 09)
57117	RAMADHAN ISHAFADA BIN ISMAIL	B.E.HONS.(UNITEN) (MECHANICAL, 05)
56420	RODZILLA BINTI YAHYA SHARAFUDDIN	B.E.HONS.(UTHM) (MECHANICAL, 12)
56421	ROHANA BINTI MOHD SALLEH	B.E.HONS.(UTHM) (MECHANICAL, 12)
56422	ROSLINDA BINTI SUFARMAN	B.E.HONS.(UTHM) (MECHANICAL, 12)
56423	SAIFUL IZWAN BIN ALI	B.E.HONS.(UTHM) (MECHANICAL, 12)
56543	SANTHA A/P RAMAN	B.E.HONS.(KUITTHO) (MECHANICAL, 06)
56536	SHAH HAZLI BIN SHAHURUDIN	B.E.HONS.(KUITTHO) (MECHANICAL, 06)
56475	SIM YEN CHIN	B.E.HONS.(MALAYA) (MECHANICAL, 05)
56424	SITI ASNA BINTI YAHYA	B.E.HONS.(UTHM) (MECHANICAL, 12)
56425	SITI HAMIDAH BINTI MOHAMMAD HAIRI	B.E.HONS.(UTHM) (MECHANICAL, 12)
57116	SITI HANIS-SYAZANA BINTI MOHAMAD	B.E.HONS.(UIAM) (MECHANICAL, 08)
56426	SITI NORSUHAILY BINTI MUHAMMAD NAZRI	B.E.HONS.(UTHM) (MECHANICAL, 12)
56532	SIVA A/L RAMALINGAM	B.E.HONS.(UTM) (MECHANICAL, 10)
56528	SUFANDI BIN MOHD JOHAN	B.E.HONS.(UPM) (MECHANICAL, 01)
56455	SUHAIMI BIN SULAIMAN	B.E.HONS.(UTHM) (MECHANICAL, 12)
57110	SUHANA BINTI HASSAN	B.E.HONS.(UTP) (MECHANICAL, 09)
56427	SYAZWAN FAIZ BIN SABTU	B.E.HONS.(UTHM) (MECHANICAL, 12)
56428	SYED MOHAMAD FAZWAN BIN SYED OMAR	B.E.HONS.(UTHM) (MECHANICAL, 12)

MEMBERSHIP

56530	TAN FU KEN	B.E.HONS.(MMU) (MECHANICAL, 11)
56456	TAN HUI SIANG	B.E.HONS.(UTHM) (MECHANICAL, 12)
56608	TAN JING YING	B.E.HONS.(UNITEN) (MECHANICAL, 09)
57100	TAN KIAN GUAN	M.E.HONS.(BATH) (MECHANICAL, 10)
56477	TAN KIM HUEI	B.E.HONS.(MMU) (MECHANICAL, 11)
57565	TAN MENG SAN	B.E.HONS.(MMU) (MECHANICAL, 10)
57103	TENGKU KHAIRUZZAMAN BIN TENGKU YUSOFF	B.E.HONS.(USM) (MECHANICAL, 07)
56429	THARMAAH RAO A/L SINNASALAM	B.E.HONS.(UTHM) (MECHANICAL, 12)
57118	TONG KUM TIEN, DOUGLAS	B.E.HONS.(NUS) (MECHANICAL, 91) ME (UM) (MECHANICAL, 07)
56430	UGESWARAN A/L ARUMUGAM	B.E.HONS.(UTHM) (MECHANICAL, 12)
56431	UMMU RAIHANAH BINTI HAJI HASHIM	B.E.HONS.(UTHM) (MECHANICAL, 12)
56611	WAN FOO MUN, LAWRENCE	B.E.HONS.(MONASH) (MECHANICAL, 10)
56432	WAN MOHAMAD ARIF BIN WAN HUSAIN	B.E.HONS.(UTHM) (MECHANICAL, 12)
56433	WIDIA WAHYUNI BINTI AMIR	B.E.HONS.(UTHM) (MECHANICAL, 12)
56434	YEOH YEONG KAI	B.E.HONS.(UTHM) (MECHANICAL, 12)
56607	ZAINAL BIN AHAMAD	B.E.(NAGASAKI) (MECHANICAL, 02)
56435	ZAINAL BIN ZARDAD	B.E.HONS.(UTHM) (MECHANICAL, 12)
57120	ZETI AKHTAR BINTI MOHAMAD	B.E.HONS.(UTHM) (MECHANICAL, 12)
57129	ZUELFAKHAR AL-BUKHARY BIN IBRAHIM	B.E.HONS.(UTHM) (MECHANICAL, 06)
56633	ZURINA BINTI ISMAILI	B.E.HONS.(UTHM) (MECHANICAL, 12)

MECHATRONICS ENGINEERING

57030	CHIN MIEN LIM	B.E.HONS.(UCSI) (MECHATRONICS, 11)

METALLURGY ENGINEERING

57031	MOHD FARID BIN SHAKIRIN	B.E.HONS.(UNIMAP) (METALLURGY, 07)

MINERAL RESOURCES ENGINEERING

57124	KOH KANG WEE	B.E.HONS.(USM) (MINERAL RESOURCES, 08)
56472	TENGKU NURAITI BINTI TENGKU IZHAR	B.E.HONS.(USM) (MINERAL RESOURCES, 05)

CIVIL ENGINEERING

57515	AMIR FATEH	B.E.(ISLAMIC AZAD) (STRUCTURAL, 08) ME(UTM)(CIVIL, 11)

ADMISSION TO THE GRADE OF INCORPORATED MEMBER

M'ship No.	Name	Qualification
57577	KAMARULZAMAN BIN BUJANG	BSC(HERTFORDSHIRE) (BIO-MEDICAL, 01)
57578	R. GUNALAN A/L RAMAMUTHEY	B.E.(SUNDERLAND) (ELECTRICAL, 11)
57135	TUN TEE KONG	B.TECH.(UTM) (ELECTRICAL, 95)
57579	CHEE WEI YANG	B.E.HONS.(LIVERPOOL JOHN MOORES) (ELECTRONIC, 12)

ADMISSION TO THE GRADE OF ASSOCIATE MEMBER

M'ship No.	Name	Qualification
56631	THURAISINGAM, A/L CHANDRA SEHKARAN	DIP.(PTSB) (ELECTRICAL, 09)

TRANSFER TO THE GRADE OF FELLOW MEMBER

M'ship No.	Name	Qualifications
14650	LEE FOOK LONG	MSC (LEEDS) (CONSTRUCTION ENG., 1988) BE (TAMKUNG, TAIWAN) (CIVIL, 1987)
15320	LOW KAW SAI	BSC (SUNDERLAND POLYTECH) (CIVIL, 1981) PHD (SUNDERLAND POLYTECH) (ENGINEERING,1986)

TRANSFER TO THE GRADE OF MEMBER

M'ship No.	Name	Qualification
19953	CHE BAKAR BIN CHE SOH	BE HONS (UPM) (CIVIL, 1999)
38888	GOH NAI JUN, STEVEN	BE HONS (UMS) (CIVIL, 2005)
15054	HENG CHEW KOK	BE HONS (UTM) (CIVIL, 19950
39964	HO JIN KIAT	ME HONS (BIRMINGHAM) (CIVIL, 2006)
22258	LEE WEI THIAM	BE HONS (LEEDS) (CIVIL - CONSTRUCTION MANAGEMENT, 1999)
27491	LIEW GUAN DUT	BE HONS (UPM) (CIVIL, 2002)
26384	LIM CHEE TAT	BE HONS (UNITEN) (CIVIL, 2004)
21662	LOI TIEN SIANG, ANTHONY	BE HONS (AUCKLAND) (CIVIL, 1999)
41117	MOHD FAZLI BIN MOKHTARUDDIN	BE HONS (UITM) (CIVIL, 2003)
47047	MOHD NAJIB BIN BASIRAN	BE HONS (USM) (CIVIL, 2004)
29203	MOHD. AMIN BIN IRAM	BE HONS (UTM) (CIVIL, 2001)
33724	MOHD. AZMER BIN MD ZAINOL	BE HONS (UKM) (CIVIL & STRUCTURAL, 2006)
49547	ROBIA ANAK LIMAN	BE HONS (USM) (CIVIL, 2001)
43852	VICKNESH A/L RAGHUNATHAN	BE HONS (USM) (CIVIL, 2005)
35596	WONG SOON LIUNG	BE HONS (BIRMINGHAM) (CIVIL, 1999)
19385	WONG TZE CHEONG @ THOMAS	BE HONS (HERTFORDSHIRE) (CIVIL, 1998)
39176	WONG TZE VUI, LESTER	BE HONS (USM) (CIVIL, 2004)
22946	WONG WOAN JIUAN	BE HONS (USM) (CIVIL, 2001)
25150	YAP BIN KIM	BE HONS (UNITEN) (CIVIL, 2006)
41224	YIP WENG CHEONG	BE HONS (SHEFFIELD) (CIVIL, 2005) MSC (NOTTINGHAM) (CIVIL, 2007)
25773	DZULKIFLE BIN DAWAM	BE HONS (UM) (ELECTRICAL, 2004)
35609	GAN HAN LIN	BE HONS (MMU) (ELECTRICAL, 2006)
33735	GOH CHEAH HOE	BE HONS (UTM) (ELECTRICAL, 2005)
29738	LEE CHOO YONG	POST-GRAD DIP (EC) (ELECTRICAL, 2009) ME (UTM) (ELECTRICAL-ELECTRONIC & TELECOMMUNICATION, 2008)
22891	MOHD FIRDAUS BIN ISMAIL	BE HONS (MALAYA) (ELECTRICAL, 2003)
42006	NG CHOON BOON	BE HONS (UM) (ELECTRICAL, 1997)
49444	NG CHUN HUAT	BE HONS (UNITEN) (ELECTRICAL & ELECTRONICS, 2008)
23205	S ROSLAN BIN RAZALI	BE HONS (UITM) (ELECTRICAL, 2002)
12411	SHARUDDIN BIN MOHD SIMIN	BSC (MISSOURI) (ELECTRICAL, 1987)
27581	TAN LOO YEN	BE HONS (UNITEN) (ELECTRICAL POWER, 2006)
45274	THONG CHUAN KEAT	BE HONS (NOTTINGHAM) (ELECTRICAL & ELECTRONIC, 2001)
45275	THONG YEE KEAT	BE HONS (NOTTINGHAM) (ELECTRICAL & ELECTRONIC, 1997) PHD (NOTTINGHAM) (2002)
22644	WONG SIONG UNG	BE HONS (SWINBURNE) (ELECTRICAL & ELECTRONIC, 2001) ME (SWINBURNE) (CONSTRUCTION MANAGEMENT, 2001)
38761	YEW CHIEW MAY	BE HONS (UPM) (ELECTRICAL & ELECTRONIC, 2008)
41154	YU SENG CHIANG	BE HONS (UPM) (ELECTRICAL & ELECTRONIC, 2008)
34315	SHAIFUL NIZAM BIN SAMIN	BE HONS (UKM) (ELECTRICAL, ELECTRONIC & SYSTEMS, 2002)
22569	VINESH A/L THIRUCHELVAM	BSC (WESTERN MICHIGAN) (ELECTRICAL, 1998)
19079	ENG SIEW CHEE	BE HONS (UTM) (CIVIL, 1996) MSC (LONDON) (SOIL MECHANICS & ENVIRONMENTAL GEOTECHNICS, 1997)
30595	UMI HANI BINTI MUSTAFA	BE HONS (UTP) (ELECTRICAL & ELECTRONIC, 2004)
20917	CHIA HOONG SUM, KEVIN	BE HONS (UMIST-VICTORIA) (MECHANICAL, 1999) MSC (HONG KONG POLYTECHNIC) (BUILDING SERVICES, 2003)
38904	CHIA SOON YOON	BE HONS (MALAYA) (MECHANICAL, 2008)
41331	CHIN TECK ENG	BE HONS (LIVERPOOL JOHN MOORES) (MECHANICAL & MARINE, 1998)
24836	LAU CHUANG BING	BE HONS (MALAYA) (MECHANICAL, 2002)
22533	MATHEN KUMAR S/O RAMACHENDRAM	BE HONS (UNITEN) (MECHANICAL, 2005)
33901	MOHAMAD DZULASRI BIN HIPENY	BE HONS (MALAYA) (MECHANICAL, 2006)
25541	MOHAMED MOHIDEEN BIN A JAMAL MOHAMED	BE HONS (KUITTHO) (MECHANICAL, 2006)
37071	MOHD FAIZ AMIR BIN MOHD SHITH	BE HONS (UTP) (MECHANICAL, 2007)
27571	NEO HAI FUN, RONNIE	BE HONS (MULTIMEDIA) (MECHANICAL, 2006)
41300	NGU HENG JONG	BE HONS (MONASH) (MECHANICAL, 2008)
49389	TAN BOON TONG	BE HONS (MONASH) (MECHANICAL, 2007)
21808	WONG HUAI CHIING	BE HONS (UTM) (MECHANICAL-MATERIALS, 2005)

PASS PAE (BEM)

M'ship No.	Name	Qualification

ELECTRICAL ENGINEERING

25613	NUR SERFLY BIN ALIAS	BE HONS (UPM) (ELECTRICAL & ELECTRONICS, 2002)

ELECTION TO THE GRADE OF MEMBER

Name	Qualification

CHEMICAL ENGINEERING

LEE SEOW YUN	BE HONS (UKM) (BIOCHEMICAL, 2002)

CIVIL ENGINEERING

AHMAD FADHIL BIN ISMAIL IKRAM	BE HONS (USM) (CIVIL, 2000)
KOAY BOON HOE	BE HONS (UTM) (CIVIL, 2005)
LEE FUNG YING	BE HONS (NANYANG TECHNOLOGICAL) (CIVIL, 2003) MSC (SINGAPORE) (CIVIL, 2006)
MOHAMMAD JOHARI BIN ISMAIL	BE HONS (UTM) (CIVIL, 2004)
MOHD NAZRI BIN YASMIN	BE HONS (UPM) (CIVIL, 2002)
SHAMSUL BAHRIN SULAIMAN	BSC (COLUMBIA) (CIVIL, 1991)
THAM MUN FATT	BE HONS (UKM) (CIVIL & STRUCTURAL, 2000)
YASOTHA RAMACHANDRAN CHETTY	BE HONS (UTM) (CIVIL, 2000) MASTER OF RESEARCH (WALES) (2003)
YEO AN THAI	BE HONS (UKM) (CIVIL & STRUCTURAL, 1997)

ELECTRICAL ENGINEERING

MOHAMMAD ADNAN BIN SUJAN	BSC (DREXEL) (ELECTRICAL, 1998) MSC (DREXEL) (ELECTRICAL, 2001)
MOHD HAFIDZ BIN JAMIL	BE HONS (UM) (ELECTRICAL, 2004)
TENG BOON PING	B.APP.SC HONS (WINDSOR) (ELECTRICAL, 2001)
TEOH KHYE CHERN	BE HONS (MALAYA) (ELECTRICAL, 2008)

ELECTRONIC ENGINEERING

AHMAD RIZAL BIN ALI	BE HONS (UMIST-VICTORIA) (ELECTRONIC, 1998)

INSTRUMENTATION & CONTROL ENGINEERING

MOHD FIRDAUS BIN RAZALI	BE HONS (UTM) (ELECTRICAL-ELECTRONICS, 2006)
YANG SOO SIANG	BE HONS (SUNDERLAND) (ELECTRICAL & ELECTRONIC, 1994) MSC (BRADFORD) (CONTROL, 1996) PHD (2004)

MANUFACTURING ENGINEERING

AZRIN BIN ABD RAZAK	BE HONS (UKM) (MANUFACTURING, 2002)

MECHANICAL ENGINEERING

ABU BAKAR BIN SULONG	BE (GIFU) (MECHANICAL & SYSTEMS, 2001) PHD (SEJONG) (2008)
AZHAN BIN MUHAMAD SUFIAN	BE HONS (UTM) (AERONAUTICS, 1998)
CHAN KAM KEONG	BSC (MISSOURI) (MECHANICAL, 1998)
CHEW TZE SEANG	BE HONS (UNITEN) (MECHANICAL, 2007)
LOKMAN BIN YUSOFF	BSC (MISSOURI) (MECHANICAL, 1997)
MOHD SAFAR BIN MAHFODZ	BE HONS (UNITEN) (MECHANICAL, 2002)
NG WOON YEN	BE HONS (UTM) (MECHANICAL - MARINE TECHNOLOGY, 2000)
SUHAILI BIN MANSOR	BE HONS (UTM) (MECHANICAL, 1992)
ZALINA BINTI MOHD YUSUF	ADV DIP (UITM) (MECHANICAL, 1995)

WATER RESOURCES ENGINEERING

ASMADI BIN AHMAD@ HASAN	BE HONS (UTM) (CIVIL, 2000)

PASS PAE (BEM)

Name	Qualification

ELECTRICAL ENGINEERING

MOHD FERDUS BIN ABDUL KADIR	BSC (HARTFORD) (ELECTRICAL, 1992)

ADMISSION TO THE GRADE OF GRADUATE

M'ship No.	Name	Qualification

AEROSPACE ENGINEERING

58717	KESAVAN A/L NALLALUTHAN	B.E.HONS.(UPM) (AEROSPACE,05)
58041	MUHAMMAD IYAS BIN MAHZAN	B.SC.(CALIFORNIA STATE) (AEROSPACE,2011)

BIO-MEDICAL ENGINEERING

58038	ONG CHI WEI	B.E.HONS.(UTAR) (BIO-MEDICAL,2011)

CHEMICAL ENGINEERING

58728	ONG CHI WEI	M.E.HONS.(NOTTINGHAM) (CHEMICAL,08)
58045	CHONG CHEE SIONG	B.E.HONS.(UTM) (CHEMICAL-BIOPROCESS,2001)
58034	DZUN NORAINI JIMAT	B.E.HONS.(UKM) (CHEMICAL,2007)
58718	EDDY FAIZZAL BIN KAMARI	B.E.HONS.(UTM) (CHEMICAL,04)
58705	MOHAMMAD SHAHNOR BIN BANI	B.E.HONS.(UITM) (CHEMICAL,08)
58035	MOHD HAIDAR ASYRAF BIN MOHD YASSIN	B.E.HONS.(UTP) (CHEMICAL,2008)

Note: *Remaining list of the "ADMISSION TO THE GRADE OF GRADUATE", "ADMISSION TO THE GRADE OF INCORPORATED MEMBER" and "ADMISSION TO THE GRADE OF ASSOCIATE MEMBER" would be published in the May 2013 issue. For the list of approved "ADMISSION TO THE GRADE OF STUDENT", please refer to IEM web portal at http://www.myiem.org.my.*

61st Announcement

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22	09542	WONG NENG KWONG, PETER
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24	02564	ABDUL AZIZ BIN HASSAN
25	47047	MOHD NAJIB BIN BASIRAN
26	12544	ONG BOON HAI
27	02982	MURAD BIN HAJI JAAFAR
28	26903	AISHAH BINTI OTHMAN
29	21872	RANJIT SINGH SANDHU
30	25271	TAN SOON LIANG
31	32625	LAI SEA SEN
32	17978	CHEAH CHEE FONG
33	17221	ALI SHASTRY @ HASLAN BIN HUSAIN
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35	14115	CHIN CHEE KHEONG
36	02069	LEE MOOK SWEE, LARRY
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38	38658	GAN HONG WEI
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50	25174	MOHD RAPHEL AFFENDY BIN MOHAMED NAZAR
51	36316	WONG YONG MING
52	17679	CHOY WENG WAH
53	33794	S MUGENESWARAN A/L SHANMUGAM
54	38741	UNANG ANAK BUNDAN
55	13245	NORHAMIDI BIN MD. DIN
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57	23415	KAMSANI BIN AHMAD
58	25731	MOHD. ROSLI BIN SALIM
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86	42532	NONEE HARTINEE BINTI HASSAN
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140	00883	LIM WEN SEE
141	49313	YUZRIAN EFREN YUNUS
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143	02750	REDIT ROBET/RUBET
144	30536	MOHD DALIAS BIN AWI
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146	04110	TEE CHU ENG
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150	24789	TAN WEE KOK
151	05023	WONG KA HOW
152	39071	HALIM MUSA BIN SAIRI
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155	55124	FATIN NUR AININA BINTI AMIRUDDIN
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160	00536	TAN HOCK AUN
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180	03442	KUN GOON HONG
181	07357	HIEW YET KUEI
182	24138	LEONG YEK LOONG
183	04070	TAN POH KEAT
184	06789	MOHD. FAZLI BIN OSMAN
185	01189	CHANG CHING CHAU
186	54682	NUR NABILA BT. ZAMAN
187	54171	MUHAMMAD IZAT BIN ISHAK
188	07326	MOHD. NOR BIN ABD. BASAR
189	25252	FOO YEW CHIN
190	01229	KHAW TEO GIAP
191	12533	KAMARUDIN BIN ABD. KARIM
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193	03607	DATU HJ. MOHIDIN BIN ISHAK
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- **Pipe Clash Checking between Water, Sewerage & Storm Drainage system to resolve conflicts.**
- **Deliver consistent multi-disciplinary design calculation, drawings & construction documentation.**
- **Better visualization, more accurate design, enjoys better coordination.**

Road & Highway
-Horizontal & vertical alignment design
-Junction design
-Cut section and detailing needed for submission
-Based on REAM guideline

Earthworks
-Digital Terrain Method and Grid Method for volume calculation
-3D visualization before and after development
-Auto sloping and retaining wall design
-Auto balancing between cut and fill volume

Drainage
-Follows MSMA 2 guideline
-Auto proposes sump invert level, cascading drain, dimension & gradient.
-Auto generates output needed by JPS

Sewerage
-Auto calculates Population Equivalent (PE)
-Auto proposes manholes invert level, pipe diameter, gradient & drop manhole.
-Auto generates output needed by IWK

Urban Stormwater Management (MSMA 2)
-Rainfall IDF
-On-site Detention (above & below ground)
-Detention Pond
-Rainwater Harvesting Tank
-Sediment Basin (wet & dry)

Water Reticulation
-Hardy-Cross Method and Hazen-Williams Formula
-Looping & branching design for peak flow & fire flow
-Schematic diagram with pump, hydrant, valve and etc

We also offer Individual Modules like:

MES-Road | EW3D | DraNet | SewNet | LoopWinPlus | PondCAD | MES-Survey | MES-GeoF | MES-BioFD

MSMA 2 Workshop (With CPD):

Date: To be confirmed
Venue: Selangor, Johor and Sabah
Main Speaker: Prof. Dr. Nor Azazi Zakaria
Fee: RM 250/day/person (RM50 discount for early bird)

Kindly contact us for more information regarding the workshop.

Topics:
- *Design Rainfall*
- *OSD Design*
- *Detention Pond Design*

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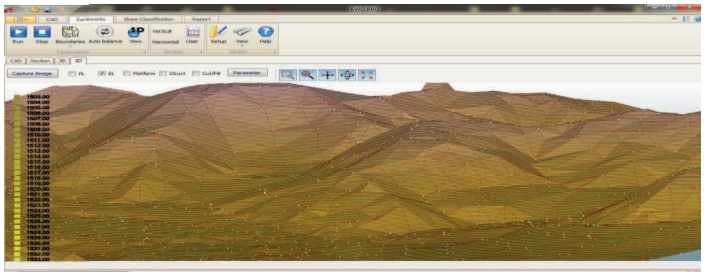
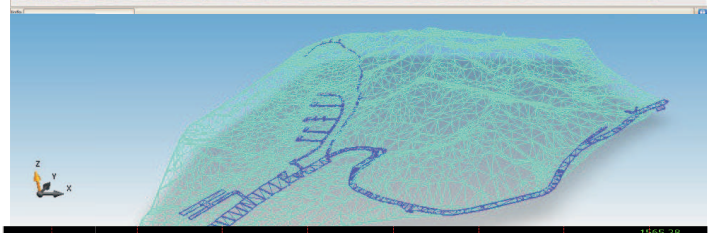
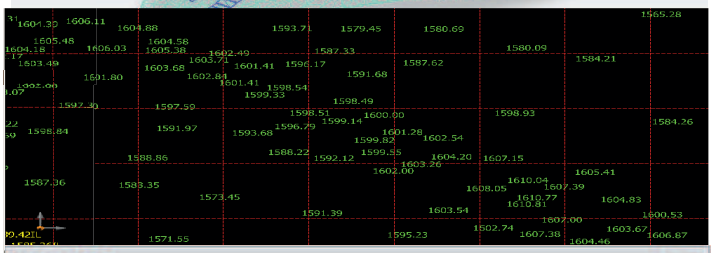




Surveyor Software Function :
✓Point labeling, e.g.: point number, elevation, height & code.
✓Can import points from ASCII (text) file with delimiter either of tab, space, comma and even different entities for single reading.
(eg. 12.21 where 12 and 21 is from different entity in similar layer)

Earthwork Planning / Design :
✓Auto interpolation between points/texts of the original ground levels .
✓Digital Terrain Method and **Mgrid*** System.
✓Auto Slope Classification to Existing Ground Level.
✓Auto slope and berms generation to JKR standard / user defined;
✓2D cut/fill area, 3D contour and 3D platform level view.
✓Auto generates longitudinal sections, cut/fill reports, volume and quantity take off.

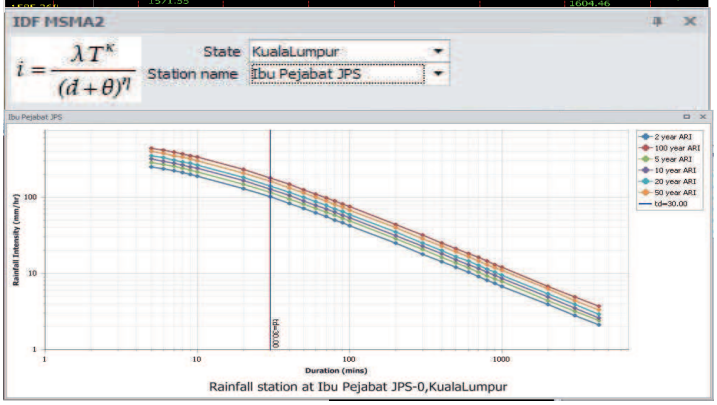
*MGrid is another new innovative method by C&S Software Solutions S/B to improve accuracy and precision of Earthwork Calculation



Storm + V3.0

We have more compact and all-in-one solution for MSMA Design !

MSMA 1 + MSMA 2



Sewer + V3.0

Aquator V2.0

Sediment Basin

Drain+ V3.0

MSMA 1 (2000-2012)
•On-Site Detention (OSD) should be used for development < 1 Ha.
•Rational Method for Pond should be used for development < 80 Ha.
•Time-Area Method can produce more economy and accurate design

MSMA 2 (2012)
•On-Site Detention (OSD) can be use for development < 5 Ha.
•New submission report format
•Many more…

Storm + V3.0 Feature Highlights
✓Above / Below Ground OSD design with Orifice and Wier Optimized Design
✓Pond Design (Rational Method / Time-Area Method)
✓Report in PDF and Excel format using MSMA 1 and MSMA 2 format.

Promotion to Upgrade To Get Infravera V2.5! (Supports Windows 8)

•For users who purchased before 1/3/2012, we offer attractive UPGRADE Cost for you. Please call 03-80635733 to get a quote.
(Valid from 1/4/2013 till 31/5/2013 only)

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•We offer trial package to you before trade-in process is accomplished, to ensure a complete satisfaction level at your side.

75%
Faster & Stable

85%
Enhanced Features

120%
Productivity

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