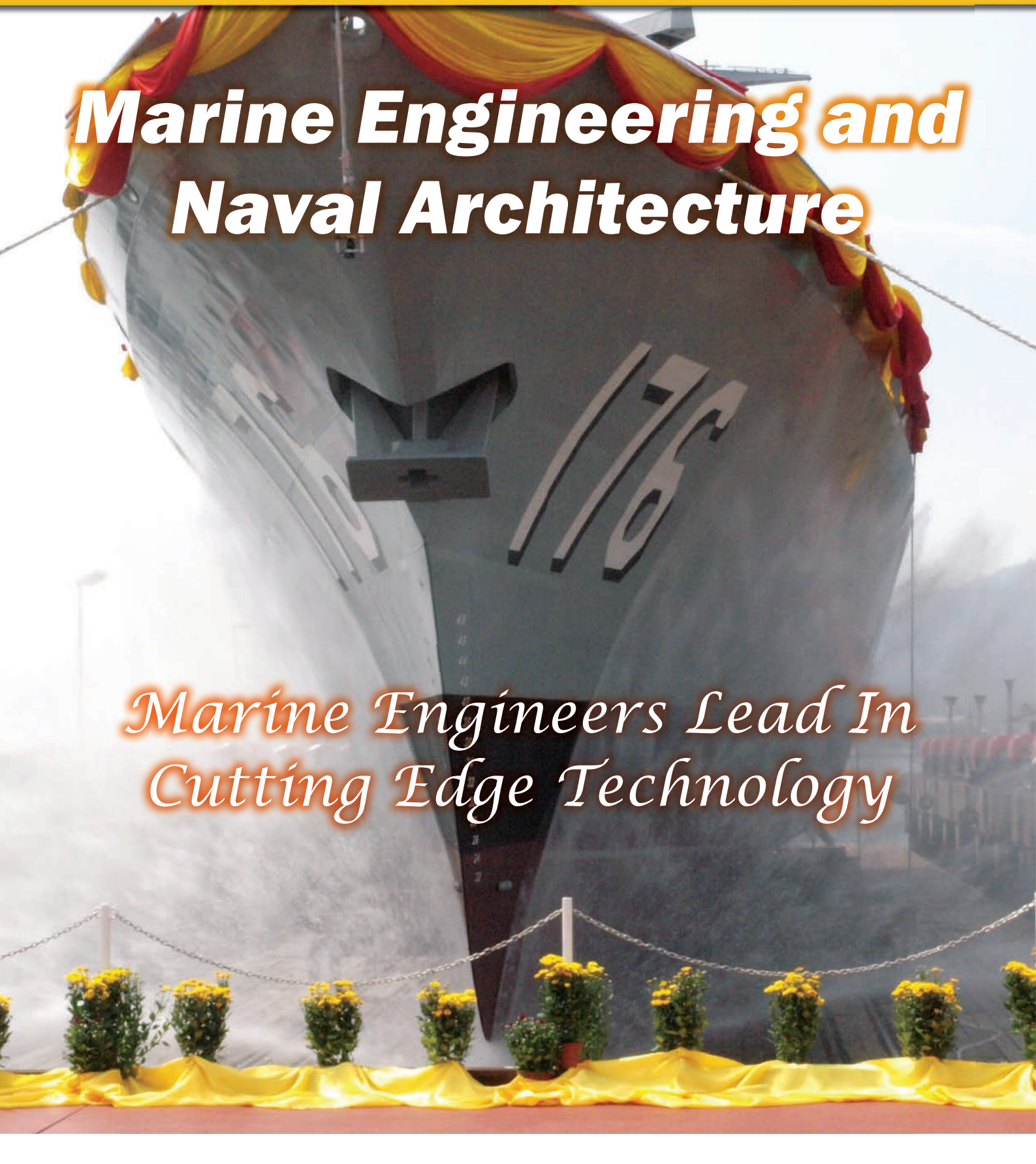
VOL. 2013 NO. 2 FEBRUARY 2013

JURUTERA

THE MONTHLY BULLETIN OF THE INSTITUTION OF ENGINEERS, MALAYSIA
KDN PP 1050/12/2012 (030192)
ISSN 0126-9909



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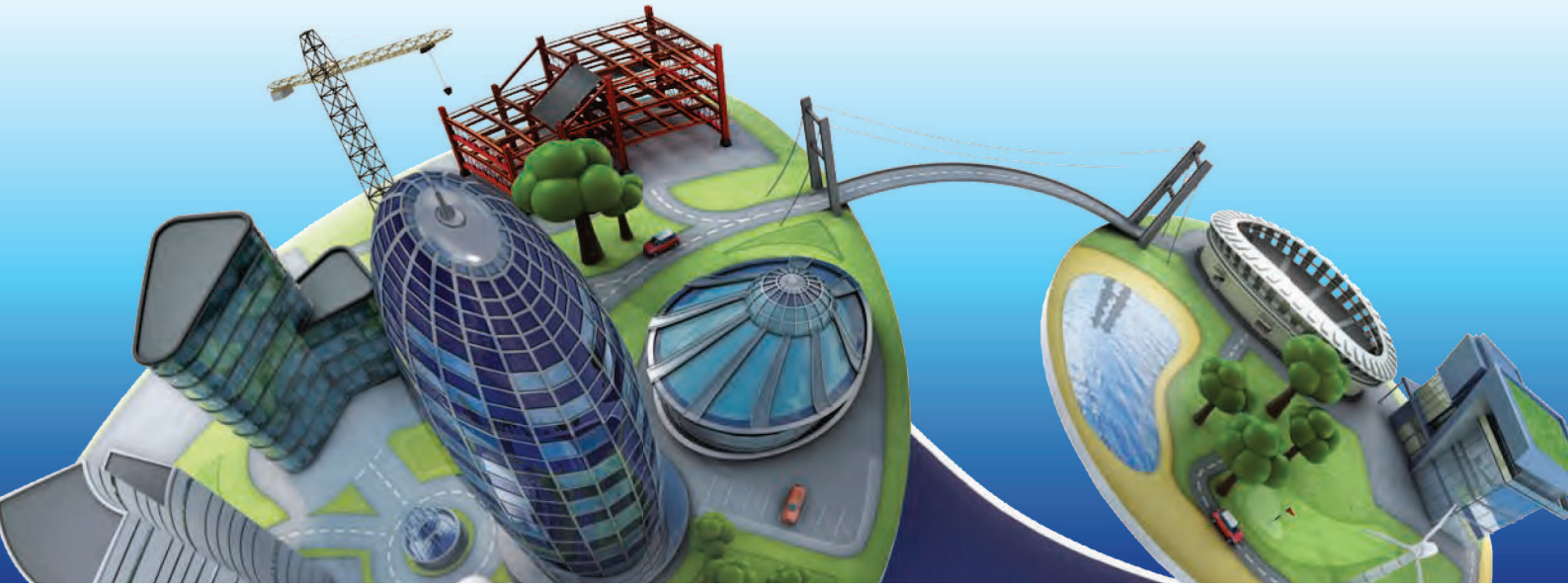

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Chairman ROBERT MEBRUER

CEO/Publisher PATRICK LEUNG
patrick@dimensionpublishing.com

General Manager SHIRLEY THAM
shirley@dimensionpublishing.com

Business Development Manager JOSEPH HOW
joseph@dimensionpublishing.com

Editor REIKA KUA KEE ENG
reika@dimensionpublishing.com

Creative Production Manager LEE SIEW LI
siewli@dimensionpublishing.com

Graphic Designer NABEELA AHMAD
beela@dimensionpublishing.com

Senior Advertising Executive MASAKI YAP
masaki@dimensionpublishing.com

Advertising Executive ALICIA CHAN
alicia@dimensionpublishing.com

Accounts cum Admin Executive YONG YEN YIN
yenyin@dimensionpublishing.com

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Chief Editor
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Bangunan Ingenieur,
Lots 60 & 62, Jalan 52/4, P.O. Box 223 (Jalan Sultan),
46720 Petaling Jaya, Selangor.
Tel: +(603) 7968 4001/4002 Fax: +(603) 7957 7678
E-mail: pub@iem.org.my or sec@iem.org.my
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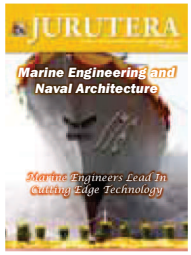

Photo courtesy of Rear Admiral Dato' Pahlawan Ir. Hj. Jasan Ahpandi bin Sulaiman (Rtd)
Naming and Launching Ceremony of KB Selangor at Boustead Naval Shipyard, Lumut

TENTATIVE THEMES – 2013

March 2013
Liberalisation of Service Sub Sectors

April 2013
Civil and Structural Engineering

May 2013
IEM Annual General Meeting and Annual Dinner

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Number 2, February 2013 IEM Registered on 1 May 1959

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46720 Petaling Jaya, Selangor Darul Ehsan.
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E-mail: sec@iem.org.my Homepage: http://www.myiem.org.my

Making the Difference in Meeting Engineering Challenges of the Future

by ***First Admiral Adjunct Prof. Dato' Ir. Hj. Ahmad Murad bin Hj. Omar (Rtd)***
Chairman,
Marine Engineering and Naval Architecture Technical Division

IN the current setting where engineering challenges are found anywhere and everywhere, it is differentiation that stands out as the ingredient that separates true engineers from the rest.

Malaysia is fast-moving and is transforming from a developing nation to a high-income nation. The time frame is indeed short and by 2020, the results would have to be realised. The stage is set and there is no turning back. The New Economic Model through the framework of the Economic Transformation Programme (ETP) is the pillar that shall propel Malaysia into one of the world's top locations for offshore manufacturing and service-based operations.

Offshore manufacturing and service-based operations are just a few of the sectors involved and in exploring the 12 National Key Economic Activities (NKEAs) that have been identified, one will realise in all clarity that the Maritime Technology and Science sector is the vanguard to assure the success of Vision 2020.

Malaysia is truly a maritime nation. Its total coastline measuring 4,675 kilometres and an Exclusive Economic Zone (EEZ) which stretches from 3 to 200 miles possess riches both on land, under the ground, in the oceans and within the sea bed – and they are all waiting to be explored, harvested and mined. High technological engineering is here to stay and this warrants highly motivated and enthusiastic marine professionals to drive the maritime industry that is poised to take the lead in achieving Vision 2020.

Obviously, the driving of technology requires the combination of highly skilled multi-discipline marine professionals who are well-trained in soft skills management, and who also possess leadership qualities while being a well-rounded engineer at the same time. Only with the combination of such attributes will these professionals be able to withstand the test of time and sustain the severe weather and working environmental conditions. It is certainly not a place for the weak hearted.

The Marine Engineering and Naval Architecture Technical Division will continue to persevere and impart knowledge and skills from its vastly experienced members to the younger generation of engineers who shall one day be the successors to the senior and experienced engineers. Hence, marine professionals practising differentiation as a culture shall definitely prevail. ■

ANNOUNCEMENT

Important events to note on Saturday 20 April 2013:

- The 54th IEM Annual General Meeting will be held at Wisma IEM, Petaling Jaya
- The 54th Annual Dinner will be held at One World Hotel, Bandar Utama, Petaling Jaya

The Prospects of Marine Engineering in Malaysia

by Ms. Reika Kua Kee Eng

ACCORDING to the United Nations Conference on Trade and Development (UNCTAD), the most rapid rise in export share of developing economies has occurred in the field of ship construction. In 2010-2011, ships and floating structures (cruise and cargo ships, barges, and other vessels) built in developing economies grew to 64.7 per cent of the global total (an increase of 37.4 percentage points from 1995-1996). The principal net exporters were the Republic of Korea, China and India. The main destinations were Singapore, China, and Hong Kong (China), as well as "open registry" countries, notably Liberia, the Marshall Islands and Panama.[i] In fact, exports of ships and floating structures from developing countries have grown in each of the past 10 years, even during the global financial crisis of 2008 and 2009. This compensated downturns or stagnation in a number of developed countries.[ii]

Malaysia, a maritime nation with a total boundary stretching 7,344 km (4,563 mi) of which 4,675 km (or 2,905 miles) is coastline,[iii] has recognized the importance of maritime activities and the maritime-related industry which has contributed greatly to our nation's economic growth. Based on the Review of Maritime Transport 2006 released by UNCTAD, Malaysia was ranked as the 20th most important maritime nation in the world, although its position had dropped two places since year 2005, overtaken by Turkey and Iran which assumed the 18th and 19th positions respectively.[iv] Will Malaysia in the coming years be able to improve its ranking, maintain its current position, or continue to slide down out of the top 20 maritime nations?

In order to gain a better insight on Malaysia's prospects as a leading maritime nation as well as to find out more about the key issues related to marine engineering, *JURUTERA* interviewed one of the most prominent personalities in the field of maritime engineering, First Admiral Datuk Ir. Yahya Hashim, the Director of Operations of Boustead Naval Shipyard Sdn. Bhd. (BNSY). Also present at the interview was First Admiral Adjunct Prof. Dato' Ir. Ahmad Murad B. Hj. Omar (Rtd), Chairman of Marine Engineering and Naval Architecture Technical Division, Institution of Engineers, Malaysia (IEM).

THE NEED FOR MORE MARITIME EXPERTS

From Datuk Ir. Yahya's point of view, Malaysia, as a maritime nation, clearly lacks expertise in marine and naval engineering. Even today, only a small number of local universities offer courses in marine engineering or naval architecture. The great demand from the industry for marine engineers and naval architects with the expertise and capability to design and construct naval-type ships has not triggered the desired response from our academic institutions to increase the supply of such graduates in line with the aspirations of the country.

"We hope that our naval architects will be more exposed and will sharpen their expertise in naval shipbuilding. As a stakeholder, we will try and continue to develop our naval architects by giving them the opportunity and avenue to practise their engineering skills in our projects which will directly contribute towards the development of the required expertise in the country. The benefits will be not only for us but also for the entire industry," commented Datuk Ir. Yahya.

He further elaborated, "We are consistently pursuing our strategic intent of developing the expertise for the country. As a maritime nation with a long coastline and vast abundance of resources from the sea, it is significant that we should have the expertise in the various disciplines of marine engineering and naval architecture in order to meet the ever increasing demand from economic activities associated with the maritime industry. This will become increasingly crucial in the future."

First Admiral Datuk Ir. Yahya Hashim,
Director of Operations of Boustead Naval Shipyard Sdn. Bhd. (BNSY)

[i] *http://unctad.org/en/Pages/Statistics.aspx*
[ii] *Ibid*
[iii] *http://www.nationsencyclopedia.com/Asia-and-Oceania/Malaysia-LOCATION-SIZE-AND-EXTENT.html#b*
[iv] *http://www.portsworld.com/news/nst1nov27_06.htm*

"We have prepared the platform to create and nurture the emergence of marine engineers and naval architects. We have embarked on the relevant investment in software and human capital in line with our strategic intent." Datuk Ir. Yahya continued, "We have made the efforts through the Littoral Combatant Ship Project to enable our marine engineers and naval architects to gain the experience in naval shipbuilding. It is our belief that the more our engineers are involved in the design and construction of these vessels, the higher the value and level of competency that will be accrued, thus indirectly contributing benefits to the nation."

Datuk Ir. Yahya also pointed out that there is also an actual need to strengthen our expertise in platform system integration, which is the driven and concentrated role in the management and leadership of any shipbuilding project. "Building a ship is like building a town. However, the scenario is tighter with constraints of limited space and ideal balance. We need to have experts in all areas and systems, not particularly in the hull structure, but also in marine propulsion, piping, and electrical systems. And we do recognise the growing needs and expertise in the field of welding, where highly skilled workers are paramount to the critical success factors in shipbuilding," explained Datuk Ir. Yahya.

COMPETENCY OF YOUNG ENGINEERS

When asked on whether young engineers' attitudes and competency levels were below expectation, Datuk Ir. Yahya Hashim, without hesitation, confirmed the declining trend. He explained, "Nowadays, they lead a simple life and expect everything to be given to them. In order to become good engineers, they must have hands-on experience and this is important for the continuous process of development of skills and knowledge. They must acquire the knowledge of how to apply the theories and to put them into practical use. If they do not want to get their hands dirty, they would not be able to understand the functionality of parts that work as a system. Just like a human body, they need to know the functionality of each part in order to understand and master the knowledge on how the system works."

Further more, according to Datuk Ir. Yahya Hashim who had kick-started his career in marine engineering as a cadet officer in January 1978 in the Navy, the ability to communicate and have the right attitude is essential in the formative years to become a competent engineer. Many of them would have had the opportunity to mix with people from various cultural and ethnic backgrounds, and also to be trained overseas. Thus, he believes that language and communication has never been a barrier to the path of becoming a competent engineer.

"It is the attitude that counts!" exclaimed Datuk Ir. Yahya. He continued, "I would always tell these engineers that I do not require highly intelligent people. I only require the people with the right attitude. This is very important to me. If they are intelligent, then it is a bonus. The right attitude always comes first."

INTIATIVES TO BOOST COMPETENCY OF YOUNG ENGINEERS

Various initiatives have been taken to boost the competency level of young engineers. One of these initiatives is the Young Engineers Scheme (YES), a partially Government-funded programme which spans for a year. "Under the YES programme, we will train the participating trainees. However, we are strict on the selection of candidates and will only choose those with a CGPA score of 3.0 and above," emphasized Datuk Ir. Yahya. He further explained that the YES programme is a non-binding scheme whereby the participants are offered an option as to whether or not they would like to be absorbed into the workforce of BNSY.

(Continued on page 9)

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"So far, under the graduating first batch of trainees, we have had 20 participants and all of them have been absorbed either as BNSY employees or engaged by our associate companies in the Group.

"We pay quite a high allowance for these trainees. Under this programme, we have also mentoring sessions with practitioners in the industry, career counseling and motivation courses to improve their competency and adaptation to the real work place. The scheme has been successful and we can see significant improvements in them," he remarked. According to Datuk Ir. Yahya, in the quest for continual improvement, BNSY is constantly head-hunting for potential and qualified engineers and experts in the industry to form part of the team that contributes to sustainable growth of the Company's business.

RENUMERATION ISSUES

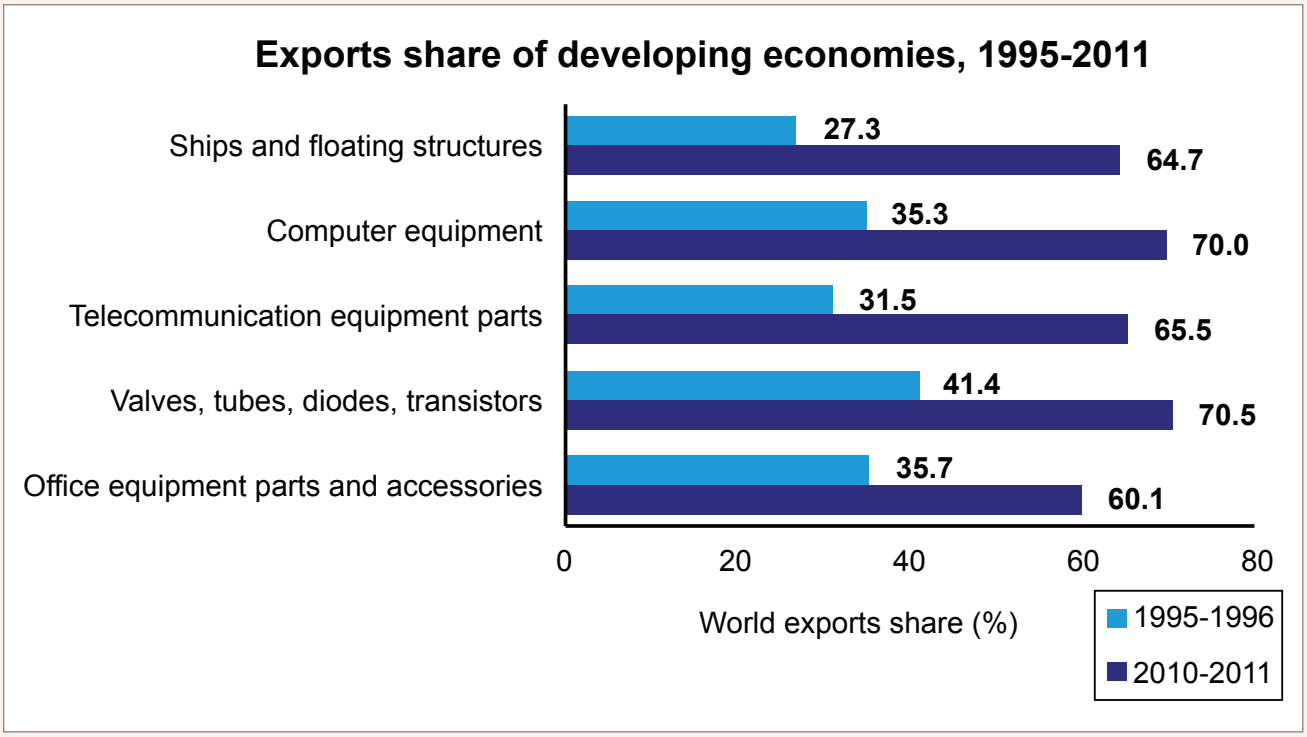
"Why most people do not want to practise engineering is because of the perception that they cannot rise to the highest position of the organisation. In most firms, the CEO normally comes from an accounting, business or economics background. Career development for some engineers therefore tends to get stuck as the technical people appear to be functional as the backbenchers," said Datuk Ir. Yahya. He added half-jokingly, "Only in JKR (Public Works Department) and JPS (Drainage and Irrigation Department) are the bosses themselves engineers, but this does not hold true for other organisations."

As most of the decision makers are non-experts in the field of engineering, it is quite de-motivating for fellow engineers to pursue their careers to become the top leaders of companies. Datuk Ir. Yahya pointed out that being an engineer does not mean that one cannot possess entrepreneurial qualities. He advises, "Actually, engineers only need to upgrade their knowledge about business and management to be capable to assume management positions. We understand the fundamentals about engineering, and if we put our efforts to understand more about business administration, we will be as good as those who come from an accounting or business background."

According to Datuk Ir. Yahya, addressing these lopsided remuneration and promotion issues is vital to increase the interest among qualified engineers to seek prominent roles in the running of the business of companies. The drive will reinforce the continual commitment to enhance and practice engineering. Apart from that, project management should also be included in the curriculum of an engineering course at tertiary institutions. "It is also equally important that we should embark at an early stage of learning to motivate and create excitement among students on the prospects of a career and life in the field of marine engineering," suggested Datuk Ir. Yahya.

FUTURE ASPIRATIONS

According to Datuk Ir. Yahya, currently most of the ships in the naval shipyard are procured from overseas. There is a new strategic intent. "We want to establish a full capacity ship design and engineering centre, so that we can have our own intellectual property, where we can design our ships and sell our design to others. This is what we have set out to do. It is also in line with the Government's aspirations," he added.



Source: UNCTAD secretariat calculations based on UNCTADstat [v]

[v] *http://unctad.org/en/Pages/Statistics.aspx*

(Continued on page 11)

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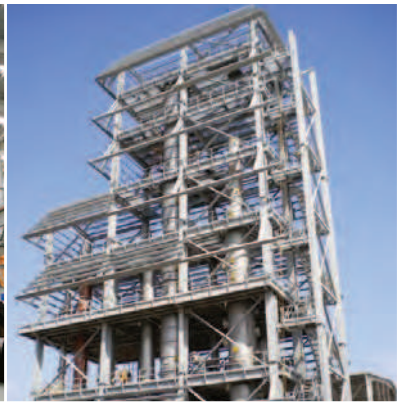
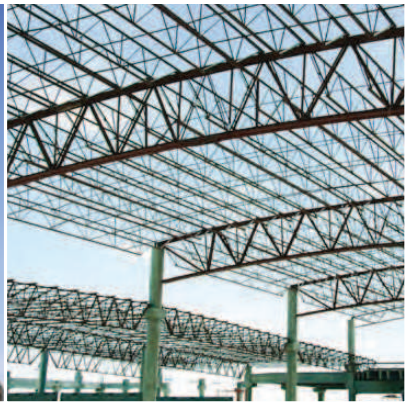


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He informed that BNSY intends to set up the ship design and engineering centre in Cyberjaya. "Our marine engineering and design base in Lumut is only to cater for the in-house requirements, just for BN Shipyard. However, it is our aspiration to have an engineering design centre for the country," emphasized Datuk Ir. Yahya. He further elaborated, "This is actually incorporated in our contract in relation to our commitment to supply the Littoral Combatant Ships to the Royal Malaysian Navy (RMN). At the initial stage, we will first collaborate with DCNS, a French company, to make sure that we are capable to design and construct the ships which will all be done locally in Malaysia, except for the integration part."

He said that currently, most shipbuilding services are still outsourced from foreign companies. Hence, there is a need to localise such services. Datuk Ir. Yahya added, "The help from DCNS is for the initial stage, whereas later we will make it totally Malaysian – localising it, not just for the purpose of the defence project, but also for commercial reasons."

However, he also stressed that Malaysia would also need to constantly send our experts overseas not only to acquire more advanced knowledge and skills in shipbuilding and naval architecture, but also to continually keep abreast with technology and practices in other countries. When these engineers are back in Malaysia, they will be able to transfer their knowledge and skills into the local operations and directly contribute to the enhancement of the local maritime industry.

> **"We want to establish a full capacity ship design and engineering centre, so that we can have our own intellectual property, where we can design our ships and sell our design to others."**

FUTURE PROSPECTS FOR MARINE ENGINEERING

"In terms of the future prospects for marine engineering and naval architecture, there certainly is a very good potential for rapid growth and expansion. In fact, I believe, the potential is always better than any other fields of engineering, since the driving factor of the industry demand is fundamentally based on transportation by sea. In any circumstances, carriage by ship is cheaper than by air," asserted Datuk Ir. Yahya.

He also pointed out that it is crucial for Malaysia to be prepared and continually enhanced its development of marine engineering and naval architecture so that the nation is able to cope with the increasing demand for vessels, not just for defence purposes but also for commercial use such as freight services to transport industrial goods. "And if our people do not start developing and building our own ships, when the volume gets bigger, not only are we unable to cope with the demand but we will also lose the opportunity and learning experience in order to move towards a higher application of technology and growth," explained Datuk Ir. Yahya.

He added, "Currently we have a lot of potential business in luxury yachts, especially now in Langkawi. We need to build up the local expertise in this area and take advantage of our cost position. To park a yacht at the dock in most ports overseas is very expensive in comparison to a much cheaper rate locally."

Another area of concern is the application of materials in the industry. As sea water can easily cause corrosion, the need for maintenance of ships is high. Certain materials are banned to protect the marine environment from being destroyed. Hence, there has been an increasing need for a constant research and development programme to source for potential materials that can be safely used and is environmentally friendly for the purpose of shipbuilding.

"We take in a lot of vendors with us under the maritime vendor development programme. Under this new scheme, we have set the target of 60% local content for whatever components and labour that we use in shipbuilding, ranging from pumps to cables, equipment and ultimately the work force." He continued, "However, I cannot simply bring foreigners into the naval shipyard, except for specialists from overseas, due to specific ownership of technology of the acquired system. All the lower levels of workforce must be acquired locally."

There has been an increasing trend of more women engineers being employed in the work force. He also mentioned that many of the engineers in the design section comprised women engineers. "Now, I have also women engineers working on board. Even the technicians and some skilled workers are women. The only drawback is that we might be temporarily short of manpower during their absence due to maternity leave. But after that, they could continue working as usual. Hence, gender has never been a major issue."

"We have embarked on so many initiatives including the vendor development programme, Young Engineers Scheme, and so forth. In whatever projects that we venture into, there has always been the involvement of local players. The only right thing to do is to implement it properly, and it is crucial to find the most effective ways to execute it," he emphasized.

According to Datuk Ir. Yahya, all these efforts will eventually lead to the opening of more job opportunities for Malaysians, which will directly contribute to our country moving closer towards becoming a high-income nation. ■

THE BIRTH OF IEM

THE story of The Institution of Engineers, Malaysia (IEM) began with our nation's independence. The Institution, born exactly 20 months after Merdeka on 1 May 1959, has had a marked influence on the engineering profession in the country. It was indeed a herculean task in those days to set up an association as the British Officers were still firmly on the saddle even after our nation had achieved its independence. It was an impressive feat to get in the wedge to open the way for the establishment of a local institution.

The Institution's prime mover and founder President, Allahyarham Tan Sri Ir. (Dr) Haji Yusoff Haji Ibrahim, first had the idea of forming a local Institution when he was the State PWD Engineer in Kelantan in 1957. *"As we were attaining Merdeka soon, I thought it was the right time to form an Institution of our own to reflect our independence professionally"*. He managed to gather a few engineers who were interested in forming a local institution when he was transferred to the Kuala Lumpur JKR headquarters.

What motivated him most was to oppose the British civil, mechanical and electrical engineering institutions which were trying to conduct joint examinations for local candidates. Another factor that compelled him to act was that membership of these institutions was a must if engineers in the Civil Service were to be promoted. This was seen as a move by the British institutions to keep local engineers from being independent.

These institutions had submitted their application to the then Works Minister, Allahyarham Tun Sardon Jubir for permission to conduct their examinations locally. However, Allahyarham Tan Sri Ir. (Dr) Haji Yusoff was able to persuade the Minister, whom he had personally known, not to reply to the institutions, pending the registration of IEM. When he was transferred to Johor Bahru in 1958, he commuted frequently to Kuala Lumpur to hold "secret" meetings with his fellow engineers to draw up the Constitution of the proposed Institution.

His hard work paid off when The Institution of Engineers, Malaysia, was officially formed on 1 May 1959. ■

Extracted and adapted from the IEM 25th Anniversary Report, 1984

Allahyarham Tan Sri Ir. (Dr) Haji Yusoff served as the President from 1959 to 1962. He was also an Honorary Fellow member of IEM. He served for many years in government and quasi government committees and had contributed towards the advancement of the profession. He was formerly the Director General of the Public Works Department, Peninsular Malaysia. For his dedication to the nation, Allahyarham Tan Sri Ir. (Dr) Haji Yusoff was awarded the Panglima Setia Mahkota (PSM) by DYMM Seri Paduka Baginda Yang Di Pertuan Agong in 1968. He was also very active in the Muslim Welfare Association, PERKIM, of which he was the national Vice President for many years. He was also the Chairman of the Universiti Teknologi Malaysia Council.

Networking in Maritime Technology, Science and Management Sector: An Industry Perspective

by First Admiral Adjunct Prof. Dato' Ir. Hj. Ahmad Murad bin Hj. Omar (Rtd)

The challenges posed by the current global economic situation are truly a concern for not only Malaysia and the region but also the world. Around the globe, national economies are one by one feeling the effects of the slowdown and crumbling into a sea of debts. With Iceland, Greece and today Spain, where the youth unemployment rate is 50%, requiring international financial assistance to keep afloat, who would not be worried? Meanwhile, the middle-eastern nations are in turmoil as civil war and anarchy is the order of the day. Against this gloomy backdrop, Malaysia, a nation which is striving to become a high-income nation by 2020, is embarking on a bold and strategic plan that will propel the economy of the nation to achieve greater heights.

The Economic Transformation Programme (ETP) has been launched. As with other mega initiatives that are as strategic as the ETP, it is expected to transform the nation's economy so drastically that it will transform the whole landscape of Malaysia to that of a high-income nation.

The question that probably lingers in one's mind would be, "Can this really be achieved?" Achievement means not only all the programmes as listed under various National Key Economic Activities (NKEAs) be completed successfully but also with the intended 'outcome' realised and dovetailed snugly into the framework of the new Malaysia.

The framework in question is the combination of elements amongst which, is related to the fundamental activity that is familiarly known as "Networking". In the industry, networking is essential, if not fundamental. In an effort to enhance Maritime Technology, Science and Management, the industry is the backbone of the whole process and without that the sector will not progress. It is the industry driven by maritime professionals that will realise the aspiration of the nation and not a plan in the world will be successful without the existence of industry that has been well managed. Therefore, networking and industry should go hand-in-hand to achieve success in Malaysia's strategic ETP and to transform our homeland into a better Malaysia.

INTRODUCTION

Malaysia is indeed a Maritime Nation with a coastline measuring 4,675 kilometers[i] with almost all of its states having a sea frontage. Generally, a maritime nation's economy would be dependent on the resources found in the seas and beneath it, and Malaysia is not excluded. Not only is the Malaysian economy dependent on the resources beneath the waves and under the seabed, but also on the sea-lines of communication such as the Straits of Malacca. This is a trade route that had been known to many traders from the early days since mankind took to the sea. In 2004, over 80% of Chinese crude oil imports transited through the Straits of Malacca, with less than 2% transiting the Straits of Lombok. This is a clear demonstration of the importance of sea-lines of communication or better referred to as SLOC[ii].

Since 1957, the Malaysian economy has had a gigantic leap. The transformation of the country's economy from one that was based on primary commodities such as tin, rubber and palm oil, to a dynamic and vibrant industrialising nation, is attributed to a variety of pull factors. Malaysia's political and economic stability, prudent and pragmatic investor-friendly business policies, cost productive workforce, developed infrastructure comparable to that of any western country and a host of other amenities have made this country an enticing place for investors.

Multi-national corporations from more than 40 countries have invested in over 5,000 companies in Malaysia's manufacturing and related services sectors, encouraged by the country's pro-business environment. Today, Malaysia is one of the world's top locations for offshore manufacturing and service-based operations and is centered in the heart of the Asian oil and gas hub. Malaysia is in its most radical transformation stage as it battles to achieve Vision 2020.

The New Economic Model (NEM) to be achieved through an Economic Transformation Programme (ETP) constitutes a key pillar that will propel Malaysia into being an advanced nation with inclusiveness and sustainability in line with goals set forth in Vision 2020. The ETP will be driven by eight Strategic Reforms Initiatives (SRIs), which will form the basis of the relevant policy measures. The 12 National Key Economic Activities (NKEAs) include:

a) Oil & Gas and Energy
b) Palm Oil
c) Financial Services
d) Tourism
e) Business Services
f) Electronics and Electrical
g) Wholesale and Retail
h) Education
i) Healthcare
j) Communications Content and Infrastructure
k) Agriculture
l) Greater Kuala Lumpur/Klang Valley.

Some entry point projects have been identified in supporting these NKEAs and those related to the maritime technology sector would be, the oil and gas, energy, agriculture, and to a small extent, the Tourism NKEA. It is therefore obvious that the Maritime Technology, Science and Management sector will be necessary to support the national aspiration of becoming a high-income nation as targeted under the ETP.

[i] *www.indexmundi.com<Malaysia Geography>*
[ii] *www.wikipedia.org<sea_lines-of_communication>*

Malaysia has achieved 14 continuous years of trade surplus. The total trade in 2011 reached RM1.269 trillion, with an increase of 8.7% as compared to 2010, and it is the highest total trade ever recorded thus far. Exports showed a positive growth with an increase of 8.7% to RM694.55 billion in 2011, while imports rose by 8.6% to RM574.23 billion.

International trade, especially seaborne trade, has traditionally been the lifeblood of Malaysia. The key word "seaborne" trade signifies the sea transportation mode as fundamental in the economic development. Today, more than 90% of the country's trade is seaborne and is carried out via seven international ports of Malaysia, namely Penang Port, Port Klang, Johor Port, Port of Tanjung Pelepas, Kuantan Port, Kemaman Port in Peninsular Malaysia and Bintulu Port in Sarawak. In tandem with the expansion of the economy and trade, ports in the country have registered impressive growth in recent years. Two of the ports, Port Klang and the Port of Tanjung Pelepas (PTP), are ranked amongst the top 20 container ports in the world.[iii]

THE INDUSTRY

"Where the medium and long term outlook for the maritime and aerospace industries is concerned, Malaysia is well positioned to take advantage of any future growth opportunities. Malaysia's strategic location, competitive costs, skilled and talented work force and first-class infrastructure provide an excellent environment for investment."

– Dato' Sri Mohd. Najib Tun Abdul Razak[iv]

The above quote was made by the Honorable Prime Minister in the book published by MiGHT titled, "Malaysian Shipbuilding/Ship Repair Industry Strategic Plan 2020" and was launched at Langkawi International Maritime Aerospace Exhibition (LIMA) in December 2011. The statement reinforced the nation's belief and trust that the maritime industry shall be able to drive the nation's economy to greater heights. It identifies the elements such as location, costs, skill and talent of workforce, and infrastructure that will ensure the climate for investment is truly suitable. The maritime science and management related industries are as follows but not limited to:

a) Oil & Gas and its supporting industries
b) Agriculture (aquaculture and fisheries related)
c) Tourism (resorts construction on islands and sea fronts)
d) Energy and its related industries
e) Port management
f) Shipping (Charter)
g) Shipbuilding and ship repair (inclusive of maintenance)
h) Ocean engineering
i) Training and human resource development
j) Coastal engineering/management.

This paper shall address four major industries that contributes generously towards the Gross National Income (GNI) and very much related in some ways to the NKEAs identified in the ETP and the significance and impacts of networking in enhancing the Maritime Technology, Science and Management sector. These involve the oil and gas, fisheries (agriculture), tourism and shipbuilding and ship repair industry.

OIL & GAS INDUSTRY

With the development of new oil finds and current trends in technologies related to the industry, Malaysian oil and gas industry is poised to increase and boom. Tax incentives announced at the budget 2013 too will be another factor to be reckoned with the increasing foreign direct investments streaming into the industry. A 100% tax exemption for a period of 10 years, and the exemption of withholding tax and stamp duty for public-private partnership projects in the development of oil industry will spur greater opportunities for Malaysians. Quoting Ernst & Young LLP Partner in the Star, dated 13 October 2012, the chances of a hit in oil exploration used to be 1 in 8 and now with advanced technologies, it is 1 in 2. A high probability ratio in this magnitude will only result in further expansion of new wells and rapid growth in the industry.

On the financial side, expenditure is about USD15 trillion for the past 20 years that equates to approximately USD750 billion (RM2.3 trillion) per annum.[v] The three key fundamental success factors are technology, global reach and local delivery capability, and for Malaysian oil companies involved in the provision of services, the opportunities are just there for the taking.

On the global front, deep-water offshore exploration in eastern Mediterranean, Brazil, Africa and offshore basins in Australia are potential markets that will grow. Renewables will be a subject explored by many countries as an alternative energy resource but it will not pose a threat in the next few decades as the development and growth will take time. Close scrutiny of the industry will reveal that the elements of Maritime Technology, Science and Management in their different facets and forms exist and, in some instances, the magnitude of its importance ranks high.

FISHERIES INDUSTRY

Although the outlook for oil and gas industry may seem promising, fisheries industry play an important role in Malaysia's culture and economy too. Malaysia is a nation with more sea than land and there are more than 120,000 licensed fishermen and aquaculture operators within the fisheries sector in 2007. The total fish production in 2007 was 1.65 million tons. The total revenue from the fisheries industry was RM5.8 billion (Department of Fisheries, 2007).

Despite the increase in revenue over the years, the situation on the ground is worrying. Fisheries resources have depleted since 1970, so much so that fish biomass has declined as much as 90% between 1971 and 1997 in some fishing areas. This is based on the Department of Fisheries' decadal resource survey to assess demersal fish biomass,

[iii] *www.mdbc.com.my<Malaysian Economy>*
[iv] *Malaysian Shipbuilding/Ship repair Industry Strategic Plan 2020. MiGHT 2011*
[v] *The Star, online 13th October 2012*

(Continued on page 17)

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growth, mortality, yield and catch-per-unit-effort (CPUE) which concludes that the demersal resources in the west coast and east coast of Peninsular Malaysia, Sabah and Sarawak were already over-exploited in 1997.

The threats to sustainable management of fisheries are both terrestrial and marine-based. Some of the immediate threats are:

- **Overfishing** – the fish resource harvested is more than the sustainable level.
- **By-catch** – the use of non-selective gears such as trawl nets results in high catch of non-targeted species (non-commercial fishes, juveniles of commercial fishes, turtles, dolphins and others). This practice will deplete fish resources, as well as affect the food chain and marine biodiversity.
- **Destructive fishing practices** – many fishermen use cyanide, bombs and electric gears to stun that enable them to easily catch the fishes, but the impact of these practices on the natural habitats of coral reefs, sea grass and the marine environment is devastating.

Above are some information with regards to Malaysia's fishing industry and the elements that contributed to the depletion of fish stock and what the outcome would be like in the future if positive actions are not taken now.[vi]

Travelling along the track related to fishery industry, the two key elements that warrant close scrutiny are the eco-system in which the fish reside and the conservation of the various species. There are currently many initiatives and studies that are underway towards improving the two elements. The eco-system management regimes transcend across political boundaries and draw in the involvement of numerous agencies and bodies both in the public and private sectors. The conservation of the eco-systems and natural habitats and the recovery of local populations of species living in the proximities require scientific, technology and management approaches dovetailed into statutory regulations conforming to world's standards.

Some of the lead agencies and organisations (stakeholders) that are directly and indirectly involved in the efforts are:

a) Ministry of Science, Technology and Innovation (MOSTI)
b) MiGHT
c) Ministry of Energy, Green Technology and Water
d) Ministry of Natural Resources and Environment
e) Ministry of Human Resources
f) Department of Town Planning (Coastal Zoning)
g) Malaysian Maritime Enforcement Agency
h) Department of National Heritage
i) Ministry of Tourism
j) Department of Environment
k) Ministry of Transport.

TOURISM INDUSTRY

Malaysia is truly an exotic country when it comes to beauty of the flora and fauna landscape. As such it becomes an attraction for tourism, especially the beaches and islands that are found in abundance along the coastline. Adding to this, the diverse culture and way of life of the local inhabitants also pose as a value adding ingredient in the promotion of the tourism industry.

Following the expansion in the industry of tourism, the development of infrastructure shall require a rapid growth too, as new resorts and chalets are required to be built, thus requiring involvement of transportation facilities such as boats, ferries, jetty facilities and other related amenities and utilities, which will inevitably compliment the need of collaborative actions amongst the maritime technology and management pool of expertise. The logistics element has to be increased and perfected in order to offer a good service to the tourists.

Tourism Malaysia has grown by leaps and bounds with its focus on promoting Malaysia at the domestic and international levels. It aims to market Malaysia as a premier destination of excellence in the region. Its vision is to make the tourism industry a prime contributor to the socio-economic development of the nation.

The growth of world tourism and Malaysia's potential as a destination of tourism have contributed to the change and focus in the country's tourism sector. The tourism sector has helped generate substantive foreign exchange earnings and employment, and it would only be a matter of time before Malaysia places itself in the global map as a tourism-centered destination sought by many around the world.

SHIPBUILDING AND SHIP REPAIR INDUSTRY

In the global scenario of shipbuilding and ship repair industry, emerging giant China has taken over Korea as the world's largest shipbuilding nation in terms of number of vessels produced, and combining the two nations, they produce almost 85% of the world's total order booked for new shipbuilding. The demand of new ships is very much generated by the maritime industry and its expansion. The five-year statutory dry dock repair for big ships with sizes longer than 300m are taking up dock spaces up to 2015 and this would certainly boost the ship repair industry.

SBSR industry in Malaysia generated RM7.36 billion in revenue and provided 31,000 jobs in 2010

Extracted from SBSR (PEMANDU) Presentation MiGHT

[vi] *www.worldwildlifefederation.save our seafood.my*

The local shipbuilding and ship repair industry only represents a small contribution to the global statistics. However, it is still an industry that is in direct support of the nations Maritime industry as a whole. According to statistics, Malaysia's order booked in 2009 represented only 0.8% of the world order booked. The revenue generated approximately RM7.36 billion and provided 31,000 employments. From the 252 new ships built locally, only 72 ships were exported (28%).[vii]

Currently the domestic shipbuilding and ship repair market outlook is promising, as this is driven by the demands of new ships from the local ship owners. In the Oil & Gas sector, the demands for Offshore Support Vessels (OSVs) shall continue to increase so long as the industry is booming. To date there are 450 OSVs owners who are providers of service to Petronas Carigali and other Production Sharing Contractors (PSCs) servicing 350 offshore platforms all over the country. However, only 40% of these vessels are built locally in Malaysian shipyards.

In the shipbuilding and ship repair industry, application of technology and the research in sciences related to geotechnical structures as well as petrochemical attributes are indeed abundant. On the support side of the house, the logistical element that forms the backbone of the industry is an intricate and massive pool of resources of high technology and value investments. The parties involved in the support sector varies from companies belonging to the private sector to government statutory agencies policing, regulating the safety and conduct through to the conservation of environment and the eco-system balance.

The management including coordination and collaboration between inter and intra agency network is indeed majestic. So much has been said about the Marine Technology, Science and Management domain that seem to be involving numerous people from different sectors and agencies both public and private alike that are instrumental in the driving of the industry and above all the economy of the nation, but what would be the impact of networking that gels all the elements into one big melting pot.

NETWORKING

Business Networking

Business networking is a socio-economic activity by which groups of like-minded business people recognise, create, or act upon business opportunities. A business network is a type of social network where business activity is its reason of existence. As an example, a business network may agree to meet weekly or monthly with the purpose of exchanging business leads and referrals with fellow members. To complement this activity, members often meet outside this circle, on their own time, and build their own one-to-one relationship with the fellow member.

Business networking can be conducted in a local business community, or on a larger scale via the Internet. Business networking websites have grown over recent years due to the Internet's ability to connect people from all over the world. Internet companies often set up business leads for sale to bigger corporations and companies looking for data sources. Business networking can have a meaning also in the ICT domain, i.e. the provision of operating support to companies and organisations, and related value chains and value networks.[viii]

Networking As A Tool

Networking has always been and will continue to be a common feature amongst business community as it is thought to be the bridging for communication amongst the parties involved in business. However, networking is not just limited to the business circle only, as it can be applied in other models where human interaction is essential. In everyday life, networking is occurring sometimes unknowingly amongst us. The housewife will network with the group of fishmongers in the market for reasons such that she will know which stock of fish is fresh and fetch the most competitive price in terms of value. Another example would be when networking occurs between lecturers from a university and those of other universities so that he or she could keep abreast with the developments of teaching skills and methods taught by other institutions as compared to his or hers. Thus, networking is an activity that brings positive results developing from meeting, communicating, merging, and exchanging ideas and thoughts. Ultimately, networking will ease the process of rapport and facilitate the decision-making process and ease of collaboration and co-operation on a mutual basis.[ix]

Networking can also be considered as a tool for producing results with other people, as people are the most important resource of an organisation. The ability to network would be one's greatest asset as the skill can turn someone into a successful career person. There are several prominent business networking organisations that create models of networking activity that, when followed, allow the businessperson to build new business relationships and generate business opportunities at the same time.[x]

If one were to attempt networking by merely using the content of conversation, we are doomed to failure. The reason being that it is not just through communication that we create a networking circle. Communication is a major portion of the equation but not the only one. Other attributes that will ensure successful networking are:

a) Understanding the other parties' thinking processes
b) Understanding the body language
c) Knowledge of the over arching determinants
d) Managing hierarchy and levels
e) Developing trust, respect, integrity, credibility and ownership.

[vii] *Malaysian Shipbuilding/Ship repair Industry Strategic Plan 2020. MiGHT 2011*
[viii] *www.en.wikipedia.org/wiki/<Business_networking>*
[ix] *"The Magic of Dialogue", by Daniel Yankelovich, Nicholas Brealey Publishing, 1999*
[x] *"Unlimited Power', by Anthony Robbins, CPI Cox & Wyman, 2001*

NETWORKING IMPACTS ON INDUSTRY

In earlier paragraphs, we discussed the intricacies of each industry working methodology in meeting their vision and goals. Each industry has to comply with certain governance regime that is being regulated by one or many statutory and regulatory bodies. Over and above this, companies associated with the industry have its performance targets to meet in order to be presented to the stakeholders. A business will fail if it does not offer a favourable business proposition by increasing the shareholders value. Therefore, the industry has a two-prong responsibility to satisfy. Firstly, towards the shareholders and secondly, to the agencies that are relevant in its governance (stakeholders). The former is probably the more difficult between the two as the latter is where the networking element is more sought after. It is more sought after because in the process of achieving success in the industry, compliance to strict regulatory terms imposed by the governing bodies must be met. Failure to comply will result in cancellation of contracts and even more drastic result, where a legal action or a heavy penalty in the form of a fine would be imposed.

To circumvent this possibility, companies involved in the industry will attempt to network amongst the same peers and similar industrial players for reason that in a case where assistance is required, provided of course good networking is in place, companies can actually help one another. The help that is described here is wide in range and not limited to just physical nature. Supply of material and financial assistance sometimes can also be facilitated in cases that warrant such assistance. During engagement with relevant authorities, such assistance could also be requested such as when engaging with government agencies and regulatory bodies. Just to name a few, examples of such agencies include customs and excise, immigration and international trade office. It is never a means to encourage malpractice or misconduct but rapport and networking do facilitate ease of transaction in many cases.

The objective of any business would be expeditious implementation of the contract and deliverables. Sometimes the red tape and bureaucratic impediments are in the way and block the progress of successful implementation. The path to success is to know your objective, taking action, knowing what results you are getting, and having the flexibility to change until you are successful. Businesses associated with Maritime Technology, Science and Management, as described earlier, are already in a complex industry. There could be more than one regulatory body that is involved in each industry and as the number grows, so does the complexity.

In the Maritime Technology, Science and Management sector, the industries are confronted with an environment that is full of uncertainties just like the climate or weather itself. Managing an unpredictable industry where the outcome of which is fluid and ever changing, is a task feared by many. Knowledge is superior and through networking the circle of knowledge and sharing of information can be further enhanced. Once the reaches are expanded, one can be more confident in determining to a certain level of accuracy and confidence of a certain action, and thus, a successful outcome. If networking is fundamental, how then can it be practised in the industry?

INDUSTRY'S PRACTICE IN ENHANCING NETWORKING

There are many ways an industry can enhance networking with relevant parties and here are some:

a) Social events where face-to-face engagement can be conducted (in groups or individually)
b) Conduct educational activities portraying related subjects or issues
c) Corporate Social Responsibilities (CSR)
d) Identify what can the industry do to offer positive support

e) Affiliation with an International Marine Professional Body such as the Institution of Marine Engineering Science & Technology (IMarEST).

Through the conduct of social events, a closer rapport can be created with peer industries, government and private agencies that are relevant to a particular sector, or in short their stakeholders. For example, shipyards in Malaysia can organise an annual dinner and invite co-workers from the Ministry of Transport (Marine Department) and Ministry of Finance as well as Classification Society such as Bureau Veritas to join. This rapport will strengthen ties and foster good relationships while enhancing networking. Likewise, conducting educational training courses could also be an activity to foster good rapport.

Like many industries elsewhere, Corporate Social Responsibility (CSR) is an activity that has been proven to be useful in introducing industries to the general public and other entities. Some of the CSR activities such as donations to family day or participating in a charity walkathon will help encourage networking. Positive reinforcement by industries too will contribute a great deal of *esprit de corps* and motivational sentiment amongst industries and government agencies, as this action will signal solidarity and a harmonious relationship.

Lastly, affiliation with a marine internationally acclaimed professional body or a learned society such as IMarEST which has a worldwide membership roll of 15,000 would certainly work well in promoting networking, especially in the Marine Science and Technology professional line.

CONCLUSION

In conclusion, related industries under the auspices of the Maritime Technology, Science and Management sector is indeed a key driver in the nation's ETP initiative directed towards transforming Malaysia into a high-income nation. It is never an easy task as there are 12 NKEAs that need to be administered and some are related to the sector. The discussions above have deliberated on some of the relevant industries that are directly involved with the Maritime Technology, Science and Management sector and have highlighted briefly their impacts to the ETP and the wide extent of agencies and organisations which have linkages with them and the complexities of their contribution. Each industry has its peculiar way of supporting the NKEAs, and the underpinning factor to ensure success but not limited to it is "Networking".

Networking is usually used in the business sector as it has been an appendage in the business world all these years. However, beside business, networking also exists in other sectors and in industries where one cannot delineate networking as something that is different as in business. Although its approaches in business may be slightly different, there are many similarities and the outcome would be the same – it facilitates the decision-making process; it speeds up actions and instills the sense of camaraderie amongst the industry entities.

Instilling a sense of camaraderie is demonstrated by the discussion above, where industries which participated in networking clearly showed success in more ways than one. Amongst them include conducting activities and inviting participation from peer industries and government agencies whilst continuously showing positive reinforcement to grow good rapport and improve networking. In the international arena, a professional body or learned society such as IMarEST that has a ready membership of 15,000 worldwide can offer instant networking with members from every corner of the globe.

In summary, from the industry's perspective, networking is indeed fundamental in facilitating ease of execution of tasks. It will also enhance the rapport amongst people from the industry and government agencies alike, to come together to share success, improving camaraderie and *esprit de corps* towards a strong and buoyant Maritime Technology, Science and Management sector which in turn will drive the economy of Malaysia into becoming a high-income nation. ■

First Admiral Adjunct Prof. Dato' Ir. Hj. Ahmad Murad bin Hj. Omar (Rtd) possesses a degree in Mechanical Engineering from Universiti Teknologi Malaysia (UTM) and a Masters of Science degree in Engineering Business Management (EBM) from Warwick University UK. Currently, he holds several positions in IEM, including Chairman of Marine Engineering and Naval Architecture Technical Division and Public Services Special Interest Group as well as a Council Member and Executive Committee Member. He is also Executive Chairman of Omahams Corporation Sdn Bhd and Chairman of Marine Technical Center Sdn Bhd, ASTF Logistics Sdn Bhd and Preston Shipyard Sdn Bhd. He is a Fellow of the Institute of Marine Engineering Science & Technology (IMarEST), United Kingdom.

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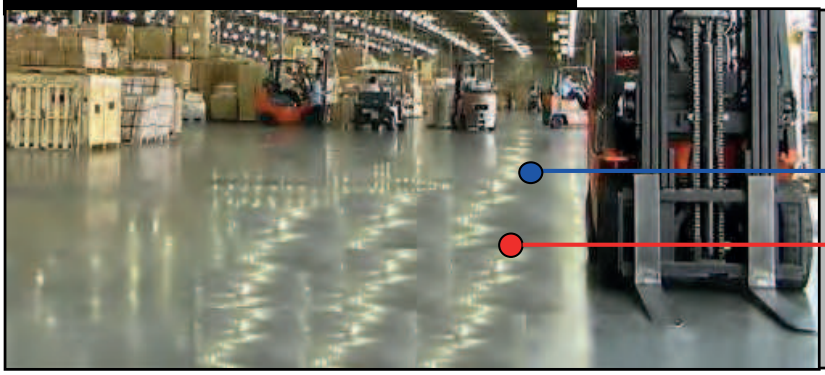

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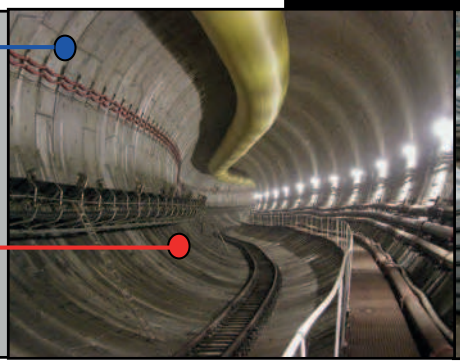

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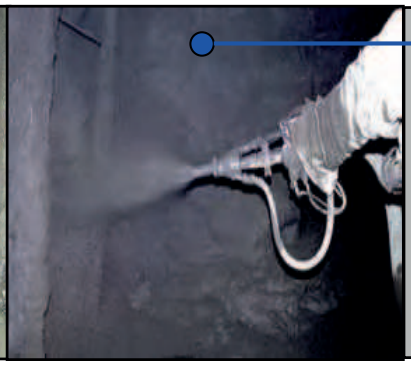

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No. 9, Jalan 16/11, Off Jalan Damansara,
46350 Petaling Jaya, Selangor D.E. Malaysia.
Tel: (60-3) 7955 7800 Fax: (60-3) 7955 7801
e-mail: mm@maccaferri-asia.com
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Development of a Robust and Sustainable Malaysian Integrated Ocean Observation System



by Engr. Assoc. Prof. Dr Mohd. Rizal Arshad, En. Khalid Isa and Cik Herdawatie Abdul Kadir

INTRODUCTION

An integrated ocean observation system which utilises multiple platforms that will enable vast discoveries of the complexities of ocean interactions will accelerate the information speed for the forecasting and analysis process. The aim of this research is to develop a reliable and robust ocean observation system aptly named as the Malaysian Integrated Ocean Observation System (MIOOS). MIOOS will be the future backbone of real-time and continuous ocean data measurement system in Malaysia. The availability of a fleet of mobile underwater robotic platforms, together with the fixed (stationary) system will expectantly meet the multitude of ocean-based measurement and monitoring requirements and, thus, provide a more flexible and robust MIOOS.

THE NEED FOR AN ADVANCED OCEAN OBSERVATION SYSTEM

Technological advances and pressing management problems have coerced the development of a new mode of ocean observation. Many of the benefits derived from the earth's eco-systems rely on the knowledge of the current condition of the said eco-systems, the understanding of the controls exercised on those systems and the identification of stressors that might lead to their deterioration in the future. Continuous, real-time information on multiple variables is essential and is increasingly feasible with new instrumentation and communication. This information is essential in measuring the environmental response to unpredicted events in the natural and anthropogenic system. Aquatic systems (including saltwater and freshwater) are currently threatened on a global scale by a variety of contaminants, a multitude of water management practices and destructive uses of land.

The behaviour of contaminants in an aquatic eco-system is complex and can involve precipitation, solubilisation, biological uptake, absorption-desorption, excretion and sedimentation and then re-suspension. Apart from the natural processes that affect water quality, there are also a multitude of anthropogenic impacts, such as man-induced point and diffuse sources, alteration of water quality due to water use and river engineering projects, and also various land uses that detrimentally affect water quality at a micro and macro level in the catchment. The degradation of water sources has increased the need to determine the baseline quality status of aquatic regions so that an indication of changes can be provided, which will subsequently indicate induced anthropogenic activities.

Thus, water quality monitoring refers to the acquisition of representative and quantitative information on the chemical, physical and biological characteristics of a water body in time and space, most preferably in real-time mode. In order to understand the process' dynamics of aquatic zones, a well-designed water quality monitoring system needs to be implemented. In the establishment of a water monitoring programme, an integrated approach is necessary and the nature of the zones as well as the objectives and functions of the system must be considered. If monitoring is not performed correctly or errors are contained within the monitoring programme, sample analysis will not represent the actual situation and will result in an indiscriminate wastage of

finances, manpower and time. Therefore, an efficient aquatic or ocean monitoring programme which yields reliable and representative results is certainly very crucial.

WHAT IS AN OCEAN OBSERVATION SYSTEM?

An ocean observation system can be defined as an infrastructure which consists of a set of independent instruments that interact to gather data for the purpose of observing the ocean. Several observation systems have been developed around the world in the past years, such as the U.S. Integrated Ocean Observing System (IOOS), the European Seafloor Observatory Network (ESONET), the Australian Integrated Marine Observing System (IMOS), and the India National Centre for Ocean Information Services (INCOIS).

Basically, the physical systems of the ocean observation are highly specialised in a specific oceanic phenomenon that can be divided into two events, namely the low bandwidth events such as observations of slow biogeochemical phenomena, and high bandwidth events such as ultrasonic biological sources. The physical platforms for the observation system can range from networks of autonomous underwater vehicles, remotely operated vehicles, vertical profilers, surface vessels, unmanned aerial vehicles and buoys. These platforms can provide offline and online data. The data are collected by the data acquisition system and will then be processed in order to prepare the data for digital transmission.

Enormous benefits can be acquired through the implementation of the ocean observation system as this system will support and enhance the efforts in:

i. improving the health of the oceans;
ii. protecting human lives and livelihoods from marine hazards;
iii. supporting defence and security systems;
iv. measuring and predicting environmental changes;
v. providing for the sustainable use, protection and enjoyment of ocean resources;
vi. providing a scientific basis for implementation and refinement of ecosystem-based management;

Figure 1: Typical anchor and buoy-mounted measurement devices for ocean observation

vii. tracking and understanding climate change and the ocean's role in it; and
viii. supplying important information to ocean-related businesses.

MIOOS AIMS

The in-situ data when combined with satellite data enable a more holistic condition of the aquatic or oceanic zones to be modeled and determined. Sustaining the project will allow identification and management of climate change in the coastal marine environment. It will also provide the observations necessarily for better understanding and forecasting of the fundamental connection between the coastal biological processes and the regional or oceanic phenomena that influence biodiversity. The observation system presented here represents a new way for integrated observations of the targeted zones. MIOOS aims to enable and execute a number of basic and applied ocean-related scientific studies. Amongst others, MIOOS serves to gather data for:

i. Episodic large scale events
ii. Episodic small spatial and temporal scale events
iii. Large noise that signal variables
iv. Filling gaps
v. Legacy science information.

MIOOS ARCHITECTURE

The availability of a fleet of underwater robotic platforms, together with the fixed system (buoy), makes MIOOS flexible and robust enough for a multitude of ocean-based measurement and monitoring requirements. This fleet of underwater robotic platforms consists of:

i. Intelligent Hybrid Underwater Vehicle(IHUV)
ii. Underwater Glider Platform
iii. Mini Remotely-Operated Vehicle (ROV)
iv. Autonomous Surface Vessel (ASV)
v. Drosobots (Micro-ASVs with multi-agent applications)
vi. Blimp (Communication Hub).

The research and development efforts for all the underwater robotic platforms were conducted in the Underwater Robotics Research Group (URRG) lab in Universiti Sains Malaysia (USM). MIOOS will also make use of the existing sensor development capability for much better sensing modules and instrumentation suited to the Malaysian maritime eco-systems. The real-time data acquisition will be further enhanced by a built-in intelligent system, whereby a number of data pre-processing and analysis can be done prior to the final decision-making process. The processed data can also provide a better insight on the current oceanic or coastal conditions.

Investigations on the sustainability of the marine eco-system will be enhanced by the installation of MIOOS with its associated capabilities. MIOOS will also be utilised for a number of specific eco-system based studies, and these will be utilised as a proof of concept for its viability and feasibility over a wider usage.

Figure 2: Underwater robotic platforms for ocean observation (a) Mini Remotely-Operated Vehicle (ROV), (b) Drosobots, (c) IHUV, (d) Blimp, (e) ASV, (f) Glider

IMPLEMENTATION PROGRAMME

The research challenges consist of hardware, software and integration issues. The tasks of developing these platforms are in line with the government's effort for national capacity building, self-reliance, knowledge creation and also highly potential wealth generation goals. Figures 3 and 4 show the complete setup of MIOOS.

The proposed project is divided into three stages. Stage 1 consists of three major components involving platform improvement for existing mobile platforms, the design and development of stationary observation nodes and the development of land-based monitoring and database. The first two components will be tested rigorously through controlled lake and sea tests. The tests conducted will enable detailed performance criteria to be determined. The information will be used to improve and upgrade all the available sub-modules.

In Stage 2, all three components in Stage 1 will be integrated to form an observation system prototype. The major key in this integrated observation system is the wireless communication between sub-modules within each component, data acquisition from the mobile platform to stationary nodes, and the pre-processed data transmission from multiple stationary nodes to land-based monitoring and database. At this stage, dedicated eco-system studies will be conducted and matched to the most suitable platform or group of platforms. A series of tests and further refinement of the dedicated platform will be conducted. The system criteria will be fitted into field applications. Relevant sensor modules will also be tested and further optimised. The land-based monitoring and database centre will be tested for real-time data acquisition, analysis and visualisation. Most research activities occur at this stage of the research.

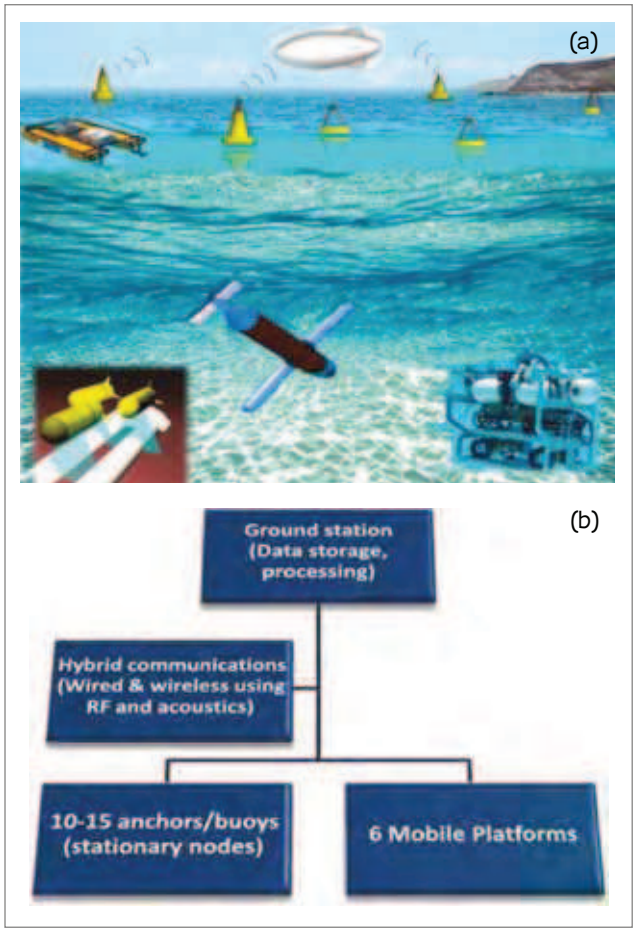

Figure 3: MIOOS Application (a) Concept, (b) System Components

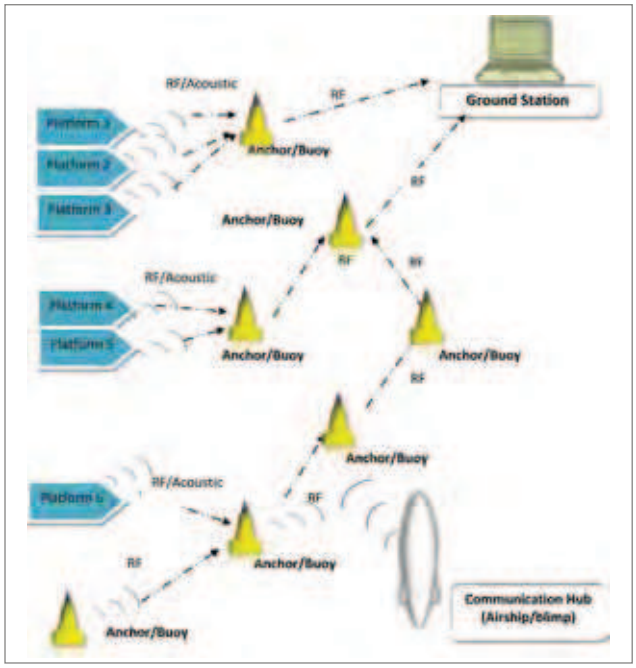

Figure 4: The Complete Setup of MIOOS

Finally in Stage 3, the optimised integrated ocean observation system will be ready for actual industrial application and market identification.

FUTURE PLANS AND FURTHER DEVELOPMENT

Starting from early 2012, the testing period will be used to evaluate the MIOOS setup in a dedicated eco-system where several studies will be done and matched to the most suitable platform or group of platforms. A series of tests and further refinement of the dedicated platform will be conducted. Subsequently, the system criteria will be fitted into field applications. Meanwhile, the relevant sensor modules will also be tested and further optimised. The main control and command centre will be tested for real-time data acquisition, analysis and visualisation. ■

REFERENCES

[1] Muzathik, A.M., Wan Nik, W.B., Samo, K.B. & Ibrahim, M.Z. (2011); *"Ocean wave measurement and wave climate prediction of Peninsular Malaysia"*. Journal of Physical Science, 22(1), 79-94.

[2] Khalid, B.S., Aziani, A., Suzuri, H., Sulaiman, O., & Azizi, A. (2010); *"Underwater noise generated by ferries, boats and dredger at a typical jetty of Terengganu, Malaysia"*, Proceedings of the "3rd. Int'l Conf. on Underwater System Technology: Theory and Application 2010", 1-2 Nov. 2010, Cyberjaya, Malaysia.

[3] Muzathik, A.M., Wan Nik W.B., Ibrahim, M.Z., Samo, K.B. (2008); *"Ocean Wave Energy Potential and Extraction Technologies"*, The 6th. Regional Conference on Marine Technology (MARTEC 2008), 26-27 Aug. 2008, Universitas Indonesia, Jakarta, Indonesia.

[4] Nowlin Jr., W.D. (1999); "A strategy for long-termocean observations", Bulletin of the American Meteorological Society 80-4: 621-628.

[5] F.A. Ian, P. Dario and M. Tommaso (2005); "Underwater acoustic sensor networks: research challenges", Ad Hoc Networks, (3), 257-279.

Links: http://urrg.eng.usm.my/

Engr. Assoc. Prof. Dr Mohd. Rizal Arshad graduated from the University of Liverpool in 1994 with a B.Eng. in Medical Electronics and Instrumentation. He then pursued his MSc. in Electronic Control Engineering at the University of Salford, graduating in December 1995. Following from this, in early 1999, he completed his PhD. degree in Electrical Engineering, with specialisation in robotic vision system. He is currently an Associate Professor and the deputy dean of the School of Electrical and Electronic Engineering, Universiti Sains Malaysia and with his team of researcher, is also the pioneer of underwater system technology research efforts in Malaysia, known as URRG. He is very interested in investigating the fusion of the natural world with the modern engineering pool of knowledge. This is the reason his group has embarked on the bio-inspired research efforts and the utilisation of nature to complement the current robotics system.

En. Khalid Isa graduated from the Universiti Teknologi Malaysia, in 2001 with a BSc in Computer Science. He then pursued his MSc in Computer System Engineering at the Universiti Putra Malaysia, graduating in 2005. Since then, he has been working at the Universiti Tun Hussein Onn Malaysia (UTHM), as a full-time lecturer. Currently, he pursuing his PhD in Electrical and Electronic Engineering at Universiti Sains Malaysia (USM), in a field of Computational Intelligence. He has been with the Underwater Robotics Research Groups (URRG) USM from December 2010. His research interests are computational intelligence, image processing, control and autonomous system.

Herdawatie Abdul Kadir received the Bachelor degree in electrical and electroning engineering from Universiti Teknologi Malaysia in 2001 and the master degree in mechatronic and automatic control in 2005. She is currently working toward the Ph.d degree in computational intelligence at URRG, University Sains Malaysia. Her current research interest include modeling, control, localization and Mapping.

RELOCATION NOTICE

Please be informed that the main offices of Construction Industry Development Board Malaysia (CIDB) and CIDB Wilayah Persekutuan have been relocated to a new premise with effect from **2 January 2013**.

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Underwater Sensors for Marine Applications

by Engr. Assoc. Prof. Dr Mohd. Rizal Arshad and En. Mohd. Norzaidi Mat Nawi

INTRODUCTION

The ocean covers about 71% of the earth's surface and the wide use of underwater sensors has contributed greatly to the success of exploration of the underwater world without endangering human lives. An underwater vehicle which requires minimal or no intervention of a human operator is also known as an unmanned underwater vehicle (UUV) and was developed in the early 70s. With the help of the underwater sensors in monitoring and performing environmental surveillance, the UUV makes the system completely functional by enabling it to move around flexibly, avoiding any obstacles. The installation of sensors has enabled the vehicle to make decisions according to the input while operating with minimal human supervision.

Power consumption, communication and operational cost are some of the most common issues involved when it comes to operating the underwater system in the open seas or in lakes. To overcome these problems, the miniaturisation and performance quality of the underwater system are required.

There are so many small areas which could not be explored as the size of the current UUV is too big, thus making it impossible for it to be operated within narrow spaces. The minimisation of UUV size is important and it depends greatly on the system integration which consists of sensors and circuitry. In order to achieve the miniaturisation and higher performance of the underwater system, a small-scale sensor which is high in efficiency and performance, yet low in power consumption while possessing a longer life span, is required.

In general, the sensor is divided into two categories, namely physical and chemical. Physical sensors are usually used to measure physical variables such as force, acceleration, pressure, temperature, flow rate, acoustic vibration, and magnetic field strength. Meanwhile, chemical sensors are usually used to detect chemical and biological variables including chemical concentrations, pH, binding strength of biological molecules, and interaction amongst proteins.

Underwater sensors are mostly physical sensors such as the acoustic sensors, optical sensors and flow sensors. Such sensors have been developed over decades using a variety of approaches. To improve the performance of sensors, various designs and materials are used. Many factors need to be considered when it comes to designing underwater sensors, such as water murkiness, water pressure, and the salinity effect which is quite different from a sensor that is operated on land.

THE DEVELOPMENT OF UNDERWATER SENSORS

The navigation and localisation of the underwater vehicle are a big challenge. Hence, various techniques for the estimation of the position and orientation such as an inertia, sonar and vision based systems have been developed. The sonar based system utilises the acoustic wave for communication and imaging in the underwater environment as shown in Figure 1. The sonar technology is most commonly applied in geophysical, geotechnical and environmental surveys. Minimisation of the size, improvisation of the performance and efficiency in energy consumption are some of the main challenges faced by researchers in acoustic micro design.

Figure 1: Sidescan sonar survey by UUV

Since the last decade, various acoustic sensors starting from the scalar-type sensor, which only measures pressure components, to the vector-type sensor, which measures both pressure and velocity component in acoustic field, have been designed. With the help of Micro-Electro-Mechanical Systems (MEMS) technology, a new structure has been developed where both capacitive type and piezoelectric type acoustic sensors have been successfully miniaturised. The purpose of MEMS is to miniaturise the devices by using silicon process technology which has led to the many different principles of sensing including electrostatics, piezoresistivity, piezoelectricity, thermal resistivity and bimetallic thermal bonding.

Another technique used in positioning the underwater vehicle is the vision based system. By using an optical sensor, this system offers many advantages in terms of cost and size compared to the acoustic designed sensor. The vision based system can also provide some important information such as the horizontal and vertical distance between the UUV and an object. Further more, optical information travels at the speed of light so that the bandwidth and latency of visual sensing are only introduced by the camera and for subsequent processing. However, this type

of sensor has its limitation when it is operating under a poor visual condition. It could perform better near the ocean or lake floor. Moreover, there are many unresolved problems for the optical sensor such as motion estimation and non-uniform illumination.

Nowadays, the flow sensor is increasingly being studied to enable its implementation on underwater platforms. There are two types of principles applied in the conventional flow sensor, namely the thermal based hot-wire anemometry and Doppler frequency shifts. The principle of the hot-wire anemometer is based on the anemometer principle where it measures the flow rate by sensing changes in heat transfer through a small electrically heated hot-wire sensor. However, the disadvantage of the hot-wire anemometer is the energy management. The hot wire needs an accumulator with high density to produce a high current. Therefore, to improve the power consumption, the use of MEMS hot-wire is suggested.

The Doppler frequency shift measures the velocity by transmission and reception of signal. However, reducing the size of this type of sensor is the critical part because it consists of the transmitter and the receiver. With the help of MEMS technology, few researchers have successfully miniaturised the Doppler by the fabrication of integrated optics on a single substrate.

The development of the underwater sensors is still ongoing and many different designs have been proposed. In addition, a new approach has been found to improve the performance of the sensor including investigation of the mechanism inspired by nature or better known as bio-inspired sensor, while the use of new materials such as polymer is proposed.

BIO-INSPIRED SENSOR

A bio-inspired approach can provide ideas for new designs and capabilities, starting from the use of tongs and tweezers to genetic algorithms and autonomous legged robots. Table 1 shows a few examples of different mechanisms inspired by nature. Many researchers are trying to implement the function of nature to the underwater system and sensor. In the development of a bio-inspired flow sensor, the biological approach is a promising alternative to the conventional underwater sensor, which has encountered the current conventional flow sensor problems. The development of bio-inspired flow sensor has gradually increased in the past few years. For instance, a flow sensor based on the lateral line flow sensor in the fish's body is being investigated. Many species of fish and bacteria depend on the side of this system to monitor the flow fields for maneuvering and for survival under water.

The biological lateral line system consists of canals neuromast and superficial neuromast. Both canals and superficial are composed of hair cells which are embedded in the gelatinous cupula. When the fluid passes through the neuromast, it will cause cupula displacement and the hair cells will induce a neuron signal. Based on this principle, different sensor designs have been discussed by a few researchers at the University of Illinois at Urbana-Champaign since year 2000. Figure 2 shows the hair cell sensor inspired by the fish lateral line. The bio-inspired flow sensor is one of the passive sensing systems where the power consumption required to run the system is low but with an improved lifespan for certain operations that require longer running time such as monitoring activity of some habitats. This system also helps to minimise the size of UUV which enables it to perform this simple task and reduces the cost of operation.

Table 1: Representative mechanism and underwater applications inspired by animals

Inspired by	Mechanism	Underwater Applications
Fish and cricket	Hair Cilium	Flow detection
Fish	Neuromast	Hydrodynamic imaging around vehicle
Jellyfish	Morphology and Propulsion	Autonomous underwater vehicle
Plankton	Communication	Underwater wireless sensor network
Dolphin	Swimming Behaviour	Maneuverable underwater vehicle for short-distance echolocation
Rats and Etruscan Shrews	Whisker	Tactile sensing in underwater environments

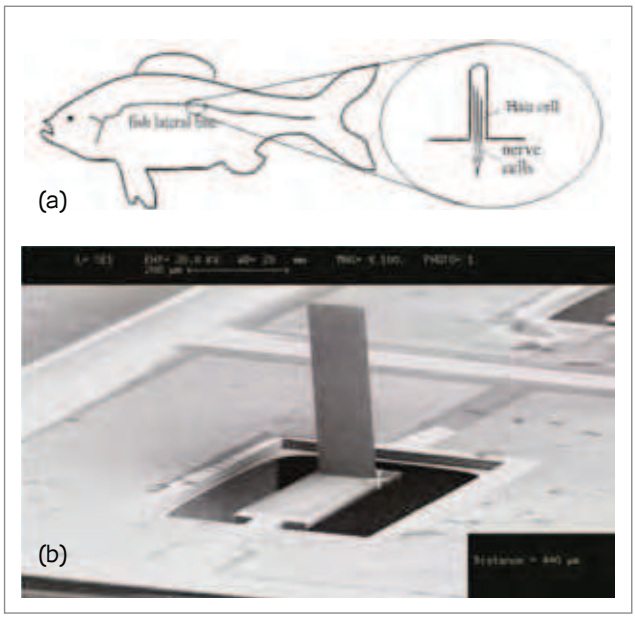

Figure 2(a) Hair cells in the lateral line system; (b) SEM for the artificial hair cell sensor (Fan, 2002)

POLYMER BASED SENSOR

Recently, polymer material has been found to have higher compatibility as compared to other previously used materials. It can provide greater advantages, especially in

mechanical yield strain than commonly used silicon. Most of the polymer materials are easy to deform and they are suitable to be used to form the membrane or smart skin for the sensor. Polymer material can also be used for different purposes including as substrates, adhesion, packaging and coating. The acquiring cost for many polymer materials is significantly lower while the fabrication process can be accomplished outside the cleanroom confinement and is easier to handle. Polymers also allow the researcher to design the sensor with a simpler structure and fabrication process such as casting and molding. Table 2 shows the different types of polymer and applications in sensors.

Table 2: Representative Polymer Materials and Applications

Types of Polymer	Applications
PDMS	Microfluidic channels, pump and valves
Parylene	Microfluidic
Liquid crystal polymer	Flow sensors
Su-8 epoxy	Artificial hair cell sensor
Acrylics	Microfluid channels
Polyimide	Sensor substrates, microfluids

Generally, the polymer is used in a microfluidic condition where it is integrated with a sensor. The microfluidic plays an important role in leading the small-scale device to integrate with a different number of applications because of their potential in chemical and biochemical engineering. It is required to handle and process the small amounts of fluid. In addition, smaller channels improve resolution and enable the reduction of the overall size of the device, but it also makes the detection of small vessels to be more challenging and more sensitive to adsorption. The commonly used material in microfluidic is PDMS because it can be easily attached to the glass, making it a user-friendly material that allows the user to create any types of geometry using mold-replication technology.

OPPORTUNITIES AND CHALLENGES

There is a significant challenge yet to be solved. Some major problems with the underwater sensor include the size, material and the efficiency of the sensor. The underwater sensor is important for the autonomous vehicle to survive the underwater environment especially for monitoring and navigation. The variable of the sensor with different purposes demand researchers to explore the underwater world which has become more challenging. The underwater sensor technology needs to be further improved to increase the role of the sensor in assisting the underwater vehicle.

The advancement of MEMS fabrication technology helps the researcher to improve the current conventional sensor and has led to some new trends pertaining to the use of sensors. More research in the future will need to leverage on these advantages to develop nano-scale technology, which is quite new compared to micro technology. In fact, it is necessary to explore and understand the bio-inspired sensor in underwater sensing in future researches. The mechanism inspired by nature is more unique and suitable to implement in various types of applications. The new materials such as polymer have the potential to be integrated with MEMS, where currently the implementation of polymer in MEMS application is relatively small as compared to other materials. Future work is required for the development of underwater sensors, especially in the effort to look for new materials, structures and sensing principles. ■

REFERENCES

[1] Liu C, (2007), Recent developments in Polymer MEMS, Advanced Materials, Vol. 19, pp. 3783-3790.

[2] Arshad M R, (2009), Recent advancement in sensor technology for underwater applications, Indian Journal of Marine Sciences, Vol 38, pp. 267-273.

[3] Budiyono A, (2009) Advances in unmanned underwater vehicles technologies: Modeling, control and guidance perspective, Indian Journal of Marine Sciences, Vol. 38, pp. 282-295.

[4] Dama M and Tosunoglu S, (2011). Unmanned Underwater Surveillance Robot, Florida Conference on Recent Advances in robotics, 4-5 May 2011.

[5] Ebefors T, Kalvesten E, Stemme G, (1998). Three dimensional silicon triple-hot-wire anemometer based on polyimide joints, In: Proceedings of the IEEE MEMS'98, Jan 25-29, Heidelberg, Germany, pp. 93-98.

[6] Bleckmann H, (1993). Role of the lateral line in fish behavior, 2nd revised edn. In: Pitcher TJ (ed) The behaviour of teleost fishes, Chapman and Hall, London, pp. 201-246.

[7] Chen J, Fan Z and Zou J (2003) Two-dimensional micromachined flow sensor array for fluid mechanics studies, Journal of Aerospace Engineering, Vol. 16, pp. 85-97.

[8] Verpoorte E, De Rooij NF, (2003) Microfluidics meets MEMS, Proc. IEEE, vol. 91, pp. 930-953.

[9] Nawi MNM, Manaf AA, Arshad MR, Sidek O (2011) Review of MEMS flow sensors based on artificial hair cell sensor, Journal of Microsystem Technologies, Vol. 17, No. 9, pp. 1417-1426.

[10] Cufi X, Garcia R, Ridao P. (2002). An approach to vision-based station keeping for an unmanned underwater vehicle. IEEE/RSJ International Conference on Intelligent Robots and System, 2002.

[11] Fan Z, Chen J, Zou J, Bullen D, Liu C, Delcomyn F, (2002). Design and fabrication of artificial lateral line flow sensor, Journal of Micromechanics and Microengineering, Vol. 12 pp. 655-661.

Engr. Assoc. Prof. Dr Mohd. Rizal Arshad graduated from University of Liverpool in 1994 with a B.Eng. in Medical Electronics and Instrumentation. He is currently an Associate Professor and the deputy dean of the School of Electrical and Electronic Engineering, Universiti Sains Malaysia.

En. Mohd. Norzaidi Mat Nawi received the B.Eng. degree in mechatronic engineering from Universiti Sains Malaysia, Penang, Malaysia in 2010. He is currently pursuing a Ph.D degree in electrical and electronic engineering at Universiti Sains Malaysia and his research focuses on the development of the flow sensor and their applications to underwater platforms.

OBITUARY

With deep regret, we wish to inform that **Datuk Ir. Terence Chong Nyim Fatt**, past IEM Sabah Branch Chairman, had passed away on 7 November 2012. On behalf of the IEM Council and management, we wish to convey our deepest condolences to the family.

The IEM Editorial Board

University Expands into China for Energy Efficiency Research Programme

Universiti Malaysia Sabah (UMS) has expanded into China by venturing into energy efficiency research in Dongguan. The university inked a deal with a Chinese firm, Centro Ecotech (CE) Energy Technology (Dongguan) Co. Ltd. for the setting up of a research lab in the city located in the southern Guangdong province. The signing was done between UMS Vice Chancellor, Prof. Datuk Dr. Mohd. Harun Abdullah and Chairman of CE Co. Ltd. Chen Bing Guang in Dongguan on 22 Dec 2012. This collaboration would help to better understand the research and development of green technology. Both parties would also work together to develop an energy-efficient cleanroom control and create an automated building system, as well as exchange of ideas and knowledge pertaining to this field. Meanwhile, another letter of intent was signed between UMS and the Graduate School, Shenzhen Campus, Tsing Hua University on 24 Dec 2012. Both institutes will collaborate in science and engineering. Previously, UMS officials had also suggested for a Tsing Hua marine science research centre to be established in UMS, strengthening collaborative research for the development of green technology between both parties.

(Sourced from The Star, 3 January 2013)

Expertise for Export

Malaysia is not only exporting palm oil but also all the expertise that goes into processing and refining the oil. The need to build plants is good news for local engineering firms such as Lipochem. Its Managing Director, Koh Pak Meng, said his company was engaged by the Malaysian Palm Oil Board (MPOB) as a consultant to build biodiesel plants based on the board's proprietary technology in 2005. The other company is Oiltek, and these two companies are exporting technology for normal (non-winter use) first generation biodiesel plants using refined oils as feedstock. Chemical engineers play a key role in the field of process engineering, especially in optimising the production process so that it produces the highest amount of value-added products while using the least amount of energy and water. In recent years, process engineering has become the new golden field as the downstream part of the palm oil industry flourished. Present-day clients, including those based in Indonesia, also recognise the importance of capitalising on a highly efficient process, and not just on the plant capacity. Clients also demand that the plants be fully automated, and robust, so as to reduce down time.

(Sourced from The Star, 1 January 2013)

Regular Maintenance of Slope is Vital, says Expert

"It is safe to stay above an anchored slope but regular maintenance is required to ensure the slope's safety", said engineer and geo-technical consultant, Dr Gue See Sew. Such slope would be safe if it was maintained every six months. An anchored slope is used for steep slopes that are strengthened by ground anchors in the rock or soil behind it. The anchors need to be re-stressed consistently to maintain the carrying capacity of the ground anchors. If the carrying capacity is reduced without re-stressing, the safety of the slope is reduced in time and may lead to landslides. Dr Gue, the former president of the Institution of Engineers, Malaysia (IEM) and Fellow of Academy of Sciences Malaysia, said anchored slopes were sometimes used at highways when there was a dedicated team to conduct the necessary maintenance. On the issue of the collapse of the wall in the Bukit Setiawangsa area, Dr Gue, who visited the site, said he did not attribute the cause of the landslide to a water drainage problem as water was flowing away from the slope. However, a detailed investigation should be conducted on the wall's failure. According to the Chairman of IEM Geotechnical Engineering Technical Division, Liew Shaw Shong, if the areas with anchored slope had been designed with proper design practices and executed with good construction practices under supervision of a slope designer, there would not be a problem to build buildings or structures over it. However, the use of pre-stressing ground anchors for residential development was losing favour worldwide while it was discouraged by the local authorities due to the high maintenance needed.

(Sourced from The Star, 1 January 2013)

Young Entrepreneur Gets Boost through 1MCA Scheme

Local entrepreneur, Ong Hooi Siang who initially did not have a shop to market his intelligent LED electronic circuit system has received a loan of RM15,000 from MCA through the 1MCA micro-credit scheme for youths. Ong, an electronics engineering graduate, said when he started his business in June last year, he could not record much sales for a few months because he did not have a place to display his products. With the injection of micro-credit capital, Ong decided to lease and refurbish an outlet, which he hopes to open for business by March 2013. There are also five other entrepreneurs who has received similar loans totalling RM80,000 from MCA. The loans, ranging from RM5,000 to RM20,000 each, are created to help those aged 45 years and below to start or expand their businesses.

(Sourced from The Star, 2 January 2013)

Sentoria Inks Deals with Seriemas to Develop RM1.8 Billion Resort City in Morib

Property development and civil engineering company, Sentoria Group Bhd has signed agreements with another property developer, Seriemas Development Sdn Bhd, to develop a RM1.8 billion integrated resort city in Morib, Selangor. The proposed resort city would encompass 354 acres of land, of which 150 acres would be developed into an integrated theme park resort, while the remainder would be used for a mixed development of commercial and residential units. Sentoria signed two agreements with Seriemas for the proposed project – a development rights agreement for the development of the integrated resort, and a joint-venture agreement for the development of commercial and residential properties. The development cost of the integrated resort (targeted for completion within five years) together with land purchase is estimated to be RM190.3 million. The mixed property development project is estimated to have a gross development value of RM1.6 billion, spanning over an eight-year period.

(Sourced from The Star, 1 January 2013)

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A Technical and Networking Visit to Surabaya

MARINE ENGINEERING AND NAVAL ARCHITECTURE TECHNICAL DIVISION

by Dr Abdul Rahim Othman

INTRODUCTION

The technical visit has become an important part of interpersonal development of human capital especially for educators from a university. There is a certain knowledge that cannot be acquired and will not be imparted without a technical visit. The technical visit is a vital part of one's career development where it helps to bridge the gap between learning through the theoretical and the real working environment.

In general, the visit also provides first-hand knowledge about the organisational structures and modes of operation in different industries, particularly involving the marine sector. The scope of the technical visit which has been determined by the organiser varies, and it can be clustered into three main areas that is, the research, technology and human capital training.

A technical and networking visit to Surabaya was organised by the Marine Engineering and Naval Architecture Technical Division, The Institution of Engineers, Malaysia (IEM) from 1st to 3rd March 2012. Amongst the objectives of the visit are to develop a networking relationship with the counterpart parties in Surabaya, as well as to attain specific knowledge in the research and technological development in the marine industries. In addition, the visit also serves as a platform to present the *SME Assist* as an agenda of Universiti Sains Malaysia (USM), which could enable opportunities for future collaboration in teaching and research.

The delegation from USM comprises Dr Abdul Rahim Othman (Chairman of SME Assist, BJIM), Associate Prof. Dr Shahrul Kamaruddin (Deputy Chairman of SME Assist, BJIM) and Associate Prof. Dr Mohd Rizal Arshad (Head of Underwater Robotics Research Group).

SCOPE OF VISIT

The scope of the visit focuses on the following:

- Visit to Dok Perkapalan Surabaya (DPS) – One of the largest dockyards in Indonesia.
- Visit to Indonesia Hydrodynamics Laboratory (IHL), Universitas Teknologi Sepuluh November – Marine laboratory (longest towing tank in Indonesia/South East Asia).
- Visit to Balai Pendidikan dan Pelatihan Ilmu Pelayaran (BP2IP), Surabaya – Ship handling simulator (computer generated) and engine room simulator (real live size). This training centre is meant for nautical and marine engineering cadets who will serve the commercial fleet upon graduation.
- Networking session with marine businesses in the Surabaya region during dinner.
- Socialising in Golf (Optional: Afternoon of 2 March 2012). This session would also involve local engineers/ businessmen and IMarEST members from Surabaya.

A VISIT TO DOK PERKAPALAN SURABAYA (DPS)

History started on 22 September 1910, when the colonial Dutch Government established N.V Drogdok Maatschappij. It was originally intended to service Dutch ships in Indonesia. Between 1942 and 1945, the company was managed by the Japanese Government under the name of Harima Zosen. After its nationalisation on 1 January 1961, N.V Droogdok Maatschappij Soerabaja became a state-owned company named P.N Dok dan Perkapalan Surabaya. Based on the decree by the Minister of Sea Communication in 1963, the dockyard Sumber Bhaita was integrated into the company. Thereafter, since 8 January 1976, the company has assumed a new legal status as a 'PT'.

PT. Dok & Perkapalan Surabaya owns 4 floating docks, which are able to accommodate vessels of up to 290m in length and of approximately 135,000 DWT. They also have the possibility of repairing vessels up to 310m in length along the shipyard quays. The quays are about 6,000m long in total, including 3,500m of quays fully equipped with the essential infrastructure, electric supply and technical gas supply. 24 cranes which are able to lift up to 300t are available. The technical features of PT. Dok & Perkapalan Surabaya docks are as follows:

Description	Dok I	Dok II	Dok IV	Dok V
Length Over Pontoon	99.24 M	99.24 M	94.30 M	138.52 M
Length Over All	113.24 M	109.24 M	112.30 M	152.52 M
Capacity	3500 TLC	3500 TLC	4000 TLC	6000 TLC

A VISIT TO THE INDONESIAN HYDRODYNAMICS LABORATORY (IHL)

The Indonesian Hydrodynamics Laboratory (IHL) is an advanced research laboratory of BPPT (the Agency for Assessment and Application of Technology) with sophisticated facilities such as Towing Tank, Manoeuvring and Ocean Engineering Basin, and Cavitation Tunnel, for testing many types of ships and offshore structures.

The Laboratory is devoted to research and development, and marine business services related to the propulsive, sea-keeping and manoeuvring performances of ships and offshore structures of all types. The role of IHL is not only to study and develop the hydrodynamic performance of existing design, but also to contribute to the continuing progress and development of technology and know-how. The facilities equipped are as follows:

Towing Tank

- Tank Dimensions: Length 234.5m (incl. Harbour) x Breadth 11m x Water Depth 5.5m
- Towing Carriage: Manned, Maximum Acceleration 1 m/s^2, Maximum Speed 9 m/s
- Ship Model: Wooden Model 4 – 9m
- Wave Maker: Hydraulically driven dual-dry-back-flap type capable of generating regular and irregular waves with a period of 0.5 – 3.5 seconds with direction between 0^0 and 180^0 and significant wave height up to 0.5m
- Manoeuvring and Ocean Engineering Basin
- Cavitation Tunnel
- Workshops.




The visit involved a discussion on the capacity of IHL and research institutes in Malaysia, especially USM, and how further collaboration could be initiated in the future.

A VISIT TO BALAI PELAYARAN DAN PELATIHAN ILMU PELAYARAN

BP2IP (Balai Pelayaran dan Pelatihan Ilmu Pelayaran) in Surabaya was initially named as Surabaya Institute of Education and Training Cruise (BPLP) which was a filial arm of BPLP Semarang in 1982, then turned into Hall of Sailing Basic Education and Training (BPLPD) Surabaya in 1990, and subsequently renamed as BP2IP Surabaya since 2002.

As a Technical Implementation Unit (UPT) under the Education and Training Agency of Transportation, the main task BP2IP Surabaya is in implementing education and training in the areas of primary and secondary levels of sea-going courses in compliance with standards and provisions of the legislation in force, and may hold other sea-going functional technical training based on Head of Marine Transportation Pusdiklat's assignment.

Facilities equipped are as follows:

- Bridge Simulator
- Steering Trainer
- Workshop
- Radar Simulator
- ARPA Simulator
- Navigation aid Simulator
- Engine Graphic Simulator.




LESSONS LEARNT

Apart from understanding the relationship on how to adopt the real problem in the academic world from the studies and assignment perspective, the technical visit also works as a refresher for the educator and gives a fresh insight of making learning more interactive. It is one of the best examples of "Enjoyable Learning". The visit has made acquiring knowledge more interesting and fun, and can be translated into a new method of knowledge acquisition.

It builds up interest in an uninteresting subject and also works as a get-together for educator and students.

One of the main highlights of the technical visit is to follow through the technology adoption for the fabrication and maintenance processes of the marine industries. This comprises a wide range of technologies. Throughout the visit, the participants, many of whom have no previous knowledge and experience in such field, acquired an understanding of the processes and technologies used throughout the marine industries, whilst learning about the advances of the technologies and the stringent safety requirements involving this sector. As a result, one would have gained the ability to identify the correct processes and equipment to use, and the tools and equipment appropriate to each stage of the ship building and fabrication process. The visit has made the participants understand the subject to its core, particularly the marine engineering environment. It also gave an idea about the job profile for such an environment.

Arguably, strategic human capital development is the key element to human resource issues in the 21st century. This can be observed through the visit where the strategic human resource initiatives were derived, particularly by the training organisation. The initiatives include the adoption of a "human investment perspective" that values the skills, knowledge and abilities of the future trainees. Therefore, looking at the similar perspective, what one can learn from the visit is that effective human resource management strategies should focus on the added value of the human resource functions.

This strategic approach would include a valiant effort to form strategic partnerships with the future companies that will be employing the trainee. This could be achieved by the participation within the planning and strategy of interested companies. With a strategic approach in place, the human capital development would be able to function within the objectives and goals of the training organisation and companies itself. This would result in maintaining a competitive advantage and effectively managing a workforce of the 21st century. A critical function of human capital development is matching it with the needs of the company as this process is seen as the "gateway" to ensuring that the training organisation succeeds in "transferring the right knowledge at the right time, with the right skills." This function will place demands on the training organisation as a result of the diverse needs of numerous companies. ■

Dr Abdul Rahim Othman is a lecturer at the School of Mechanical/Aerospace Engineering, Universiti Sains Malaysia (USM) where he is heading the Composite Processing Laboratory at the School of Aerospace Engineering. His current research interests include composite design and processing, impact and ballistic analysis of composite materials, and aircraft composite parts via design and improvement techniques. (E-mail: *merahim@eng.usm.my*, contact no: +604 5995906).

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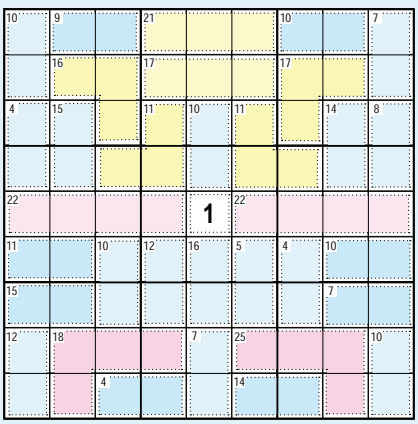
(Solution is on page 44 of this issue.)



A Visit to Boustead Naval Shipyard and Sailing on the RMN's Frigate KD LEKIU

MARINE ENGINEERING AND NAVAL ARCHITECTURE TECHNICAL DIVISION

by First Admiral Adjunct Prof. Dato' Ir. Hj. Ahmad Murad bin Hj. Omar (Rtd)

A two-day visit to the Boustead Naval Shipyard and the Royal Malaysian Navy base in Lumut was organised by the Marine Engineering and Naval Architecture Technical Division (MNATD) on 6 and 7 April 2012. On the first day of the visit, the group of 38 participants which comprise members of IEM as well as the Institute of Marine Engineering Science and Technology (IMarEST) and a few industrial representatives was well received by Boustead Naval Shipyard (BNSy) with a very enlightening programme.

Led by the Chairman of MNATD, First Admiral Adjunct Prof. Dato' Ir. Hj. Ahmad Murad bin Hj. Omar (Rtd), the group was assisted by IEM secretariat staff and office bearers from the technical division. The visit took the group firstly into a majestic auditorium for a quick peek of the corporate video and a comprehensive presentation by BNSy corporate affairs (Public Relations) officers on the roles and activities of the shipyard. Later, the group was taken for a tour which included the following areas:

- Shipyard layout
- Shallow water jetty
- Deep water jetty
- Synchro-lifts
- Covered module hall
- Open fabrication yard
- Workshops
- Administration and commercial offices
- Warehouses.

A tour of the shipyard

A group photo taken at the Boustead Naval Shipyard

At each stop, BNSy staff was at hand to offer some explanation on the spot and the group was given a guided tour of the shipyard and stops made at specific locations that were of interest to the group.

From feedbacks that were received, the first day visit to BNSy was indeed an eye opener to many participants that the business of ship repair and shipbuilding is indeed a complex field.

On the second day of the visit, the tour programme took the group through the gates of the Royal Malaysian Navy (RMN) base in Lumut. This is where the main fleet of the RMN is based, and in this naval station are located fleet assets such as surface ships, Combat Helicopter Squadron (Super Lynx), Training Helicopter Squadron (Fennec) and many other buildings and complexes that are home to many sailors and families. The group had an early start, as the frigate KD LEKIU was ready to set sail by 9.00 a.m. Breakfast was served on board and whilst the ship was casting its lines to sail from the jetty, the ship's engineering officers gave a briefing on the ship's safety procedure and the programme for the day. The programme included:

On board the RMN frigate KD LEKIU

- Briefing – KD LEKIU as a fighting surface combatant
- Tour (in small groups) of the ship's compartments and upper deck arrangement
- A demonstration of combat readiness, damage control and a fire-fighting exercise
- A demonstration by Super Lynx Combat Tactical Helicopters
- A deck landing by one of the Super Lynx Helicopter
- A briefing by the pilot and tactical officer (TACO) on weapons payload/ capability of the Super Lynx
- A tour of engine and machinery spaces
- Lunch in the ward-room (officers' dinning room).

CONCLUSION

The two-day visit was very interesting and has opened up the minds of the participants, especially the engineers who were able to witness first-hand the marine engineers' involvement in the operation of ships and naval bases. The participants also saw the complexity of shipbuilding and ship repair, and the extensive tools and equipment that are involved. A closer scrutiny of some of the workshops demonstrated the complexity of an overhaul for a 3000 HP marine diesel engine which was being carried out within the workshops in the shipyard. The outing on board the Navy Frigate KD LEKIU provided a real life sensation of how a sailor or engineer would experience rough sea conditions and would have to work regardless of such environmental hazards. On the lighter side, amongst the participants, there was also a suggestion that a similar visit should be conducted again, but this time on the "submarines" of RMN in Kota Kinabalu. ■

First Admiral Adjunct Prof. Dato' Ir. Hj. Ahmad Murad bin Hj. Omar (Rtd) possesses a degree in Mechanical Engineering from Universiti Teknologi Malaysia (UTM) and a Masters of Science degree in Engineering Business Management (EBM) from Warwick University UK. Currently, he holds several positions in IEM, including Chairman of Marine Engineering and Naval Architecture Technical Division and Public Services Special Interest Group as well as a Council Member and Executive Committee Member. He is also Executive Chairman of Omahams Corporation Sdn Bhd and Chairman of Marine Technical Center Sdn Bhd, ASTF Logistics Sdn Bhd and Preston Shipyard Sdn Bhd. He is a Fellow of the Institute of Marine Engineering Science & Technology (IMarEST), United Kingdom.

Technical Visit to Faculty of Engineering, USM and Boustead Penang Shipyard (Pulau Jerejak) Malaysia

by En. Muhammad Hilmi bin Raja A. Aziz

MARINE ENGINEERING AND NAVAL ARCHITECTURE TECHNICAL DIVISION

THE Marine Engineering and Naval Architecture Technical Division organised a technical visit to Faculty of Engineering, Universiti Sains Malaysia (USM) and to Boustead Penang Shipyard Sdn. Bhd. (BPS) on 19 and 20 October 2012. A total of 20 participants took part in this technical visit.

USM, Engineering Campus is located in Nibong Tebal, Seberang Perai Selatan, Pulau Pinang, Malaysia. There are 6 Engineering Schools in USM and all Schools are well equipped with state-of-the-art infrastructure. The Engineering Schools in the Engineering Campus of USM are:

- School of Civil Engineering
- School of Chemical Engineering
- School of Aerospace Engineering
- School of Mechanical Engineering
- School of Electrical & Electronic Engineering
- School of Materials and Mineral Resources Engineering.

The purpose of the visit is to understand and explore the facilities and capabilities readily available in USM Engineering Campus. The visit will enable IEM members to get proper exposure to USM Engineering facilities and expertise, so that potential cooperation and collaboration can be forged.

During this visit, Engr. Assoc. Prof. Dr Mohd. Rizal Arshad, Deputy Dean from School of Electrical & Electronic Engineering, gave a talk about the development of a Remotely Underwater Vehicle (ROV) for ocean explorations. The talk revolved on the efforts in developing a ROV for shallow water, i.e. costal applications, which were kick-started in USM in year 2000. The research and development efforts have strived to capitalise on the available local engineering talent and seeks to optimise or produce a robust and reliable ROV system for the industry.

The technical visit to BPS was scheduled on the second day of this programme. BPS's principal activities presently include shipbuilding, oil & gas fabrication and marine engineering construction. BPS shipyard is strategically located at Pulau Jerejak, off Penang Island. It is accessible from Bayan Lepas Free Trade Zone, Penang International Airport and Penang Port. The journey from BPS's Jetty, Batu Maung (8km from Penang Airport) to the shipyard takes approximately 15 minutes.

BPS is fully equipped with necessary infrastructure and facilities to cater for the shipbuilding activities for vessels of up to 120 metres in length and 10,000 DWT. Total yard space is about 40 acres which accommodates major facilities including slipway of 110 metres, bulkhead construction area of 200 metres, hangers, covered workshops, warehouse and various lifting capacities.

An explanation on the current construction by Head of Commercial Division of BPS

Delegates who boarded the 111m Accommodation Barge (H132)

BPS has achieved excellent safety record in the oil & gas projects and received HSE awards from PCSB, SSB, and EMEPMI & MSOSH. Emphasis has been placed on the implementation of safety procedures as stipulated in the company's Health, Safety & Environment (HSE) manual.

BPS constantly strives to achieve total commitment in terms of quality and has established a well-maintained documented QA System. This system meets the International Standard of ISO 9000 quality system. BPS was awarded the international BS EN ISO 9002 certification by BVQI on 28 December 1996 as an Engineering, Project Management, Procurement and Fabrication contractor. This award has been upgraded to ISO 9001-2000 in 2003. This Quality Management System was changed to BSI Certification on 22 November 2006.

The objective of the visit was obtain an in-depth view of the shipbuilding activities in BPS. This would provide better exposure and understanding of shipbuilding activities at BPS. During the trip, Rear Admiral Dato' Pahlawan Ir. Jasan Ahpandi bin Sulaiman, Head of Commercial Division of BPS, shared his experiences in project management and information about BPS. The shipyard is dependent on knowledgeable and highly skilled workers to deliver better vessels. There was active participation from the delegates during the presentation and Q&A session.

The presentation was followed by a tour around the dockyard. All participants had the opportunity to see some of the vessels that were still under construction. In addition, BPS also allowed the participants to go on board the 111m Accommodation Barge (H132) which was built for one of its clients. ■

En. Muhammad Hilmi bin Raja A. Aziz is Masters student from School of Electrical & Electronic Eng. USM. He received his B. Eng (Hons) in Mechatronic Engineering also from USM. His research field is on control and industrial automation.

UTM Becomes a Marine Partner with Leading Marine Science and Technology Professional Body

by Ir. Assoc. Prof. Hayati Abdullah

UNIVERSITI Teknologi Malaysia (UTM) has joined the ranks of many industrial and academia entities around the world to be a Corporate Marine Partner with the world's leading Institute of Marine Engineering Science and Technology (IMarEST). The IMarEST is a United Kingdom based marine professional body and learned society for all marine professionals which has been known previously as Institute of Marine Engineers (IMarE) since 1889.

In recent years, the demand of the engineering disciplines has increased and more than ever there was a need for scientists and technologists to found an institution that they could affiliate themselves with. It was at this time that IMarEST was formed in 2002.

The IMarEST is a registered charity and is the first Institute to bring together marine engineers, scientists and technologists into a singe international multi-disciplinary professional body. It is the largest marine organisation of its kind, with a worldwide membership roll of approximately 15,000 based in over 100 countries.

The handing over of Marine Partner Certificate from the President of IMarEST, Malcolm Vincent, to the Vice Chancellor of UTM, Prof. Datuk Dr Ir. Zaini Ujang, witnessed by First Admiral Adjunct Prof. Dato' Ir. Hj. Ahmad Murad bin Hj. Omar (Rtd), Prof. Dr Ir. Roslan A Rahman and Assoc. Prof. Dr Mohd. Zamani Ahmad

The Marine Partner agreement signing ceremony was conducted on 2 July 2012 and the handing over of the certificate was cordially done at UTM, Johor Bahru, on 19 Nov 2012. On this auspicious occasion, Prof. Datuk Dr Ir. Zaini Ujang, Vice Chancellor of UTM was also given a certificate upon his acceptance by the Institute as a Fellow of IMarEST. ■

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Integrity Initiatives by the Government and the Pledge from IEM

by Anti-Corruption NKRA, PEMANDU and Ir. Fam Yew Hin (Deputy Chairman of Mechanical Engineering Technical Division)

ON 29 March 2012, The Institution of Engineers, Malaysia (IEM) has entered into another important chapter in promoting Professional Integrity and Ethics. In supporting of the Government Transformation Programme (GTP) to cultivate a culture of integrity, IEM has entered into a pledge to promote professional integrity within the organisation and the engineering fraternity. The pledge, which was signed by Ir. Vincent Chen, the President of IEM was handed over to Y.Bhg. Senator Dato' Sri Idris Jala, the Minister in the Prime Minister's Department and CEO of the Performance Management and Delivery Unit (PEMANDU).

In an effort to create integrity awareness within the engineering society, a regular column will now be created in our monthly bulletin – the *JURUTERA*. In this first article, we will share the information about the GTP and the Integrity Initiatives by the Government.

INTRODUCTION TO THE GOVERNMENT TRANSFORMATION PROGRAMME

Initiated in 2010, the Government Transformation Programme (GTP) was conceived to address areas which topped the list of causes of concern to the Malaysian public. Its aim was to address the key areas of concern whilst serving as a catalyst for the transformation of the nation into a developed, high-income country by year 2020. In addressing these concerns, the GTP centred on building a collaborative culture within the public service by getting civil servants more deeply involved in the planning stages of these key areas of concern known as the National Key Result Areas or NKRAs. Within the aegis of the programme, measurable delivery goals and targets were assigned to various key ministries and agencies, a specific delivery chain created and a clear, unhampered reporting framework was set in motion.

These NKRAs include Fighting Corruption, Reducing Crime, Improving Student Outcomes, Raising Living Standards of Low-Income Households, Improving Rural Basic Infrastructure, Improving Urban Public Transport and Addressing Cost of Living. The goals and targets set in place under the GTP are meant to be sustained over three horizons or periods of delivery till 2020. Thus, Horizon 1 started from 2010 till 2012, followed by Horizon 2 from 2012 till 2015, and Horizon 3 from 2015 till 2020.

ANTI-CORRUPTION NKRA

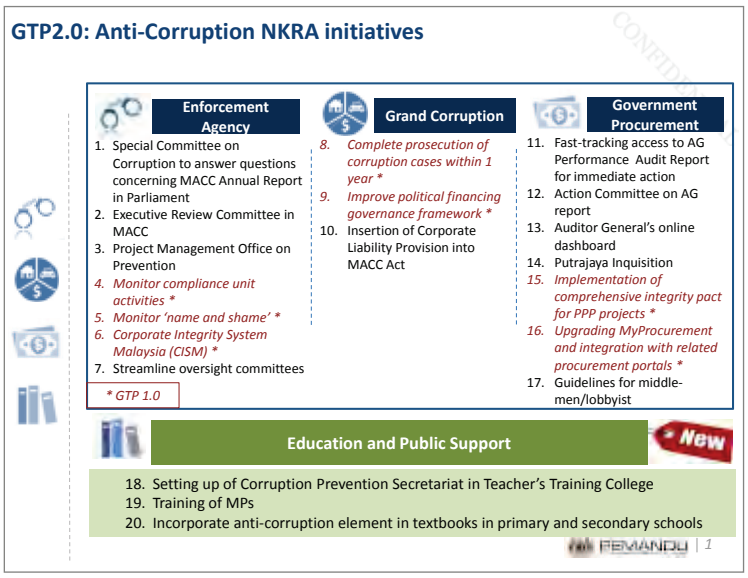
Cultivating a culture of integrity in society, be it in terms of business ethics, or social values and norms, has been identified as a key component of building a civil society which will reap the rewards of a high-income nation in a just, fair and equitable manner. For a society to thrive there must be trust in the government and community. The bedrock of any civil society is shared integrity and similarity of values. There are significant costs associated with corrupted business practices, with PEMUDAH estimating that Malaysia stands to lose as much as RM10 billion a year. With this ethos in mind, a range of initiatives were conceived and implemented under the Fighting Corruption NKRA. Three major areas were identified, namely, the regulatory and enforcement agencies, government procurement and grand corruption, which include political corruption. With all the achievements and successes under Horizon 1 of the GTP, it is now imperative to build upon them and continue with the upward trend in combating corruption. After conducting a process of review and analysis, as well as obtaining feedback from key stakeholders, GTP 2.0 identified three long term aspirations.

The aspirations under Horizon 2 of the GTP, otherwise known as GTP 2.0 are as follows:

- Firstly, to develop a credible, effective and reputable world-class Anti-Corruption Commission;
- Secondly, to enforce a zero-tolerance policy on corruption at all levels – from the highest levels of government to the rakyat on the ground; and
- Thirdly, to increase transparency and improvement of the handling of public funds by reducing or eliminating altogether the mismanagement of public funds. This will be done by ensuring a strict procedural requirement for all government procurement activities.

In order to identify the initiatives necessary to achieve these aspirations, four work streams were strategised under the Anti-Corruption NKRA in GTP 2.0:

- Enforcement Agency
- Grand Corruption,
- Government Procurement
- Education and Public Support.



The Government is fully aware that corruption remains one of the biggest threats to its ambition of being a high-income nation. However, the fight against corruption cannot be won overnight. Change at the policy level alone will not be sufficient. It will need a broader effort of cooperation to implement effective reforms to minimise opportunities for corruption. With all this in place, hopefully we can make major inroads in addressing this fight against corruption. ■

IEM President's Quote

"I am a firm believer that integrity is the most essential part of the make-up of an organisation. I share the views of Warren Buffet, the legendary American investor, industrialist and philanthropist who had once said that *in looking for people to hire, you look for three qualities: integrity, intelligence, and energy. And if you don't have the first, the other two will kill you*.

Integrity within this context generally means maintaining high moral standards and doing superior work in a professional capacity, as opposed to merely avoiding misconduct. In the profession of engineering, this is certainly of no exception.

Today, many engineers seem to be more concerned with personal remuneration and advancement as well as their desire to be seen as politically acceptable at the expense of integrity. I truly believe that with adherence to professional integrity, the practice of putting forward personal gain and greed will be no more".

Ir. Vincent Chen Kim Kieong
IEM President

BUILDING INFORMATION MODELLING (BIM) SURVEY

This survey is conducted under the purview of the Building Industry Presidents Council (BIPC) and aims to collect data, opinions and expections on BIM from industry players. The purpose of the survey is gather more information related to the status of BIM awareness, adoption and challenges in the engineering industry. We seek the support of IEM members in completing the online survey at *http://www.feiap.org/BIMSurvey/index.aspx*. Kindly submit your survey by **28 February 2013**.

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

EVERYONE knows about Leonardo da Vinci's masterpieces, *Mona Lisa* and *The Last Supper*. Many people would have seen the former masterpiece in Paris' world-famous museum, *The Louvre*, but not that many would have had the chance to see the latter, which is housed in the refectory adjacent to the Basilica of Santa Maria delle Grazie in Milan, Italy. Why does the latter piece receive fewer spectators than the former? For one mere principal reason – it is not as easily accessible as compared to the former piece.

When my wife and I were in Milan, we boarded a metro to the nearest station and thence walked to the Basilica, hoping to have a good look at the painting where its replications could be found in every corner of the globe. But alas, to my great disappointment, visits to the refectory were limited to 25 persons each time and each group of visitors were only allowed for a 15-minute visit in the refectory, and all the slots for that day had been taken. Obviously, I had not done my homework well, or else I would have gone on-line back home when I was still in the process of planning the trip, to buy two tickets for our intended visit. In summer, the peak travel season in Europe, one has to book the admission tickets at least one month in advance.

Fortunately, all was not lost. When we were in Mantua on the following day, I had had access to the internet, and to my delight, I found that some tickets were still available for one of the early morning slots two days later. I immediately bought two tickets for that slot at €8 each. Fortunately, Mantua is only about 1 hour and 40 minutes away from Milan by train.

So there we were, at 9.15 in the morning back in Milan, we had finally made it into the refectory, standing face-to-face with the original painting of *The Last Supper*, a painting which has fascinated many spectators all over the world.

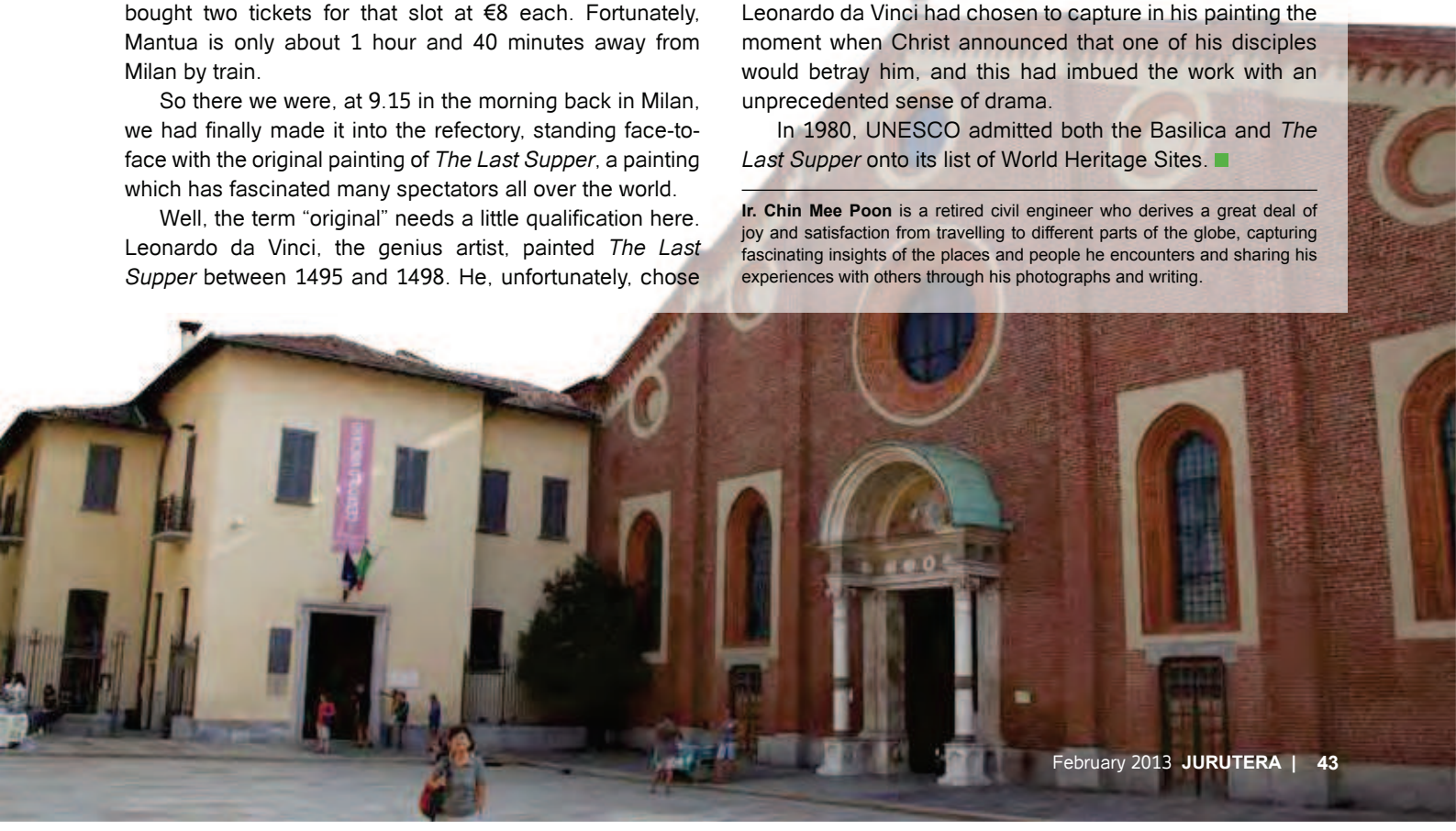
Well, the term "original" needs a little qualification here. Leonardo da Vinci, the genius artist, painted *The Last Supper* between 1495 and 1498. He, unfortunately, chose to use oil paint instead of the more popular fresco technique with watercolours that is faster-drying and longer-lasting, which resulted in the beginning of its disintegration just 5 years later. In the 19th century, Napoleon's soldiers used the wall with the painting on it for target practice. Following that, in 1943, an Allied bomb destroyed the building. But amazingly, the only wall surviving the explosion was the wall where *The Last Supper* was mounted on. Having withstood all those tests of time, the painting finally underwent a 20-year (1978 – 1998) restoration programme based on contemporary descriptions and copies which have made possible for its re-establishment to its original colours.

In the refectory, *The Last Supper* occupied one end wall, and on the other end wall was another masterpiece, *Crucifixion* by Giovanni Donato da Montorfano. Yet, nothing else in the hall was worth the attention of the visitors as compared to *The Last Supper*. Most people just glued their sight on *The Last Supper* throughout the 15 minutes. Photography was strictly prohibited in the refectory. A young European girl was caught stealing a shot of the great painting, and she was immediately reprimanded by the lady officer who had also demanded that the photo be erased right away.

Many artists throughout the ages have depicted the last supper that Jesus Christ had with his 12 disciples, each according to his/her own imagination and interpretation. Leonardo da Vinci had chosen to capture in his painting the moment when Christ announced that one of his disciples would betray him, and this had imbued the work with an unprecedented sense of drama.

In 1980, UNESCO admitted both the Basilica and *The Last Supper* onto its list of World Heritage Sites. ■

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: 14 January 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 Honorary 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 2012/2013

NEW APPLICANTS

Name	Qualifications
AERONAUTICAL ENGINEERING	
NURUL HASNAN B ABDUL MAJID	BSc (UNI OF TEXAS, AUSTIN) (AEROSPACE, 1985)
CIVIL ENGINEERING	
ANA ROZAININAIDA BINTI ABD RAHMAN	BE HONS (UTM) (CIVIL, 2003) MSc (UTM) (CONSTRUCTION MANAGEMENT, 2005)
AZRUL RAIMEE BIN RAMLI	BE HONS (UKM) (CIVIL & STRUCTURAL, 2000)
NG CHIN KHUANG	BE HONS (UKM) (CIVIL & STRUCTURAL, 2002)
TUNG SOW HOONG	BE HONS (UPM) (CIVIL, 2001) MSc (UPM) (MECHANICAL, 2007)
YONG GOK CHONG	BE HONS (USM) (CIVIL, 2007)
ZALEHA BINTI SALEHODDIN	BE HONS (UMS) (CIVIL, 2000) MSC (UiTM) (CIVIL-BUILDING, 2012)
COMPUTER ENGINEERING	
CHUAH JOON HUANG	BE HONS (UTM) (COMPUTER, 1999) ME (NUS) (2002) MPHIL (CAMBRIDGE) (2008)
ELECTRONIC ENGINEERING	
LEONG WAI YIE	BE HONS (QUEENSLAND) (ELECTRICAL, 2001)
GEOTECHNICAL ENGINEERING	
ZAITON BINTI ZAINAL BADRI	BE HONS (UTM) (CIVIL, 2003) ME (UTM) (CIVIL, 2004)
MECHANICAL ENGINEERING	
KU MOHD FAISOL BIN KU BAKAR	BE HONS (UTHM) (MECHANICAL, 2008)
TANG MIN LEONG	BE HONS (UTM) (MECHANICAL, 2001)
ZAMRI BIN KANIP	BE HONS (UTP) (MECHANICAL, 2002)
TELECOMMUNICATION ENGINEERING	
OTHMAN BIN ISMAIL	BSc (SOUTHERN ILLINOIS) (ELECTRICAL SCIENCE AND SYSTEM ENGINEERING, 1985)
WATER RESOURCES ENGINEERING	
LEE LIANG WANG	BE HONS (UTM) (CIVIL, 2006)

TRANSFER APPLICANTS

M'ship No.	Name	Qualifications
CIVIL ENGINEERING		
43663	ASMEI BIN AMIN	BE HONS (MALAYA) (CIVIL, 2007)
43545	CHAN HWA FANG	ME (PORTSMOUTH) (CIVIL, 2003)
37033	CHONG WAI FOONG	BE HONS (UPM) (CIVIL, 2007)
28611	CHUN KAM VAI, JOHNNY	BE HONS (CURTIN) (CIVIL & CONSTRUCTION, 2009)
27867	FOONG CHOON WOH	BE HONS (USM) (CIVIL, 2007)
33825	HAR WAI LEARN	BE HONS (UPM) (CIVIL, 2007)
28290	LEONG CHEE K'IZ, JOSHUA	BE HONS (USM) (CIVIL, 2007)
25668	MOKHZANI BIN ABDUL HALIM	BE HONS (UKM) (CIVIL & STRUCTURAL, 2002)
25613	NUR SERFLY BIN ALIAS	BE HONS (UPM) (ELECTRICAL & ELECTRONIC, 2003)
38016	OMAR BIN ISMAIL	BSC (NORTH ARIZONA) (CIVIL, 1989)
30556	ONG PENG PHENG	BE HONS (UTHM) (CIVIL, 2007)
20605	WONG JERN NEE	BE HONS (UPM) (CIVIL, 2002) MSC (UPM) (STRUCTURAL ENG & CONSTRUCTION, 2005)
16470	ZULKIFLI MOHD NOOR	ADV DIP (UiTM) (CIVIL, 1996)
ELECTRICAL ENGINEERING		
28875	FUNG YIP HIN	BE (WESTERN, AUSTRALIA) (ELECTRICAL & ELECTRONIC, 2003)
33855	MOHD HAFIZ BIN ZAINUDDIN	BE HONS (UTEM) (ELECTRICAL-INDUSTRIAL POWER, 2007)
26805	TIEW RI CHARD	BE HONS (UNITEN) (ELECTRICAL & ELECTRONIC, 2002) ME (MALAYA) (2009)

TRANSFER APPLICANTS

M'ship No.	Name	Qualifications
ELECTRONIC ENGINEERING		
24495	MUHAMMAD AKMAL BIN ABDULLAH	BE (ROYAL MELBOURNE) (ELECTRICAL, 1999)
21959	MURALINDRAN MARIAPPAN	BE HONS (USM) (ELECTRICAL & ELECTRONIC, 1998) MS (UMS) (ELECTRICS & ELECTRONICS, 2004) PHD (UMS) (ROBOTICS, 2008)
MECHANICAL ENGINEERING		
48107	KUANG VOON FEI	BE HONS (MMU) (MECHANICAL, 2007)
54042	RASYIDI BIN MOHD TAHIR	BE HONS (KUITTHO) (MECHANICAL, 2006)
03963	SHAHROM BIN SHAARI	BE HONS (UTM) (MECHANICAL, 1981)
37073	TAN BOON KHENG	BE HONS (MALAYA) (MECHANICAL, 2007)
22502	VISWAM RAJARATNAM	BE HONS (NOTTINGHAM) (MECHANICAL, 2000)
21414	ZULFAHMI BIN AZIZ	BE HONS (UiTM) (MECHANICAL, 2001)

Solution for 1Sudoku published on page 33 of this issue.

1Sudoku

2	4	5	6	8	7	9	1	3
8	1	6	5	3	9	2	7	4
3	7	9	1	4	2	8	5	6
1	8	3	7	6	5	4	9	2
4	9	7	2	1	3	5	6	8
6	5	2	8	9	4	1	3	7
9	6	8	4	7	1	3	2	5
5	3	4	9	2	6	7	8	1
7	2	1	3	5	8	6	4	9

JOB VACANCY

In line with our increased involvement in representing the engineering profession with outside bodies, IEM needs resourceful individuals for the position of Research Manager/Executive. The person will be primarily required to conduct research, to prepare reports and to liaise between the Institution and outside bodies on various aspects of engineering policy. The person will be expected to do his/her work on a "hands-on" basis as there will be no support staff for this post.

Requirements:

- Possess a recognized degree in Civil Engineering or related disciplines
- Has wide experience in the construction industry
- Excellent skills in literature research with annotation ability and report writing
- Proficient in English and with a working knowledge of Bahasa Malaysia
- Willing to work in a secretarial role and to serve office bearers of the Institution
- Has a passion for the engineering profession and dedicated to improving the practice of engineering
- Matured (including semi-retired) engineers with the necessary qualifications, experience and passion are encouraged to apply.

Interested applicants are requested to submit their resume to the Honorary Secretary, The Institution of Engineers, Malaysia at ***hr@iem.org.my*** before **28 February 2013**.

Note: *This is a continuation of the list which was first published on page 50 of the January 2013 issue.*

ADMISSION TO THE GRADE OF GRADUATE

M'ship No.	Name	Qualifications
ELECTRICAL ENGINEERING		
56289	NOR ZAIMAH BINTI SURIA	BE HONS (UTHM) (ELECTRICAL, 12)
56290	NORAZILA BINTI MANSOR	BE HONS (UTHM) (ELECTRICAL, 12)
56291	NOREFARIZA BINTI ROSLI	BE HONS (UTHM) (ELECTRICAL, 12)
56444	NORFARAHIN BINTI MAHMOD	BE HONS (UTHM) (ELECTRICAL, 12)
56292	NORHIDAYAH BINTI YAHAYA	BE HONS (UTHM) (ELECTRICAL, 12)
56293	NORHUSNA BINTI MOHAMAD	BE HONS (UTHM) (ELECTRICAL, 12)
56294	NORLINNOR BINTI BAHARUDIN	BE HONS (UTHM) (ELECTRICAL, 12)
56295	NORUMMIRAH BINTI ABDULLAH	BE HONS (UTHM) (ELECTRICAL, 12)
56296	NUR AQILAH BINTI MOHAMAD AMIN	BE HONS (UTHM) (ELECTRICAL, 12)
56297	NUR ASHIKEEN BT ABD RAHIM	BE HONS (UTHM) (ELECTRICAL, 12)
56298	NUR ATIQAH BT AHMAD	BE HONS (UTHM) (ELECTRICAL, 12)
56299	NUR AZEAN BINTI AZLAN	BE HONS (UTHM) (ELECTRICAL, 12)
56300	NUR AZURA BINTI MAMAT	BE HONS (UTHM) (ELECTRICAL, 12)
56301	NUR HIDAYAH BINTI YAHYA	BE HONS (UTHM) (ELECTRICAL, 12)
54589	NUR ZAWANI BINTI SAHARUDDIN	B.E.HONS.(UTEM) (INDUSTRIAL POWER, 08)
56302	NURAINI BINTI AB RAHIM	BE HONS (UTHM) (ELECTRICAL, 12)
56303	NURHAFIZAH BINTI ISMAIL	BE HONS (UTHM) (ELECTRICAL, 12)
56304	NURUL FADILA BT SAMSUDIN	BE HONS (UTHM) (ELECTRICAL, 12)
56305	NURUL SUHAILAH BINTI KIMSIN	BE HONS (UTHM) (ELECTRICAL, 12)
56306	NURUL WAHIDAH BINTI SHAFEE	BE HONS (UTHM) (ELECTRICAL, 12)
56307	NURULFARAHIDA BINTI NORAZAHAR	BE HONS (UTHM) (ELECTRICAL, 12)
56308	ONG YI VERN	BE HONS (UTHM) (ELECTRICAL, 12)
56309	OOI ZHI JIANG	BE HONS (UTHM) (ELECTRICAL, 12)
54566	POVANESAN A/L LOGANATHAN	B.E.HONS.(UTHM) (ELECTRICAL, 11)
56310	PUVANENDRAN A/L RENGASAMY	BE HONS (UTHM) (ELECTRICAL, 12)
56311	RAHAYU BINTI JAMALUDIN	BE HONS (UTHM) (ELECTRICAL, 12)
56312	ROSLIZA BINTI MOHAMAD ZIN	BE HONS (UTHM) (ELECTRICAL, 12)
54217	ROZEMAN BIN HASSAN	B.E.HONS.(UNISEL) (ELECTRICAL, 07)
56313	SADEQ ALI QASEM MOHAMMED	BE HONS (UTHM) (ELECTRICAL, 12)
56314	SANMARKAM A/L DHANA SIGH	BE HONS (UTHM) (ELECTRICAL, 12)
56315	SATHYBABU PAIDUTHALY	BE HONS (UTHM) (ELECTRICAL, 12)
56316	SHAHRUL ATIQAH BINTI ABDUL RAZAK	BE HONS (UTHM) (ELECTRICAL, 12)
54532	SHALIZAN BIN KADIR	B.E.HONS.(UMS) (ELECTRICAL & ELECTRONICS, 01)
54333	SHAMSOLNIZAM BIN ARIFFIN	B.E.HONS.(UiTM) (ELECTRICAL, 07)
56317	SHARIFAH NAZATUL NURHAKIMI BINTI SYED MOHAMED SHAHRUDDIN	BE HONS (UTHM) (ELECTRICAL, 12)
55871	SHARINDRAN A/L GOPAL	B.E.HONS.(UNITEN) (ELECTRICAL & ELECTRONICS, 08)
55869	SIAO WEI KIONG, GEORGE	B.E.HONS.(CURTIN) (ELECTRICAL, 05)
56318	SITI ASMA BINTI ZAKIRIA	BE HONS (UTHM) (ELECTRICAL, 12)
56319	SITI AZULAINEY BT MHD ASLAN	BE HONS (UTHM) (ELECTRICAL, 12)
56320	SITI FARHANAH BINTI ZULKIFLI	BE HONS (UTHM) (ELECTRICAL, 12)
54285	SITI FAUZIAH BINTI TOHA @ TOHARA	B.E.HONS.(UTP) (ELECTRICAL & ELECTRONICS, 03) MSC (UPM) (ELECTRONIC SYSTEMS DESIGN, 06)
56321	SITI NOR AKMALIZA BINTI LUTFI	BE HONS (UTHM) (ELECTRICAL, 12)
56322	SITI NURHAFIZAH BINTI ANUAL	BE HONS (UTHM) (ELECTRICAL, 12)
56323	SITI SUWARNI BINTI AWANG	BE HONS (UTHM) (ELECTRICAL, 12)
54221	SUGUNESAN A/L GUNALAN	B.E.HONS.(UNITEN) (ELECTRICAL POWER, 09)
56324	SUHALINA BINTI SELAMAT	BE HONS (UTHM) (ELECTRICAL, 12)
56325	SYLVESTER TIMOTHY JAMES	BE HONS (UTHM) (ELECTRICAL, 12)
56326	TAN CHIN CHUAN	BE HONS (UTHM) (ELECTRICAL, 12)
54222	TAN KOK HENG	B.E.HONS.(UPM) (ELECTRICAL & ELECTRONIC, 11)
56327	TAN MIN HORNG	BE HONS (UTHM) (ELECTRICAL, 12)
55868	TAN POH TOO	B.E.HONS.(UTEM) (ELECTRICAL, 08)
54288	TAY WEI LI	B.E.HONS.(MALAYA) (ELECTRICAL, 05)
55872	TEE PING HONG	B.E.HONS.(UTP) (ELECTRICAL & ELECTRONICS, 11)
55862	TEO TZE KIN, KENNETH	B.E.HONS.(LEICESTER) (ELECTRICAL & ELECTRONIC, 97) MSC (UMS) (ELECTRICAL & ELECTRONICS, 03)
55896	TEOH SZU FERN, ANGELINE	B.E.HONS.(UKM) (ELECTRICAL & ELECTRONIC, 09)
56328	UK RAAI A/P CHEN	BE HONS (UTHM) (ELECTRICAL, 12)
56329	UMMI HANIM BT. MAT NAYAN	BE HONS (UTHM) (ELECTRICAL, 12)
56330	UNGKU NORBAIZURA BT UNGKU MOHD NOOR	BE HONS (UTHM) (ELECTRICAL, 12)
55870	VIMALAN NAMBIER A/L VIJIYAN	B.E.HONS.(UNITEN) (ELECTRICAL, 09)
56331	WADHAH ABDO MOHAMMED AL-ASHWAL	BE HONS (UTHM) (ELECTRICAL, 12)
56332	WAN AZHAR BIN WAN OTHMAN	BE HONS (UTHM) (ELECTRICAL, 12)
56333	WAN IBTISAM BT HAJI WAN OMAR	BE HONS (UTHM) (ELECTRICAL, 12)
56334	WAN MOHD IZWANI BIN WAN YUSUF	BE HONS (UTHM) (ELECTRICAL, 12)
56335	WAN MUHAMAD HANIF B. WAN KADIR	BE HONS (UTHM) (ELECTRICAL, 12)
56336	WONG KENG BONG	BE HONS (UTHM) (ELECTRICAL, 12)
54330	YASMIN BINTI ABDUL WAHAB	B.E.HONS.(UTM) (ELECTRICAL - INSTRUMENTATION &CONTROL, 08)
54565	YEO SIEW KHUN	B.E.HONS.(KUiTTHO) (ELECTRICAL, 05)
54316	YONG CHING LIAN	B.E.HONS.(NOTTINGHAM TRENT) (ELECTRICAL & ELECTRONIC, 08) ME (UNITEN) (ELECTRICAL, 11)
54228	YONG JENN UEI	B.E.HONS.(MMU) (ELECTRICAL, 10)
54360	YOO SHWU JING	B.SC.(ALBERTA) (BIOMEDICAL, 11)
54229	YUSOF BIN KAMARUDDIN	B.E.HONS.(UTM) (ELECTRICAL, 07)
54567	YVETTE SHAAN-LI SUSIAPAN	B.E.HONS.(UTM) (ELECTRICAL, 06) ME (UTM) (ELECTRICAL, 08)
56337	ZAINAB BINTI ABU RAIRAH	BE HONS (UTHM) (ELECTRICAL, 12)
ELECTRONIC ENGINEERING		
54561	AHMAD ZURIYADI BIN PAWZI	B.E.HONS.(UTM) (ELECTRICAL - ELECTRONICS, 09)
54212	ALESTER G JAKUIL	B.E.HONS.(KUiTTHO) (ELECTRICAL, 03)
54583	ARFAH SYAHIDA BINTI MOHD NOR	B.E.HONS.(UTM) (ELECTRONIC, 09)
55874	ASYRAF BIN MD. ARIFPIN	B.E.HONS.(UTM) (ELECTRICAL- ELECTRONICS, 03)
54318	CHANG HOW PHENG	B.E.HONS.(LEICESTER) (CIVIL, 99)
54278	CHIN KEN LEONG	B.SC.HONS.(UTM) (ELECTRICAL, 99)
54205	DANIEL KIMBIN	B.E.HONS.(KUiTTHO) (TELECOMMUNICATION, 06)
54582	EZREEN FARINA BINTI SHAIR	B.E.HONS.(UTM) (ELECTRONIC, 09)
54210	GO YUN II	B.E. HONS.(UTM) (ELECTRICAL - TELECOMMUNICATIONS, 02) MSC (UPM) (COMMUNICATIONS & NETWORK, 05)
54281	HAZIZUL BIN MOHAMED	B.E.HONS.(KUiTTHO) (ELECTRICAL, 04)
54344	HOON TAI LIANG	B.E.HONS.(MMU) (ELECTRONICS, 03)
54537	ISHAK BIN TAMAN	B.SC.HONS.(UTM) (ELECTRICAL, 98)
54585	IZADORA BINTI MUSTAFFA	B.E.HONS.(UTM) (ELECTRONIC, 00)
54558	JAYAKUMARAN A/L KANNEN	B.E.HONS.(KUiTTHO) (ELECTRICAL, 03)
54214	JUWAIRIYYAH BINTI ABDUL RAHMAN	B.E.HONS.(UiTM) (ELECTRICAL, 01)
55829	KANNAN A/L SENDRASARAN	B.E.HONS.(UCSI) (ELECTRONIC, 09)
54560	KUMERESAN A/L DANAPALASINGAM	B.E.HONS.(UTM) (ELECTRICAL, 03) ME (UTM) (ELECTRICAL, 06) PHD (AALBORG) (ELECTRICAL & ELECTRONIC10)
54562	LEE WE LIANG	B.E.HONS.(MMU) (ELECTRONICS, 10)
54592	MAI MARIAM BINTI MOHAMED AMINUDDIN	B.E.HONS.(USM) (ELECTRICAL & ELECTRONIC, 01)
55897	MAISARAH BINTI AWANG	B.E.HONS.(UTM) (ELECTRICAL, 07)
54349	MALARVILI A/P BALA KRISHNAN	B.E.HONS.(UTM) (ELECTRICAL - ELECTRONICS, 02)
54206	MD LUTHFFI BIN MD RAMDAN	B.E.HONS.(UTM) (ELECTRICAL - ELECTRONICS, 09)
54563	MOHAMAD SHAHIR BIN MOHAMAD HASAN	B.E.HONS.(USM) (ELECTRONICS, 08)
54277	MOHD AZHAR BIN ABDUL RAZAK	B.E.HONS.(UTM) (ELECTRICAL - ELECTRONICS, 03) MSC (SURREY) (BIOMEDICAL, 05)
54533	MOHD FAUZI BIN ALIAS	B.E.HONS.(USM) (ELECTRONIC, 06) MSC (USM) (ELECTRICAL & ELECTRONICS, 10)
54598	MOHD HAFIZ BIN ZAINUDIN	B.SC.HONS.(ILLNOIS) (ELECTRICAL, 08)
54209	MOHD HISYAM BIN MOHD ARIFF	B.E.HONS.(UiTM) (ELECTRICAL, 06) ME (UTHM) (ELECTRICAL, 09)
54536	MOHD NASRI BIN HASHIM	B.E.HONS.(UTEM) (ELECTRONICS, 07)
54584	MOHD SAFIRIN BIN KARIS	B.E.HONS.(UTM) (ELECTRONIC, 09)
54204	MOHD YASSIN BIN MOHD IBRAHIM	B.E.HONS.(UTM) (COMPUTER, 10)
54535	MOHD. RIZWAN BIN AHMAD	B.E.HONS.(KUiTTHO) (ELECTRICAL, 06)
54327	MUHAMMAD ASYRAF BIN AZMAN	B.E.HONS.(UTM) (ELECTRICAL - MECHATRONICS, 11)
54611	MUSTAFFA BIN DIN	B.E.HONS.(UKM) (ELECTRICAL & ELECTRONICS, 02)
55895	NG CHET SHEN, VINCENT	B.E.HONS.(UTAR) (ELECTRONIC, 08)
54282	NOR AIZILA BINTI GOREP	B.E.HONS.(KUiTTHO) (ELECTRICAL, 03)
54329	NU'MAN DIN BIN MUSTAFA	B.E.HONS.(UTM) (ELECTRICAL - MECHATRONICS, 11)
54559	NUR IZZATI ILIYES	B.E.(VANDERBILT) (ELECTRICAL, 10)
54280	NURHANUM BINTI OMAR	B.E.HONS.(KUiTTHO) (ELECTRICAL, 06)
54534	ONG TEE SAY	B.E.HONS.(UNIMAP) (ELECTRONIC, 11)
54608	POVENESAN A/L KRISHNAN MUTHI	B.E.HONS.(MMU) (ELECTRONICS, 05)
54213	PRAKAS A/L GOPAL SAMY	B.E.HONS.(UTHM) (ELECTRICAL, 10)
55867	PRAVEEN A/L SUDANANTHAN	B.E.HONS.(MMU) (ELECTRONIC, 10)
55873	RENGIAH A/L SINNATHAMBY	B.E.HONS.(UTM) (ELECTRICAL, 06)
54314	RUBITA BINTI SUDIRMAN	B.SC.HONS.(TULSA) (ELECTRICAL, 94) MSC (TULSA) (ELECTRICAL, 96) PHD (UTM) (ELECTRICAL, 08)
54538	RUZAINI BINTI ABD RAZAK	B.E.HONS.(UTM) (ELECTRICAL, 07)
54207	SUHAIRI RIZUAN BIN CHE AHMAD	B.E.HONS.(UNIMAP) (INDUSTRIAL ELECTRONIC, 09)
54539	SYAZLINA BINTI SHAMSUDIN	B.E.HONS.(UIAM) (ELECTRONICS, 10)
55828	SYED AIZAT BIN SYED ABDUL RAHMAN	B.E.HONS.(MMU) (ELECTRONIC, 11)

MEMBERSHIP

ADMISSION TO THE GRADE OF GRADUATE

M'ship No.	Name	Qualifications
54211	WAN MOHAMMED RAIS BIN JAMALUDIN	B.E.HONS.(UiTM) (ELECTRICAL, 04)
54291	WAN NUR AFIZA BINTI WAN ANUAR	B.E.HONS.(UTM) (BIMEDICAL, 10)
54312	ZAHARI BIN AWANG AHMAD	B.SC.(KENTUCKY) (ELECTRICAL, 94) ME (UTM) (ELECTRICAL - COMPUTER & MICROELECTRONIC SYSTEM, 10)
54586	ZAHRILADHA BIN ZAKARIA	B.E.HONS.(UTM) (ELECTRONIC, 98) ME (UTM) (ELECTRONIC, 04)
54208	ZAN AIZUWAN BIN ZAINAL ABIDIN	B.E.HONS.(KUiTTHO) (ELECTRICAL, 03)

ENVIRONMENTAL ENGINEERING

54350	NOR KHADIJAH BINTI SHARIAT	B.E.HONS.(MALAYA) (ENVIRONMENT, 05)
55843	TJIN SIEW PING	B.E.HONS.(MALAYA) (ENVIRONMENTAL, 05)
54547	TURSINA BINTI ABD RASHID	B.SC.HONS. (JOHNS HOPKINS) (ENVIRONMENTAL, 06)

FOOD AND PROCESS ENGINEERING

55842	ASNAWI BIN SHAHAR	B.E.HONS.(UPM) (FOOD & PROCESS, 10)

MANUFACTURING ENGINEERING

54251	AHMAD NIZAM BIN ALIAS	ME (UPM) (INNOVATION & ENGINEERING DESIGN, 12) B.E.HONS. (NOTTINGHAM) (DESIGN INTEGRITY - MANUFACTURE & MATERIALS, 09)
55844	FADLY JASHI DARSIVAN	B.E.HONS.(UIAM) (MANUFACTURING, 98)
54250	FADZLEE BIN MA'SIT	B.E.HONS.(MALAYA) (MANUFACTURING, 09)
55884	LYE KEAN CHIONG	B.E.HONS.(MALAYA) (MANUFACTURING, 11)
54249	MEERA A/P VAJAINDRAN	B.E.HONS.(UNIMAP) (MANUFACTURING, 09)
54543	MOHAMMAD HARITH BIN AMLUS	B.E.HONS.(UTEM) (MANUFACTURING, 08)
55839	MOHD KHAIRUDIN BIN SAIDINA OMAR	B.E.HONS.(UNIMAP) (MANUFACTUTING, 11)
54542	MOHD SHAHRIL BIN AHMAD FAUZI	B.E.HONS.(UTEM) (MANUFACTURING, 10)
54549	MUHAMAD HUSAINI BIN ABU BAKAR	B.E.HONS.(USM) (MANUFACTURING, 07)
54581	REZA MAHMOODIAN	B.SC.(ISLAMIC AZAD UNI) (INDUSTRIAL, 04) ME (UM) (MANUFACTURING, 10)
54576	YEW MING KUN	B.E.HONS.(MALAYA) (MANUFACTURING, 08)
54252	ZULFADLI BIN GHANI	B.E.HONS.(UTEM) (MANUFACTURING PROCESS, 11)

MATERIALS ENGINEERING

54540	HEAH CHENG YONG	B.E.HONS.(UNIMAP) (MATERIALS, 10)
54320	MOHD AS-SHIDDIQUE BIN MOHD FAUZI	B.E.HONS.(UIAM) (MATERIALS, 11)
55838	MOHD FARIZ BIN AB RAHMAN	B.E.HONS.(UNIMAP) (MATERIAL, 10)
54541	MOKHZANI KHAIR BIN ISHAK	B.E.HONS.(UNIMAP) (MATERIALS, 07)
54587	TOIBAH BINTI ABD. RAHIM	B.E.HONS.(UIAM) MATERIALS, 07)
54577	YEW MING CHIAN	B.E.HONS.(MALAYA) (MATERIALS, 08)

MECHANICAL ENGINEERING

54265	ABDUL MALIK BIN SURDI ROSLAN	B.E.HONS.(UTP) (MECHANICAL, 10)
54254	ABDUL RAFEQ BIN SALEMAN	B.E.HONS.(UKM) (MECHANICAL, 08)
54295	ABU HANIPAH BIN NAWI	B.E.(YAMAGATA) (MECHANICAL, 93) ME (YAMAGATA) (MECHANICAL SYSTEM, 95)
54518	AHMAD FAIZAL BIN SALLEH	B.E.(NAGOYA) (MECHANICAL, 98) ME (UTM) (MECHANICAL, 06) PHD (MIE) (SYSTEM, 12)
56338	AHMAD SYUKRI BIN KASIM	BE HONS (UTHM) (MECHANICAL, 12)
56339	AHMADI BIN AHMAD	BE HONS (UTHM) (MECHANICAL, 12)
56340	AIMI ASRINI BINTI JEMURI	BE HONS (UTHM) (MECHANICAL, 12)

ADMISSION TO THE GRADE OF GRADUATE

M'ship No.	Name	Qualifications
56341	AKMALUDDIN BIN YUNOS	BE HONS (UTHM) (MECHANICAL, 12)
54270	AMMAR SYAFIQ BIN GHAZALI	B.E.(CANTERBURY) (MECHANICAL, 11)
56342	ANAS BIN ABDUL HALIM	BE HONS (UTHM) (MECHANICAL, 12)
54273	ARMAN BIN ALIAS	B.E.HONS.(UTM) (MECHANICAL, 11)
55900	ARULKARTHIGEYAN A/L ARULMUGAM @ ARUMUGAM	B.E.HONS.(UNISEL) (MECHANICAL, 09)
56343	ARUN A/L RAJENDRAN	BE HONS (UTHM) (MECHANICAL, 12)
55858	ASRUL BIN ALI	B.E.HONS.(MALAYA) (MECHANICAL, 02)
54272	AZIM BIN AZMI	B.E.HONS.(UTM) (MECHANICAL, 10)
54257	AZLIANA BINTI YAHYA	B.E.HONS.(UTM) (MECHANICAL, 09)
55851	AZRI BIN ASMON	B.E.HONS.(UNITEN) (MECHANICAL, 08)
54268	AZRIE SHAM RIZAL BIN AWANG	B.E.HONS.(UTM) (MECHANICAL - AUTOMOTIVE, 07)
56344	BAINUN AKMAL BINTI MOHD ATAN	BE HONS (UTHM) (MECHANICAL, 12)
54336	BEH JOO LEONG	B.E.HONS.(MMU) (MECHANICAL, 11)
56345	BOBBY ANAK JOHN	BE HONS (UTHM) (MECHANICAL, 12)
54253	BUGLIE ANAK LAWRENCE NANU	B.E.HONS.(UTM) (MECHANICAL - AUTOMOTIVE, 06)
56445	CHE ZAHANUZI BIN BAHANUDDIN	BE HONS (UTHM) (MECHANICAL, 12)
56346	CHE ZAIRUL HAKIMI BIN CHE AB GHANI	BE HONS (UTHM) (MECHANICAL, 12)
55892	CHEE MUN FAI, KEVIN	B.E.HONS.(UTM) (MECHANICAL, 09)
55891	CHIN CHEE CHOONG	B.E.HONS.(UNITEN) (MECHANICAL, 05)
56347	CYRIL TENG YI LERN	BE HONS (UTHM) (MECHANICAL, 12)
56348	DARWIS BIN LABARONKO	BE HONS (UTHM) (MECHANICAL, 12)
54525	ESWARAN A/L BALAKRISHNAN	B.E.HONS.(UNIMAS) (MECHANICAL, 09)
54510	FAIT BIN HANAPI	B.E.HONS.(UiTM) (MECHANICAL, 06)
55856	FAZIDAH BINTI SAAD	B.E.HONS.(USM) (MECHANICAL, 01) MSC (IIUM) (AUTOMOTIVE, 11)
55852	GAN SAU LIANG	M.E.HONS.(NOTTINGHAM) (MECHANICAL, 11)
56349	GOH CHUN SHIAN	BE HONS (UTHM) (MECHANICAL, 12)
56350	HANIF NUR BIN NGAMIDON	BE HONS (UTHM) (MECHANICAL, 12)
56351	HEMARANI A/P DORAIRAJU	BE HONS (UTHM) (MECHANICAL, 12)
54550	HEW JIAN JUN	M.E.HONS.(IMPERIAL COLL) (MECHANICAL, 11)
56352	HISHAMUDDIN BIN HASBULLAH	BE HONS (UTHM) (MECHANICAL, 12)
54335	HONG KWANG SIONG, ATHANASIUS	B.E.HONS.(UTHM) (MECHANICAL, 09)
55853	HOUNG KING HOW	B.E.HONS.(MONASH) (MECHANICAL, 12)
54594	IRFAN BIN MD GHAZALY	B.SC.(HANYANG) (MECHANICAL, 10) ME (UKM) (MECHANICAL, 11)
56353	ISMAIL BIN MAT ARSHAT	BE HONS (UTHM) (MECHANICAL, 12)
56354	ISMAIL BIN ROSLAN	BE HONS (UTHM) (MECHANICAL, 12)
56355	IZZAT IZZUAN BIN ISMAIL	BE HONS (UTHM) (MECHANICAL, 12)
54517	JASON WILLIAM VITALES	B.E.HONS.(KUiTTHO) (MECHANICAL, 04)
56356	KAVIARASAN A/L MURUGAYA	BE HONS (UTHM) (MECHANICAL, 12)
56357	KHAIRIL BIN CHE MAT	BE HONS (UTHM) (MECHANICAL, 12)
54262	KHAIRUL AZHAR BIN MAT DAUD	B.SC.HONS.(UTM) (MECHANICAL, 98)
55859	KHAIRUL FADZLI BIN SAMAT	B.E.HONS.(UTM) (MECHANICAL, 09)
56358	KHAIRUL IDHAM BIN MOHSIN	BE HONS (UTHM) (MECHANICAL, 12)
55898	KHAIRUL IZHAM BIN MUSA	M.E.HONS.(NOTTINGHAM) (MECHANICAL, 10)
56359	KOH CHOON WEI	BE HONS (UTHM) (MECHANICAL, 12)
56360	KUGANESH A/L SANKARAN	BE HONS (UTHM) (MECHANICAL, 12)
54302	LEE CHIH YONG	B.SC.HONS.(STATE UNI OF NEW YORK, BUFFALO) (MECHANICAL, 11)
54309	LEE WEI MING	B.SC.(CALIFORNIA STATE UNI) (MECHANICAL, 10)

ADMISSION TO THE GRADE OF GRADUATE

M'ship No.	Name	Qualifications
54516	LEE WEI TECK, THOMAS	B.E.HONS.(MALAYA) (MECHANICAL, 06)
56361	LIANA NABILA BINTI MOHD SHAH	BE HONS (UTHM) (MECHANICAL, 12)
55855	LIM YEE TAT	B.E.HONS.(UPM) (MECHANICAL, 08)
55899	LIYANA AFIQAH BINTI ABDUL RAZAK	B.E.HONS.(UTP) (MECHANICAL, 11)
56446	LOH CHUN CHIA	BE HONS (UTHM) (MECHANICAL, 12)
54301	LOW AI LING, KIMBERLY	M.E.HONS.(BIRMINGHAM) (MECHANICAL, 09)
55893	LOW YOKE WAI	B.E.HONS.(MMU) (MECHANICAL, 10)
56362	MAK WAI LOON	BE HONS (UTHM) (MECHANICAL, 12)
56363	MARTINUS MITAN	BE HONS (UTHM) (MECHANICAL, 12)
56364	MARZILAH BINTI YAACOB	BE HONS (UTHM) (MECHANICAL, 12)
54300	MASDI BIN MUHAMMAD	B.SC.(LEHIGH) (MECHANICAL, 91) MSC (LEHIGH) (MANUFACTURING SYSTEMS, 92)
54553	MAZWAN BIN SAID	B.E.HONS.(UTM) (MECHANICAL, 00)
56447	MIOR HILMI BIN ADZHAR	BE HONS (UTHM) (MECHANICAL, 12)
56365	MOHAMAD AKHMAL B. JAHIDIN	BE HONS (UTHM) (MECHANICAL, 12)
54522	MOHAMAD AZIZAN BIN KAMARUDDIN	B.SC.HONS.(UTM) (MECHANICAL, 98)
56366	MOHAMAD AZMIL BIN MOHD ZAINUN	BE HONS (UTHM) (MECHANICAL, 12)
55835	MOHAMAD FAIZAL BIN MALEK	B.E.HONS.(UPM) (MECHANICAL, 00)
54521	MOHAMAD FARIS BIN MOHAMAD ZAKI	B.E.HONS.(UTM) (MECHANICAL, 09)
56367	MOHAMAD FIKRI B. MD YUSOF	BE HONS (UTHM) (MECHANICAL, 12)
56368	MOHAMAD IZUAN BIN KAMARUZAMEND	BE HONS (UTHM) (MECHANICAL, 12)
54255	MOHAMAD SHUKRI BIN MOHD ZAIN	B.E.HONS.(UTM) (MECHANICAL - MANUFACTURING, 00)
56369	MOHAMED ASHRAF BIN SHAIK MOHAMED	BE HONS (UTHM) (MECHANICAL, 12)
56370	MOHAMED AZMIE BIN ABDULLAH	BE HONS (UTHM) (MECHANICAL, 12)
56371	MOHAMMAD TAUFEK BIN ROSLEE	BE HONS (UTHM) (MECHANICAL, 12)
54606	MOHD ABDUL AZEM BIN MUSTAPHA	B.E.HONS.(UTM) (MECHANICAL, 11)
56372	MOHD ADIB BIN PAUZI	BE HONS (UTHM) (MECHANICAL, 12)
56373	MOHD ALI AZHAR BIN ABD HALID	BE HONS (UTHM) (MECHANICAL, 12)
54352	MOHD AMAR BIN RAJA ARIFFIN	B.E.HONS.(CANTERBURY) (MECHANICAL, 08)
54613	MOHD ARIF ANUAR BIN MOHD SALLEH	B.E.HONS.(KUiTTHO) (MECHANICAL, 06)
56374	MOHD AZREEN BIN ABDULLAH	BE HONS (UTHM) (MECHANICAL, 12)
56375	MOHD AZRUL BIN MD SHAMSUDDIN	BE HONS (UTHM) (MECHANICAL, 12)
54593	MOHD BASRI BIN ALI	B.E.HONS.(UPM) (MECHANICAL, 96)
55889	MOHD EDHZUAN BIN ARBANGAI	B.E.HONS.(KUiTTHO) (MECHANICAL, 06)
56376	MOHD FAHMI BIN OTHMAN	BE HONS (UTHM) (MECHANICAL, 12)
56377	MOHD FAIZ BIN ROSMIN	BE HONS (UTHM) (MECHANICAL, 12)
56448	MOHD FAKRUL ROZY BIN MOHAMAD ZAHAM	BE HONS (UTHM) (MECHANICAL, 12)
56378	MOHD FARHAN BIN HUSIN	BE HONS (UTHM) (MECHANICAL, 12)
54515	MOHD FARIZZAL BIN DOLAH MUHAMAD	B.E.HONS.(KUiTTHO) (MECHANICAL, 03)
56379	MOHD FIRDAUS BIN AZAM	BE HONS (UTHM) (MECHANICAL, 12)
56449	MOHD FIRDAUS BIN ZAKARIA	BE HONS (UTHM) (MECHANICAL, 12)
56380	MOHD FITRI BIN MOHD JAMIL	BE HONS (UTHM) (MECHANICAL, 12)
56381	MOHD HADI BIN ISMAIL	BE HONS (UTHM) (MECHANICAL, 12)
54520	MOHD JAZMIE BIN CHE RAHIM	B.E.(KOREA UNI) (MECHANICAL, 07)
54602	MOHD JUZAILA BIN ABD LATIF	B.E.HONS.(PLYMOUTH) (MECHANICAL, 97)
56382	MOHD KHAIRIL ANBIA BIN CHI ADAM	BE HONS (UTHM) (MECHANICAL, 12)
56383	MOHD KHAIRIL BIN ANUA	BE HONS (UTHM) (MECHANICAL, 12)
56384	MOHD KHAIRUDDIN BIN NAWI	BE HONS (UTHM) (MECHANICAL, 12)

ADMISSION TO THE GRADE OF GRADUATE

M'ship No.	Name	Qualifications
56385	MOHD KHAIRUL ANWAR BIN MOHAMMAD	BE HONS (UTHM) (MECHANICAL, 12)
55904	MOHD KHAIRUL IZZAT BIN ALWI	B.E.HONS.(UTEM) (MECHANICAL, 08)
56386	MOHD LOKMAN BIN MOHAMAD ZAIN	BE HONS (UTHM) (MECHANICAL, 12)
54605	MOHD MAHFUZ BIN MOH ZAID@ MD ZAID	B.E.HONS.(UTM) MECHANICAL, 10)
56387	MOHD MUSTAQIM BIN ABDUL NAJIR	BE HONS (UTHM) (MECHANICAL, 12)
55848	MOHD NAJIB BIN ROSELI	M.E.HONS.(UMIST) (MECHANICAL, 07)
54307	MOHD NUR AZMI BIN NORDIN	B.E.(YAMAGUCHI) (MECHANICAL, 08) ME (YAMAGUCHI) (MECHANICAL, 10)
55890	MOHD NURHADI BIN ARIFIN	B.E.HONS.(UTP) (MECHANICAL, 09)
56388	MOHD SALMAN BIN SHAFIE	BE HONS (UTHM) (MECHANICAL, 12)
56450	MOHD SHAFIK BIN AHMAD SAFAIE	BE HONS (UTHM) (MECHANICAL, 12)
56389	MOHD SHAFIQ BIN ALIP	BE HONS (UTHM) (MECHANICAL, 12)
56390	MOHD SHAFIQ BIN ZOLKARNAIN	BE HONS (UTHM) (MECHANICAL, 12)
54267	MOHD SHASRUL SYAFIQ BIN MOHAMAD SHARIP	B.E.HONS.(UTEM) (MECHANICAL-DESIGN & INNOVATION, 09)
56391	MOHD SYAHIR BIN RAMLEE	BE HONS (UTHM) (MECHANICAL, 12)
54351	MOHD YANI BIN MOHD NOR	B.E.HONS.(MALAYA) (MECHANICAL, 09)
54513	MOHD YUSRI @ ZULFIKI BIN MOHD YUSOF	B.E.HONS.(USM) (MECHANICAL, 02)
56392	MOHD ZAIDI BIN ARSAT	BE HONS (UTHM) (MECHANICAL, 12)
56393	MOHD ZAMREE BIN SININ	BE HONS (UTHM) (MECHANICAL, 12)
54306	MOHD ZHARIQ BIN MAT ISA	B.E.HONS.(AUCKLAND) (MECHANICAL, 11)
56394	MOHD ZULFAHMIE BIN HARUN	BE HONS (UTHM) (MECHANICAL, 12)
56395	MOHD ZULHASYREE BIN MOHD ZULKIFLI CHENG	BE HONS (UTHM) (MECHANICAL, 12)
56396	MOHD. FITRI BIN WANGGUH	BE HONS (UTHM) (MECHANICAL, 12)
54296	MUHAIZAT BIN MAHUDIN	B.E.HONS.(UMP) (MECHANICAL, 07)
56397	MUHAMAD HANIF BIN ADNAN	BE HONS (UTHM) (MECHANICAL, 12)
56398	MUHAMAD HISHYAM BIN HAMZA	BE HONS (UTHM) (MECHANICAL, 12)
54266	MUHAMAD KHALIS BIN RAMLI	B.E.HONS.(UTEM) (MECHANICAL-DESIGN & INNOVATION, 09)
56399	MUHAMMAD AZAN BIN GHANI	BE HONS (UTHM) (MECHANICAL, 12)
56451	MUHAMMAD AZLAN BIN BAKAR	BE HONS (UTHM) (MECHANICAL, 12)
54545	MUHAMMAD FAIZ BIN AUSPAN	B.E.HONS.(MALAYA) (MECHANICAL, 10)
54334	MUHAMMAD FIKRI BIN KHAIRUDDIN	B.E.HONS.(UTM) (MECHANICAL-INDUSTRIAL, 09)

ADMISSION TO THE GRADE OF GRADUATE

M'ship No.	Name	Qualifications
56400	MUHAMMAD FIRDAUS BIN CHAMARI	BE HONS (UTHM) (MECHANICAL, 12)
56401	MUHAMMAD HAFIZUDDIN B MOHD DAUD	BE HONS (UTHM) (MECHANICAL, 12)
56402	MUHAMMAD HAIRI BIN A. HAMID	BE HONS (UTHM) (MECHANICAL, 12)
56452	MUHAMMAD IRSYAD BIN IBRAHIM	BE HONS (UTHM) (MECHANICAL, 12)
54509	MUHAMMAD KHALIL BIN ABDULLAH @ HARUN	B.E.HONS.(USM) (MECHANICAL, 04) MSC (MECHANICAL, 07)
56403	MUHAMMAD NAQIUDDIN BIN ALIAS	BE HONS (UTHM) (MECHANICAL, 12)
54356	MUHAMMAD RIDHUAN BIN AHMAD KHAIRI	B.E.HONS.(UPNM) (MECHANICAL, 11)
55836	MUHAMMAD SAIFULLAH BIN HJ MUHAMAD JUHARI	B.E.HONS.(NEW SOUTH WALES) (MECHANICAL, 12)
56453	MUHAMMAD SHAHFIRUL BIN MAT ALI	BE HONS (UTHM) (MECHANICAL, 12)
56404	MUHAMMAD SYAZANI B MOHD YUSOFF	BE HONS (UTHM) (MECHANICAL, 12)
56405	MUHAMMAD SYAZWAN BIN AZMI	BE HONS (UTHM) (MECHANICAL, 12)
56406	MUHD AFFAN BIN MOHMAD	BE HONS (UTHM) (MECHANICAL, 12)
55849	MUHSIN BIN MOHD AMIN	B.E.HONS.(MALAYA) (MECHANICAL, 11)
54343	NADZIM AL-RASH BIN PUTIT	B.E.HONS.(CURTIN) (MECHANICAL, 12)
56407	NAJIBAH BINTI AB LATIF	BE HONS (UTHM) (MECHANICAL, 12)
55837	NG CHENG JOON	B.E.(MELBOURNE) (MECHANICAL, 11)
54260	NG SWEE HENG	B.E.HONS.(UPM) (MECHANICAL, 06)
56408	NIWAT A/L FROOM	BE HONS (UTHM) (MECHANICAL, 12)
54256	NOH BIN ZAINAL ABIDIN	B.E.HONS.(UTM) (MECHANICAL-MARINE TECHNOLOGY, 10)
56409	NOOR IZZATIE HUSNA BINTI NOOR RAHMAN	BE HONS (UTHM) (MECHANICAL, 12)
56410	NOOR QURATUL AINE ADNAN	BE HONS (UTHM) (MECHANICAL, 12)
56411	NOR AMIRAH BINTI ABD SAHAMAD	BE HONS (UTHM) (MECHANICAL, 12)
56412	NOR HAZWANI BINTI ABDULLAH	BE HONS (UTHM) (MECHANICAL, 12)
55860	NOR HISHAM BIN SULAIMAN	B.E.HONS.(UTM) (MECHANICAL, 09)
54319	NOR ILHAM BINTI AZMAN	DIP.ING. (FACHHOCHSCHULE BINGEN) (MECHANICAL, 10)
56413	NUR ASYIKIN BINTI TOMI	BE HONS (UTHM) (MECHANICAL, 12)
55833	NUR AZIATUL SAFINAR BINTI ALI	B.E.HONS.(UTM) (MECHANICAL, 10)
56414	NURADHIHA BINTI AMER	BE HONS (UTHM) (MECHANICAL, 12)
56415	NURAINI BINTI MHD NOOR	BE HONS (UTHM) (MECHANICAL, 12)

ADMISSION TO THE GRADE OF GRADUATE

M'ship No.	Name	Qualifications
54269	NURFARIZAL BIN RASID	B.E.HONS.(UiTM) (MECHANICAL, 04)
56454	NURRUL RAHMAH BINTI MOHD YUSOFF	BE HONS (UTHM) (MECHANICAL, 12)
54526	OOI BENG HOE	B.E.HONS.(UTM) (MECHANICAL, 07)
54259	OOI SHAO YIN	B.E.HONS.(UNIMAS) (MECHANICAL & MANUFACTURING, 11)
56416	PEROWANSA BIN PARUKA	BE HONS (UTHM) (MECHANICAL, 12)
54258	PETRUS BIN BANATI @ FAZZERIUS	B.E.HONS.(KUiTTHO) (MECHANICAL, 04)
56417	RADIN KHAIRUL FARAH BINTI RADIN KAMARUDDIN	BE HONS (UTHM) (MECHANICAL, 12)
56418	RAHMAH WATI BINTI OMAR	BE HONS (UTHM) (MECHANICAL, 12)
56419	RAHMAT JAINI BIN SALLEH	BE HONS (UTHM) (MECHANICAL, 12)
56420	RODZILLA BINTI YAHYA SHARAFUDDIN	BE HONS (UTHM) (MECHANICAL, 12)
56421	ROHANA BINTI MOHD SALLEH	BE HONS (UTHM) (MECHANICAL, 12)
56422	ROSLINDA BINTI SUFARMAN	BE HONS (UTHM) (MECHANICAL, 12)
56423	SAIFUL IZWAN BIN ALI	BE HONS (UTHM) (MECHANICAL, 12)
55857	SALVINDER SINGH A/L KARAM SINGH	B.SC.HONS.(UTM) (MECHANICAL, 02) MSC (UTM) (MANUFACTURING, 10)
55861	SHAHIDIN BIN HAMZAH	B.E.HONS.(UTM) (MECHANICAL, 02)
54511	SHAIFUL BATONG	B.E.(UKM) (MECHANICAL, 93)
56424	SITI ASIA BINTI YAHYA	BE HONS (UTHM) (MECHANICAL, 12)
56425	SITI HAMIDAH BINTI MOHAMAD HAIRI	BE HONS (UTHM) (MECHANICAL, 12)
56426	SITI NORSUHAILY BINTI MUHAMMAD NAZRI	BE HONS (UTHM) (MECHANICAL, 12)
56455	SUHAIMI BIN SULAIMAN	BE HONS (UTHM) (MECHANICAL, 12)
54523	SUPA'AT BIN HJ ZAKARIA @ JAWAHIR	B.SC.HONS.(UTM) (MECHANICAL, 02) ME (UTM) (MANUFACTURING, 10)
56427	SYAZWAN FAIZ BIN SABTU	BE HONS (UTHM) (MECHANICAL, 12)
56428	SYED MOHAMAD FAZWAN BIN SYED OMAR	BE HONS (UTHM) (MECHANICAL, 12)
54315	TAN BOON HONG	B.E.HONS.(MELBOURNE) (MECHANICAL & MANUFACTURING, 11)
54524	TAN CHING SEONG	B.E.HONS.(MALAYA) (MECHANICAL, 98)

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 March 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.*

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58th Announcement

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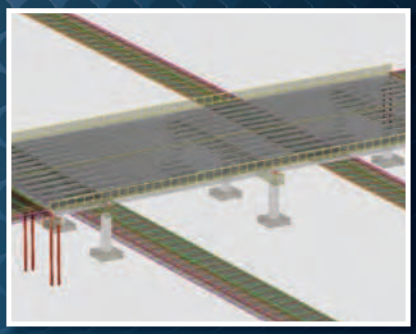
Now available as a standalone product, Power InRoads includes all the powerful capabilities of MicroStation®, along with dynamic 3D modeling functionality, complete mapping tools, and design automation to integrate all project phases, teams, and locations – ensuring your designs are ready for construction, operation, and rehabilitation.

Image courtesy of M.J. Engineering and Land Surveying

Import data from any source – ASCII, LandXML, GPS, survey, LiDAR, point cloud, DEMs, and more.



Integrated design tools simplify complex projects, reduce design time, and ensure accurate 3D information.

Immersive modeling eliminates design errors, decreases project costs, and allows upload to machine control.

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Malaysia
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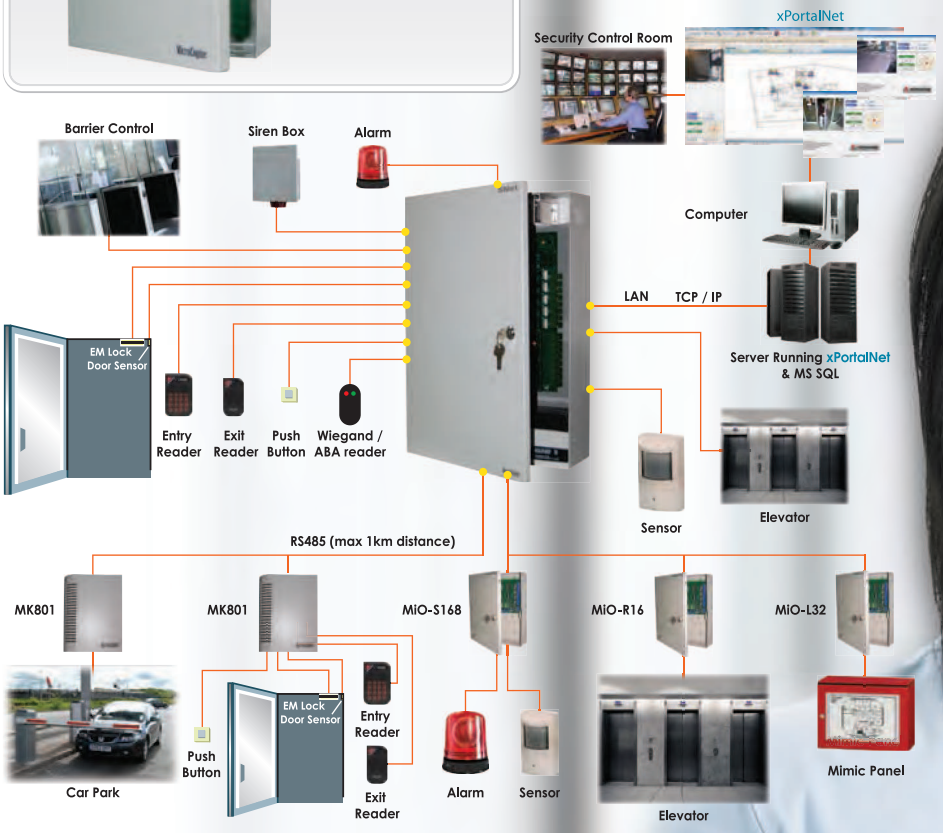

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