VOL. 2014 NO. 6

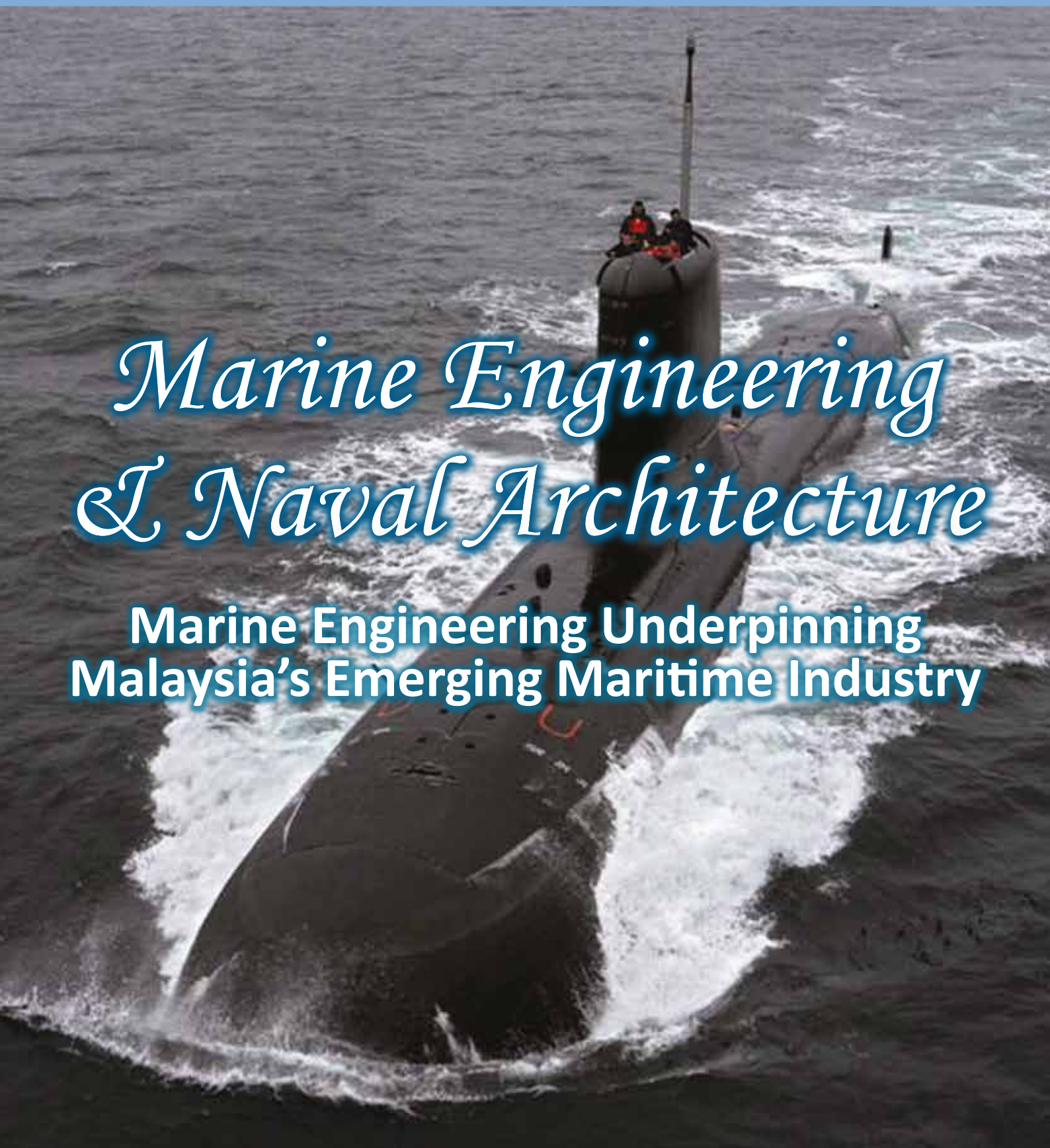
JUNE 2014

JURUTERA

THE MONTHLY BULLETIN OF THE INSTITUTION OF ENGINEERS, MALAYSIA

KDN PP 1050/12/2012 (030192)

ISSN 0126-9909



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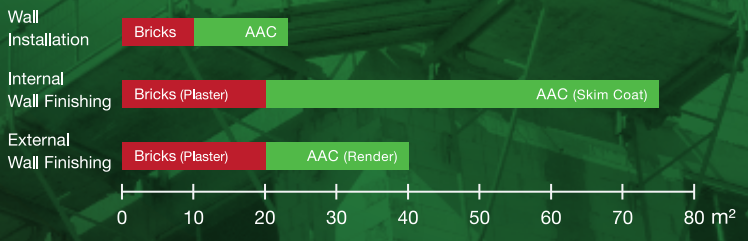

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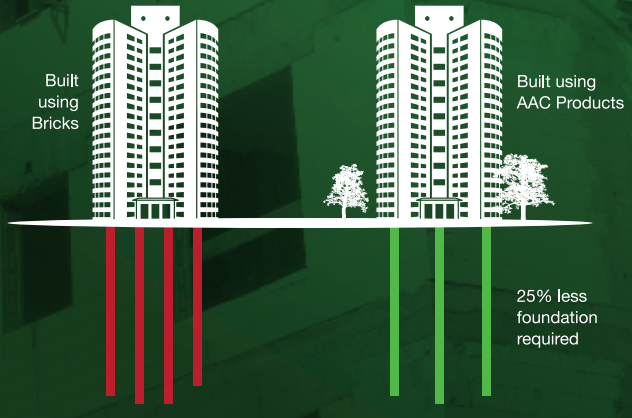

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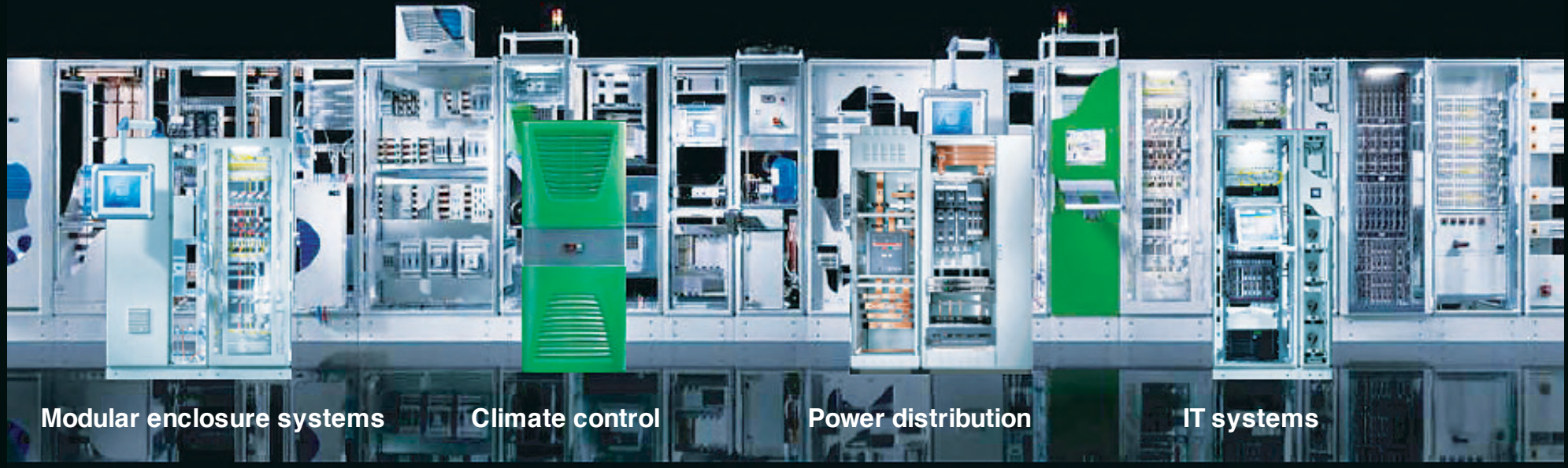

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Number 6, June 2014 IEM Registered on 1 May 1959

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12th International Conference on Concrete Engineering and Technology 2014 (CONCET 2014)
Theme: Concrete Innovations and Its Advanced Developments

12 – 14 August 2014
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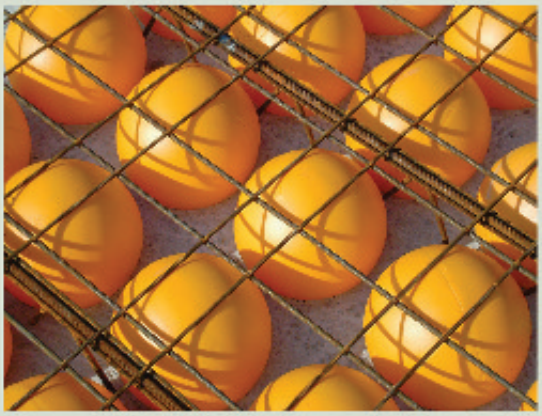

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Printed by
HOFFSET PRINTING SDN. BHD. (667106-V)
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Challenges and Opportunities in Marine Engineering

by ***Captain Ir. Hj. Rani bin Mohd. Raji RMN (Ret)***
Chairman,
Marine Engineering and Naval Architecture Technical Division, IEM

MALAYSIA is a maritime nation with a total boundary of 7,343 km (4,563 miles) of which 4,675 km (or 2,905 miles) is coastline. Maritime activities and the maritime related industries have contributed to our nation's economic growth and their importance has been recognised.

The Straits of Malacca is considered to be one of the choke points of the world, with more than 60,000 ships plying through annually. But while Singapore rides high on its world class reputation as the provider of choice for a broad spectrum of marine services, the Malaysian Marine Engineering Industry has not gained much from it in this competitive market. Shipbuilding and Ship Repair (SBSR) is a very competitive business, in terms of cost and delivery time. With offers of business incentives from their governments, the Philippines and India are expected to rise to become shipbuilding nations of South East Asia.

Here, the Government recently set up the New Economic model through the framework of the Economic Transformation Programme (ETP) to propel Malaysia into being a top world location for offshore and marine engineering manufacturing and service-based operations. This objective is one of the 12 National Key Economic Activities (NKEA) to assure the success of Vision 2020.

For the marine engineering industry, among the Strategic Plans for 2020 are the capture of 3% of the Straits of Malacca repair market, 80% of local new building market and 80% of South China Sea offshore market. The support of the government and added incentives will boost greater confidence and ensure sustainability in the industry.

The SBSR strategic plan 2020 was launched in 2011. The Malaysian Industry-Government for High Technology (MIGHT) helms this initiative, together with the Association of Marine Industries of Malaysia (AMIM). The initiative specifically addresses the SBSR industry with the aim of developing sustainable competitiveness. ■

Captain Ir. Haji Rani (age 67) is currently Chairman of Marine Engineering and Naval Architecture Technical Division (MNATD) of IEM. He was Director of Engineering with the Royal Malaysian Navy and later as Director of Shipbuilding Division at MSE (now known as MMHE).

IEM DIARY OF EVENT

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

2-Day Workshop on Recommended Earthquake Loading Model in the Proposed N.A. to EC 8 for Sabah, Sarawak & Updated Model for Peninsular Malaysia

16 – 17 July 2014
Organised by Civil & Structural Engineering Technical Division. IEM and IEM Technical Committee on Earthquake
Jointly Organised with Standards Malaysia
Time: 9.00 a.m. to 5.30 p.m. (CPD/PDP: 12 hours)
Venue: Armada Hotel Petaling Jaya

Opportunities Aplenty in Maritime Industry

by Ms. CC Tan

LAKSAMANA Madya Tan Sri Dato' Seri Ahmad Ramli bin Haji Mohd Nor retired as Chief of the Royal Malaysian Navy (RMN) in 1999. But he is busier than ever. Not only has he taken on the heavy mantle of Managing Director of Boustead Heavy Industries Corporation (BHIC) Berhad, he is also currently president of the Association of Maritime Industries Malaysia (AMIM), Chairman of the Maritime Institute of Malaysia (MIMA), and Vice-Chairman of the Malaysian Industry-Government Group for High Technology (MIGHT). Here, he shares his thoughts on the maritime industry with ***JURUTERA***.

Q: According to UNCTAD statistics, the volume of international trade carried by sea in this region increases every year. What is the prospect like for the local marine industry?

Tan Sri Dato' Seri Ahmad Ramli: I think the traffic in the Straits of Malacca and the volume of activity in our ports are certainly increasing. If I'm not mistaken, services at our ports has been growing at about 20% annually. This means trade is still very active.

There are lots of opportunities because when the ports are active, there will be a lot of services required, including providing assistance to ships in the form of tugging, repairs and so on. If these are better organised, it will be even better for the ports and the industry as a whole.

Q: Are we – the players in the industry – strategising ourselves well?

Tan Sri Dato' Seri Ahmad Ramli: From my own observation, there's still a lot of room for improvement. We often find that the real players are actually not locals but are from places like Singapore. This is why we have to be more competitive and we have to organise ourselves better.

Q: So is it because we've not been organising ourselves well that foreign players have come in so easily?

Tan Sri Dato' Seri Ahmad Ramli: Yes. As a business, you have to be good and competitive. At the end of the day, it's all about money, which means we have to provide quality services at competitive prices. This will help attract more traffic to the ports too. This is something that we (the industry as a whole) have to push for. Of course, there are also policy issues that must be addressed to encourage the industry to grow.

Q: Would you like to name a few that we should look at?

Tan Sri Dato' Seri Ahmad Ramli: In terms of encouraging the local marine industry, Singapore's tax structure, for example, is more attractive. Here, the tariffs are not so competitive. So local players, especially shipbuilders, are finding it difficult to compete with China or even Singapore. The irony of it is that in Singapore, labour is so much more expensive.

Of course, this is something that both AMIM (Association of Maritime Industries Malaysia), ship owners and, to some extent, MIGHT (Malaysia Industry-Government Group for High Technology) are seeking to improve. Because the issue here is not that the government does not want to do it, but that we have competing interests. So it must be done in such a way that every interest group is balanced and synergised.

Q: So it's got nothing to do with a lack of aggressiveness on the part of the industry players?

Tan Sri Dato' Seri Ahmad Ramli: Put it this way – it's a business venture. Everyone wants to go into business and they have to look at the bottomline. If the environment is such that they find it difficult to compete, they will not invest. That's the issue here. In a way, it's a chicken and egg situation.

Q: In 2011, the Prime Minister launched the Shipbuilding and Ship Repair (SBSR) Industry Strategic Plan 2020. Can you briefly tell us what the plan entails and how much of its target has been achieved?

Tan Sri Dato' Seri Ahmad Ramli: Roughly, we want to capture a big portion of the activities with regard to shipbuilding and shiprepair because of our strategic location. I believe the Straits of Malacca is one of the busiest strait and the biggest too, second only to the English Channel. There is a lot of ship movement and a lot of calls at our ports. We also have activities in offshore oil and gas, as well as regional and local shipping activities. All these require services and ships. Yet, we have not been able to capture a fair share of the shipbuilding and shiprepair (works).

Currently, the oil and gas companies send their vessels to Indonesia, Batam or Singapore and new vessels are commissioned in China. We want to capture 80% of the local shipbuilding. At the same time, we don't want to be competing with the likes of Korea or Japan which build huge vessels. So we're trying to capture the lower-end market, such as vessels around 120m.

We also want to capture some of the international vessels that pass through, for repair and maintenance. So we have to improve our ship repair and maintenance facilities. We also want to capture 2-3% of the international (shipbuilding) market. It's not much but it's still a lot. Currently, we export about RM2 bil (in ships) a year. A lot of ships built in Malaysia are sold overseas, but we think we can do much better. We want to have fair, realistic targets and if we achieve these, we should be able to create about 55,000 jobs in the sector and probably have a turnover (annual) of about RM10 bil. But where we are at the moment? It's not been reviewed yet.

Q: So we don't know what we've achieved so far?

Tan Sri Dato' Seri Ahmad Ramli: On our part, I think we've done quite a bit because we are, shall I say, one of the main players in the industry. This year the government has provided a special allocation of RM3 bil to assist the marine industry, so there is some recognition. Petronas is also giving out a lot more contracts – I won't say these are for long-term, but they're sufficient for shipowners to obtain better facilities from the bank.

Q: Can you suggest some ways to fast track our achievement for this SBSR 2020?

Tan Sri Dato' Seri Ahmad Ramli: The only way is to have a proper understanding of the requirements and at the same time, the government will have to create an environment that will encourage the industry to grow. We're way behind compared to what the Chinese government or even the Singapore government is doing.

In China, banks are very generous to the players who also have very easy access to land for shipyards. There are also incentive schemes for the industry to go overseas.

Similarly, in Singapore, the tax structure is very supportive of the industry. I think this is probably because Singapore realises that, although Finance is now becoming the star-player, it must continue to create a sustainable environment to support the industry as it's one of the busiest ports in the world and a marine hub. This is something where we have to come together – the industry, the government and all the stakeholders.

As mentioned earlier, there are many competing interests in the industry. In shipbuilding for example, there are people who like to monopolise certain activities but this has an impact on the industry. This is where I think all the stakeholders have to harmonise their requirements so that the government can come up with more balanced, friendly policies.

For example, people in Sabah and Sarawak complain that goods there are expensive because we restrict the transporation of goods within the country to Malaysian-flagged-and-owned vessels. But there are countries in the world which have policies that are much more stringent, like the American's Jones Act. We don't necessarily want to copy everything from them; we can see that on one hand, there's this drive towards openness but on the other hand, people are not really as open as they say they are. So for us, the industry has to really harmonise and work towards being more competitive and efficient.

Q: In 2012, the government announced that developing Malaysia as a shipbuilding and ship repair hub will be one of the Entry Point Projects under the Business Services thrust of the National Key Economic Areas (NKEAs). Can you share with us this initiative and its achievements so far?

Tan Sri Dato' Seri Ahmad Ramli: This is peculiar to BHIC because we're one of the companies singled out to champion this activity, particularly in Peninsular Malaysia.

In this programme, we undertake to do various things. For example, we have to come up with our own ability to design a range of vessels. In this case, we want to design offshore support vessels (OSV) for the oil and gas industry because one of our problems is that we don't have a full-fledged design house. So we depend on foreign design houses which would just give us the basic designs.

When it comes to the construction, the details and variations that are needed would only come in bits and pieces, depending on their speed and priority.

We cannot depend solely on these design houses. We have

(Continued on page 9)

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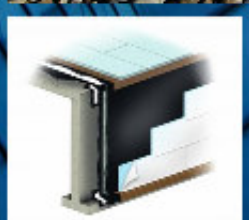

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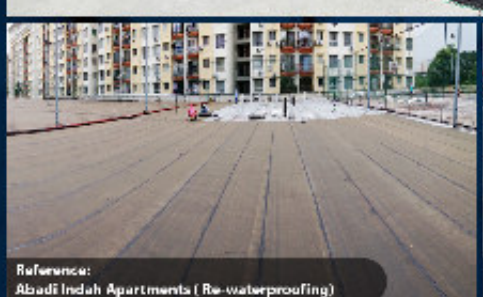

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to build our own. That's why this year, we have to be able to design one OSV and build one by next year. I think we're on track with that. We also have to train a certain number of design naval architects as well as about 100 skilled workers per year. By 2020, we have to create a new GNI (gross national income) of about RM500 million per year, which means that we have to be able to build, export and create jobs.

As for the building part, we need government assistance because many shipowners prefer to go to China which is cheaper. In order to have them commission one to be fully built here, the government must give shipowners incentives, such as a subsidy or some other form of encouragement.

Of course, at the same time, we have to be competitive ourselves. We actually did a rough industry survey and found that we are, in reality, competitive. For example, some shipowners who had tankers built cheaper elsewhere had to spend more later to make the vessels sea-worthy.

Q: Isn't the government aware of the limitations that the industry faces?

Tan Sri Dato' Seri Ahmad Ramli: The government is aware.

Q: Then why is it so slow in responding to the changes in the environment?

Tan Sri Dato' Seri Ahmad Ramli: Everyone's agenda has to be harmonised. For example, shipowners want to buy cheap, but sometimes you don't get what you really want. Some like to build overseas because they get to travel.

As long as everyone's interests are not harmonised, the more active lobbyist will get his way but not necessarily to the interest of the country or the government. If ships are built here there'll be economic spin-offs, but the government is so preoccupied with other things, so unless someone champions the cause... This is why AMIM, MIGHT and, to some extent MIMA, is initiating it. Unfortunately, I am in all three (laughs).

Q: In the 2014 Budget, the government had, as you mentioned earlier, allocated RM3 billion in soft loans under the Maritime Development Fund, through Bank Pembangunan Malaysia. With this, do you foresee any growth in shipbuilding activities?

Tan Sri Dato' Seri Ahmad Ramli: The bank has to be more sympathetic. The money is available but it will be difficult to get if conditions are too stringent.

If, for example, a bank asks for 30% fixed deposit before you can take a loan, that's a big sum of money, especially for vessels in the region of RM30 million. Not many companies have that kind of money, especially shipowners. But of course, banks have to look at the security in getting repayment. So there must be a solution where the owners can get financing while the banks are assured of repayment.

Q: What would you recommend to ensure local shipyards gain the most from this allocation?

Tan Sri Dato' Seri Ahmad Ramli: We have an association, so we communicate all these things to the industry. We encourage players to bid for it and, if they have problems, to give us feedback. So far, we have not received any feedback.

Bank Pembangunan had encountered a bit of bad experience before, so perhaps it's a bit wary now. Admittedly, you do need to come up with at least some fair portion of the cost, but if you don't have that amount, you cannot do anything. Both sides have got to find a compromise.

Perhaps Petronas, the major service consumer of these vessels, can give out five-year contracts, which shipowners can use as collateral to build confidence – because, as we know, banking is about confidence.

If other notable associations of financial standing, such as EPF (Employees Provident Fund), are to own ships, it will give further assurance to the bank that it will be getting repayment. All these (factors) have to come together so that everybody is secured, so that everybody can get their share of the market. It has to be a multi-partied approach and where everybody's interests are protected.

> **"We want to capture a big portion of the activities with regard to shipbuilding and ship repair because we are very strategically located."**

Q: The government has awarded the building of 6 new warships to BHIC. What are the challenges faced in building all the ships locally?

Tan Sri Dato' Seri Ahmad Ramli: This project is worth about RM9 billion and is probably one of the single largest contracts in the country. Because of this, the demands are also very stringent and we have to be able to achieve international standards. It's a good thing though because it raises our benchmark. That's a challenge. But at the end of the day we have to have the right people to manage and implement the project.

Q: Is getting the right people a problem?

Tan Sri Dato' Seri Ahmad Ramli: It is but if we can't get the best, we will get the next best and train them. A more established company, DCNS, will be assisting us. Yes, the challenge is there, but God willing, we will be able to achieve it.

Q: How is the progress so far?

Tan Sri Dato' Seri Ahmad Ramli: We're on track. We have virtually built the ship on paper. The way construction is done today, before you cut the steel, everything is predetermined. I think by next month we can virtually walk through the design. The first steel-cutting should be next year.

Q: BHIC and DCNS have been given the responsibility for the maintenance of the RMN submarines. What is the progress of the transfer of technology between BHIC and DCNS?

Tan Sri Dato' Seri Ahmad Ramli: Satisfactory, though I want more. I think we'll meet the target next year. Some of the talents we need are difficult to get. We don't have local people who can meet our demands. We're training people but for them to reach the level we need, they must have a certain number of years of exposure. We will catch up. It's satisfactory at the moment – at 70% – but there's still a lot of work to be done.

Q: Can Malaysia undertake the total maintenance of the submarine without the involvement of DCNS anytime soon?

Tan Sri Dato' Seri Ahmad Ramli: We should be able to do the first-line maintenance ourselves next year. The other challenge will be when we have to refit – that's a major overhaul and one that we have to train more people for. For a major overhaul, you will sometimes have to to rebuild large parts of the submarine. We're training people for that now.

Again, it's another programme for the transfer of technology. A lot of Third World countries which buy submarines have to send them back to the builder for major overhauls. We are now working at doing it here.

Q: The current trend is for local shipyards to partially build in China to reduce the cost. This could affect the future of shipbuilding in Malaysia. How can this trend be reversed?

Tan Sri Dato' Seri Ahmad Ramli: All these will change eventually. Firstly, the Chinese government is finding it difficult to subsidise and secondly, when China improves, it won't be as cheap as it is now. Meanwhile, the cost of labour in Singapore continues to be very high. So it will get more competitive.

At the moment, we are so open – anybody can take advantage of the loopholes in our policies. For example, Petronas has a policy of using only Malaysian-flagged vessels. But many Singaporean shipowners register their ships in Labuan and once you've registered there, you're considered a Malaysian-flagged vessel. This is one thing we have to address.

Q: Shiprepair facilities in the East Coast of the peninsula is very lacking. Ships, especially OSVs, have to go to Singapore, Batam or the West Coast for repairs. What is AMIM or BHIC's plan to enhance the facilities? What kind of support would you expect from the Federal and State governments?

Tan Sri Dato' Seri Ahmad Ramli: We've been telling our members of the opportunities available and to work with Petronas to encourage activities there. But Petronas can only do so much. Others will have to do their part. People will have to invest. So we encourage our members to look into these opportunities.

At the same time, the East Coast is quite limited in terms of natural harbours because of the monsoon and the river entrances there are subject to changes in currents. I know a lot of people who have tried to invest but they find it more expensive than say, investing in the West Coast or even in Sabah or Sarawak. Having said that, we are not giving up.

Meanwhile, the State governments in the East Coast must be willing to help allocate suitable sites for the building of these facilities. At the moment, such sites are scarce and it's not easy to access the current ones.

Q: Does AMIM or BHIC plan to expand the shipbuilding and shiprepair activities to neighbouring countries like Myanmar?

Tan Sri Dato' Seri Ahmad Ramli: That is very much a business decision. It's not easy to convince people to invest but we do encourage our members to look into all opportunities. Like anything else, when you go to a new market, you have to be very, very sure; you must understand the market there.

Q: What do you think of the competency of young engineering graduates? Are they meeting the industry's requirements?

Tan Sri Dato' Seri Ahmad Ramli: There is plenty of room for improvement in how our engineering graduates are prepared. University graduates in Europe, (such as France and Germany) for example, are able to fit in better to industry demands. They have a system where while they're doing their studies, they're also doing practical work in the industry.

Here, graduates may be very good with the theory part but they require a lot of exposure and retraining to fit in. This is why we have the Young Engineers Programme where we recruit grads – generally those with CGPA 3.0 and above – and train them for a year. After that, they are encouraged to work with us and most of them do. So far we have recruited about 70. ■

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Future for Marine Contractors in the Shipbuilding and Ship Repair Sector

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

INTRODUCTION

Currently, the marine industry climate in the country is growing in tandem with the needs of the maritime economic growth. The Shipbuilding and Ship Repair (SBSR) sector is a sub-set of the marine industry. Unfortunately, the marine sector is not one of the 12 NKRAs identified under the Malaysian Economic Transformation Programme (ETP). However, the closest match would be the Oil, Gas & Energy Sector that may have some linkages with the SBSR contractors. The following extract is an encouraging statement by the Honourable Prime Minister.

> *"Oil, gas and energy are an essential driving force for any modern economy. Under the astute management of PETRONAS, the domestic oil and gas industry has played a crucial role in the growth of the Malaysian economy. However, after decades of oil and gas production, our domestic resources will inevitably start to deplete. To prepare for this, we will strengthen other value creating activities in the oil and gas value chain and ensure that we have a sustainable energy platform for the future. To this end, the Government will develop Malaysia into a leading oil and gas services hub in Asia, grow Malaysia's role in oil storage, logistics and trading and import LNG to serve latent gas demand and attract new-gas based industries. At the same time we will ensure that we develop an energy efficient, diversified and sustainable energy mix to power our future."*[i]
>
> **Y.A.B. Dato' Seri Mohd. Najib Tun Abdul Razak**

With reference to the above statement, the mention of strengthening other value creating activities in the oil and gas value chain, has created a need for Offshore Support Vessels (OSVs), work-barges and accommodation modules that are really, in essence, vessels and structures that will somewhat increase the demands of shipbuilding and ship repair sector.

Going away from the ETP initiative, with reference to the document released by Maritime Institute of Malaysia (MIMA)[ii], on the review of the 1st National Marine Industries Forum 2010 in Kuala Lumpur on 23rd March 2010, signifies the importance of the industry in the context of Malaysian economy, as a multiplier, employment generator, export earner and supporter of maritime transportation in relation to trade. Further on, the review emphasised the key activities in marine industry as:

- Shipyard industry
- Marine leisure
- Support services

What poses as challenges to marine industry contractors are:

- Small domestic market.
- Stiff competition (local).
- Shortage of skilled workers.
- Shortage of high technology facilities.
- Lack of capital/financing to expand.
- Competition from neighbouring countries in pricing and delivery.
- Shortage of opportunities and if available are monopolised by bigger conglomerates.

DISCUSSION

The list of issues that the shipbuilding and ship repair sector faces, as mentioned in paragraph 2, is not exhaustive but for the purpose of discussion, these will suffice. For the purpose of discussion here, the limitation is confined to only contractors in Malaysia and Malaysian-owned bodies. Malaysian-owned contractors are usually home-grown from conception and are owned by locals with limited funding. Therefore, these are small to medium industries which need business and capital funding and sustainable cash flow in order to survive.

Small Domestic Market

Currently the demand for new ships-building and repair opportunities are limited and the market is shrinking. The reason for this is partly because ships generally last 25-30 years and ship owner will usually keep the vessel till the end of its life. Secondly, the high operating costs of periodic docking and repair of vessels can add up to a heavy toll on the owners' pockets. Because of this, owners will stretch the operations time for as long as possible or until it is absolutely necessary to send the vessel to dock.

Stiff Competition (local)

As explained, the number of ships or vessels going to docks and shipyards for repairs is limited and this number is divided among local shipyards currently able to service the vessels. Competition is indeed stiff. Price wars are common and under-cutting quotations is widespread. The net result means that smaller shipyards which are merely surviving, will be adversely affected. So too will contractors depending on these shipyards. In the long term, the reduced number

of vessels sent to shipyards for repair will signal the demise of such contractors.

Shortage of Skilled Workers

To add salt to the wound, a shortage of skilled workers aggravates the situation as this reduces the capability of contractors who will then not be able to complete the work on time or within the correct quality standards. Sub-standard work entails re-work and re-work means delays and additional costs for the contractors. Naturally, ship owners are reluctant to have to spend more than necessary, especially when the fault lies with the shipyards and contractors entrusted with the repair of their vessels. Delays also mean the owners will lose revenue from charter hire and leasing. One reason contributing to the shortage of skilled workers is that they prefer to work elsewhere as, in shipyards, they may not be sure when they will get the next repair job.

Lack of High Technology Facilities

Many local shipyards are not able to acquire high technology equipment because this is expensive. For those that have, it means a long higher purchase agreement on their hands and this adds to their monthly overheads. Some shipyards will transfer the burden of specialised tools and high technology equipment to their contractors and now, the risk lies with the contractors, along with the high overheads. It will be more difficult for contractors to survive if jobs are scarce and they have to maintain high overheads. Part of the reason is that the bigger, cash rich conglomerates often take the bigger chunk of shipbuilding and ship repair projects because smaller shipyards and contractors are incapable of investing in high technological facilities to do the job.

Lack of Capital/Financing for Expansion

When shipyards are hit by a reduced number of jobs, the direct impact will be financial. Our local banks are very strict about giving out loans and when they do, the conditions set are stiff. The inability to expand will mean stagnation of repair and building capacity and this definitely hampers shipyards and contractors.

Competition from Neighbouring Countries

If the stagnation or decline in the number of repair and building jobs can slowly kill off local marine contractors, competition from foreign neighbours who have been in the marine industry much longer is a bigger and more real challenge. These are not only cheaper but they can also do the jobs faster. Much can be debated with regards to the quality of workmanship but for ship owners, the fundamental bottom line is "cost" and how quickly the vessels can be readied to facilitate chartering. Countries like China have grown fast and even overtaken traditional SBSR countries such as Korea and Japan. The Government should take drastic action to regulate ships with Malaysian flag to be maintained in-country despite a slight hike in pricing, to facilitate experience and exposure, and it should be done for the survival of local marine contractors.

Shortage of Opportunities and Competition Controlled by Bigger Conglomerates

Alas, when local marine contractors try to spread their wings and become a bit bolder, they run smack into competition with big local conglomerates and Government Linked Companies (GLCs) which have an edge over the small time contractors with little capital to fund the projects

Photo courtesy of Logimatic IPMS Denmark

Photo courtesy of FAMOS Ltd, Gdansk POLAND

and insufficient sustainability capacity. It seems to have become the norm for mega projects to be entrusted to big conglomerates via turnkey projects. Even when marine contractors manage to get a piece of the project package, it will be very difficult for them to fend off competitors with strong links with the conglomerates. Eventually they get squeezed out and all efforts put in as well as money spent to bring in Overseas Equipment Manufacturer (OEM) representatives will turn to dust. The plight of marine contractors are never seen as an issue that requires looking into but if the situation prevails, small marine contractors will perish or barely survive.

Some Remedies

It may appear that the future for marine contractors is bleak. One of the fundamental approaches to this is Strategic Management. In meeting the challenges heads-on, marine contractors must focus on formulating, implementing and evaluating cross-functional decisions in order to achieve the set objectives. It encompasses the following, by integrating[iii]:

- Management
- Marketing/finance
- Production/operations
- Research & development, and
- Information systems

Marine contractors which have the five elements embedded in their strategy plans, will have a higher survivability rate. To achieve these, contractors need to invest and continuously improve their capabilities and capacities.

However, preparing themselves strategically is not enough, as marine contractors must then build their business along the platform that has the following elements[iv]:

- Leadership capability
- Business plan that is far reaching and well mitigated in risk aspects
- Develop competent work force
- Focused on product and service excellence
- Solid marketing plan
- Perfected sales plan

The above elements are essential for building a great business. Entrepreneurial enthusiasm and business acumen are traits that contractors must have and need to continuously develop to assure success.

CONCLUSION

In light of the current economic climate – where the cost of living is increasing, raw materials for industrial purposes are difficult to acquire, labour prices are increasing (especially with the imposition of minimum wage), tighter Immigration rulings and many other impediments – marine contractors are finding it difficult to survive and sustain their business.

The challenges are very real and will always pose as a threat against success. However, focusing on the remedial actions suggested in the above paragraph should afford some solutions in meeting and circumnavigating the hurdles. Building a solid strategy plan and managing it well with relentless vigour and extreme perseverance, marine contractors have a possible chance of surviving and, coupled with the attributes that are pre-requisites to a successful business venture, will lead to more competitive market participation.

In summary, the challenges faced by local marine industry contractors will prevail and it is entirely up to them to meet the challenges using the most appropriate approach. An approach aligned to strategy management and best business practices will produce marine contractors that are focused and competent, not only technically but also in business and the ability to pursue market forces. ■

REFERENCES

[1] [i]//etp.pemandu.gov.my.etphandbook

[2] [ii]//www.mima.gov.my

[3] [iii]Strategic Management Concepts & Cases by Fred R David, Pearson Education, 14th Ed, 2013 pp35-36.

[4] [iv]Now Build a Great Business, by Mark Thomson & Brian Tracy, Amacom Printers, 2011. Ed 1.

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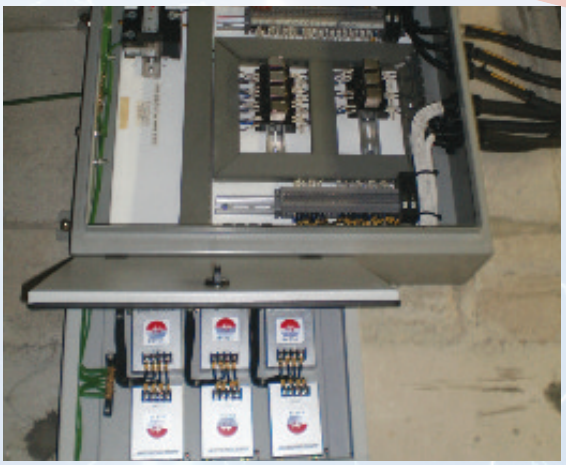

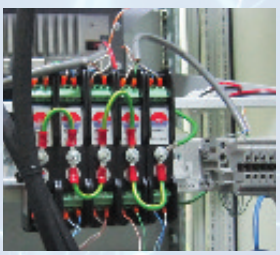

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Management of Rivers for an Environmentally Friendly Inland Waterway Transport System

by Ir. Prof. Dr Ab. Saman bin Abd. Kader

INLAND Waterway Transportation System (IWTS) is one of the modes of transport. Generally, waterways are categorised into natural and artificial. Rivers and lakes exist naturally as the result of geographically terrain while canals are artificial waterways created by man.

An inland waterway transportation system comprises facilities such as locks, inland port, weir, dock, navigation aids and bridges to facilitate navigation of vessels. Studies show that IWTS has advantages over other modes of transport. Studies also show that IWTS is the cheapest and least demanding on land acquisition, energy, labour, resources and mostly environmental benefits [1].

The philosophy of management has changed significantly, adapting to the environment. The management of water resource for transportation is a process of planning and controlling the resource in order that it can serve the purpose. The use of natural water resource for IWTS will change the physical characteristic and natural behaviour of the rivers. Furthermore, development of rivers for transportation will also change the economic value of the rivers as well. A well-designed IWTS requires an understanding of the problem, assembly and evaluation of all pertinent facts and development of a rational plan [2].

The main objective of waterway management is to maintain and protect the waterway environment. Good management practices should be able to provide an efficient and cost effective inland waterway transportation system, which is competitive with other modes of transport. In order to manage the inland waterway transportation system effectively, all criteria (water quality, safety standards and soil erosion) must be taken into consideration.

1.0 DEFINITION AND CLASSIFICATION OF IWTS

There are several definitions of inland waterway transport system. One common one used for the compilation of relevant statistics is from The Department of Transport (DOT) of the UK [3] and is as follows:

An inland waterway is deemed to include all water areas available for navigation that lie inland of the **"inland waterway boundary"**. This boundary will correspond to the seaward point of any estuary, which it would be reasonable to bridge or tunnel. Inspection of UK estuaries leads us to conclude that this is where the width of water surface area is both less than 3 km at low water and less than 5 km at high water (springs). However, vessels without load lines are legally allowed to trade anywhere within the Partially Smooth Water Area (PSWA). The summer boundaries of PSWA are often far downstream of the inland waterway boundaries. The area between these two boundaries is defined here as **"sheltered water"**. In the UK for example, the waterway classification system specifically designed for the survey of the official waterborne freight statistic classified into several categories (Table 1).

Table 1: Waterways classification in UK

Class	Specifications
A	9.0m plus draught
B	4.5m - 8.9m draught
C	3.0m - 4.4m draught
D	Less than 3m draught, barges 551 - 850 tonnes
E	Less than 3m draught, barges 351 - 550 tonnes
F	Less than 3m draught, barges 151 - 350 tonnes
G	Less than 3m draught, barges 51 - 150 tonnes

Source: DOT [3]

2.0 ROLE OF RIVERS

People used rivers as a natural mode of transport in the past when roads and rails were not well developed. Later, river transport faced competition from other modes of transport. Despite their fast speed and flexibility, however, other modes of transport contributed significantly to both congestion and environmental damage owing to their explosive and, even now, unchecked growth. Hence, these have become relatively uneconomic.

There is a growing awareness that rivers has a great potential as an alternative mode of transport to the existing road and rail networks. In difficult terrain that has substantial river networks, the option offers real economic development potential as conventional transport systems are currently unavailable. In general, the role of rivers can be broadly categorised as follows:

i. Leisure and Recreation

These include boating, boat building and services, pleasure cruising, angling, swimming, water-skiing, camping, etc.

ii. Water Supply and Water Transfer

Rivers provide water for industrial, domestic and agricultural which is drawn from surplus areas to water deficiency areas.

iii. Drainage

Rivers remove surplus rain or other water, conveying it to a large body of water where it can be safely absorbed i.e. flood control.

iv. Hydro-electricity

To generate electric power supply to consumers.

v. Transportation

Rivers can be used for transportation for both people and cargo.

3.0 INLAND WATERWAYS AND THE ENVIRONMENT

Efficient freight transportation systems can play a positive role in the economics of a country as well the quality of life of its population. While these are essential, there is growing concern over their significant negative environmental impact including pre-emption of land, disruption of topography, use of energy and resources as well as noise and air pollution [4].

Commercial transportation, which depends largely on fuel, contributes significantly to pollution levels. Therefore, we should think of the management of both the availability of energy resources and the environment before making a balanced decision about each transport mode.

Unlike other modes of transport, however, inland waterways can contribute a number of advantages to the enhancement or improvement of the environment [5]. Waterway transport is environmentally less harmful than other modes of transport in terms of noise and pollution. It is also cheap. In addition, inland waterway transport offers direct environmental benefits compared to other means of transportation.

i. Noise and Vibration

Unlike river transportation, the main contributors to transport noise are road, air and rail transportation [6]. In general, traffic noise is mainly felt in the urban areas.

ii. Visual Intrusion

Waterways cause little in the way of visual intrusion. In fact, they can even enhance the appearance of an area.

iii. Pollution

Waterway vessels do pollute the rivers to some extent. However, most water pollution comes from the irresponsible acts of industries located along the waterway.

iv. Atmospheric Emissions

Transport emissions in the UK produced 57% of nitrogen oxide, 91% of carbon monoxide and 42% of volatile organic compound [7]. A study carried out in the Netherlands in 1980 shows the levels of air emission from different modes of transport [8] (see Table 2).

4.0 PARAMETERS OF RIVER MANAGEMENT ON ENVIRONMENT

Management of rivers for sustainable inland waterway transport requires consideration on related issues as discussed in the following sections.

5.0 MANAGEMENT OF ENVIRONMENT QUALITY

It can be expected that the development of a waterway system for transportation will have some effect on the environment. Poorly planned and badly managed waterways are not only a threat to the safety of the vessels, users and freight but also to the environment. Thus, IWTS management system on water quality is among the major aspects to be considered. The standard of clean water is based on parameters such as pH (alkalinity and acidity), turbidity, BOD (biochemical oxygen demand), COD (chemical oxygen demand), TOC (total organic carbon) and TOD (total oxygen demand), heavy metals and inorganic solids.

Transportation activities along waterways will invariably affect the water quality. Vessel discharges, spills and grounding can result in minor damage to shellfish farms and even cause beaches to close. [10]. To maintain adequate depth of waterways, dredging will cause the degrading or pollution of water. In particular, dredging with open water discharge will activate dormant organic matter and increase turbidity and BOD.

The most appropriate measures in water quality control are the elimination of direct sources of pollution. Waste from boat operations and maintenance include pollutants such as petrol, oil, grease, solid waste, trash, lead, copper and detergent [11]. Increased pollutant loadings may result from facility construction, vessel discharges and accidental spills [12]. Other wastewater emanates from four primary sources as follow [13]:

i. Municipal sewage
ii. Industrial wastewaters
iii. Agricultural runoff
iv. Storm-water and urban runoff

Management of boat sanitary waste discharges includes the installation and proper use of equipment onboard the vessels and onshore equipment for collection and disposal [11]. Another effective mean of managing boat sanitary

Table 2: Emission levels from different modes of transport

Pollution type	Emission levels per tonne-km		
	Road	Rail	Inland waterways
Carbon monoxide	6.10	0.18	0.11
Hydrocarbons	1.15	0.06	0.07
Nitric oxide	3.05	0.89	0.69
Sulphur dioxide	0.15	1.09	0.10

waste discharges would be to educate boaters about the potential health risks associated with the discharge of sewage. Table 3 shows the processes applicable to wastewater treatment.

Table 3: Processes applicable to wastewater treatment

Pollutant	Processes
Biodegradable organics (BOD)	Aerobic biological (activated sludge), aerated lagoons, trickling filters, stabilisation basins, anaerobic biological (lagoons, anaerobic contact), deep-well disposal
Suspended solids (SS)	Sedimentation, floatation, screening
Refractory organics (COD, TOC)	Carbon adsorption, deep-well disposal
Nitrogen	Maturation ponds, ammonia stripping, nitrification, ion exchange
Phosphorus	Lime precipitation; Al or Fe precipitation, biological co precipitation, ion exchange
Heavy metals	Ion exchange, chemical precipitation
Dissolved inorganic solids	Ion exchange, reverse osmosis, electro dialysis

Source: [14]

6.0 SEDIMENT MANAGEMENT

Utilisation of water resource for transportation is highly dependent upon the maintenance of adequate navigation depth. Dredging is one of the methods of maintaining adequate navigation depth. In future, as ships increase in size and numbers on waterways, dredging will play a vital role in maintaining adequate depth in waterways. The volume of dredge materials will increase as well. The disposal of dredged material is usually the major problem faced by waterways management for transportation. Overall, proper sediment management will reduce the frequency of, if not eliminate, dredging work.

Reducing the amount of sediment entering the waterway will mean less need for frequent dredging. Besides carry out the dredging work to maintain adequate depth for passage of vessels, the management of waterways for transportation should, together other authorities involved in river basin management, also try to control the volume of sediment entering the rivers.

7.0 NATURAL HABITAT MANAGEMENT

Buffer zone protection will need a management programme to encourage the growth of native species and discourage invasive non-native species. Environmentalists and botanists strongly advocate an active programme to control non-native plant species and to support existing wildlife populations. As the first step in developing and implementing a management plan, nature conservancy programmes should make an assessment of non-native plants. The plan should call for the elimination of non-native species and the replanting of native stock as well as monitoring this on a long-term basis.

The goals should include restoring marginally productive agricultural lands into natural habitats, ripping up pavements in areas that won't contribute substantially to the local economy and restoring the natural habitat, protecting headwaters on both the main stem and tributaries and ensuring continuous natural vegetation along at least one bank for as much as possible of the river corridor proper.

8.0 DISCUSSIONS

Many inland waterways around the world have proved profitable and there exists a strong commercial reason for keeping them open as well as for further improvement and new development. Where similar conditions exist - in terms of geography, demand and potential development of trade, environmental enhancement, etc. – the opportunity for a new waterway development should take into consideration the proper management of the environment.

Inland transport provides cheap and efficient haulage. A combination of inland, estuary and coastal waterways can provide transportation at minimal costs. Local planning authorities should encourage the use of water transportation by investing in its improvement into a more efficient and economic system. The demand for inland water transport has risen steadily and this trend is likely to continue.

9.0 CONCLUSION

The development of a waterway system for transportation requires a wide range of knowledge, from the early stages of planning to full operations. Every development project should include stringent environmental impact assessment prior to actual development.

The economic benefits derived from the development of rivers for transportation must be in balance with the environment. The successful development of inland waterways for transportation requires the participation of various parties such as government agencies, private corporations and the public. ■

REFERENCES

[1] Doerflinger, Frederic. (1975) "Inland Waterways – A New Environmental Dimension." Environmental Conservation, Vol. 2, No.2, 1975, pp 89-98.

[2] McCartney, B. L. (1986). "Deep-Draft Navigation Project Design." Paper in Journal of Waterway, Port, Coastal and Ocean Engineering. ASCE, Vol. 111, No. 1. January 1986.

[3] Department of Transport, MDS-Transmodal: Waterborne freight in the UK in 1991, DOT, 1992.

[4] National Transportation Library, Environmental advantages of inland barge transport system, Final Report, August, 1994.

[5] Doerflinger, F., Waterway and the environment, Journal of Environmental Planning and Pollution Control, Vol.1, No.4, 1973.

[6] Grubb, E., Some ideas for a UK waterways transport policy, Proceedings of Water Freight 80's Conference, NWTA, 1982.

[7] British Waterways Board, Transport and the environment, Response to the Royal Commission on Environmental Pollution, 1992.

[8] European Parliament, Report of the committee on transport and tourism on inland navigation, Brussels, 3rd June 1991.

[9] Mc Gauhey, P. H. (1968). "Engineering Management of Water Quality." McGraw-Hill. New York.

[10] Clyde Hart (1999). " MTS Delivers Value." Proceedings of the Marine Safety Council, October – December 1999, Volume 56, Number 4.

[11] Office, Chief of Engineers, U.S. Army, "Environmental Engineering for small boat basins." EM 1110-2-1206, Washington, D.C., October 31, 1993.

[12] Office, Chief of Engineers, U.S. Army, "Tidal Hydraulics." Engineer Manual 1110-2-1607, Washington, D.C., March 15, 1991.

[13] Eckenfelder, W. Wesley. (1980). "Principles of water quality management." CBI Publishing Company, Inc. United States.

[14] McCartney, B. L. (1986). "Inland Waterway Navigation Project Design." Paper in Journal of Waterway, Port, Coastal and Ocean Engineering. ASCE, Vol. 112, No. 6. November 1986.

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IEM DIARY OF EVENTS

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One Day Seminar on Design & Construction of Pile Foundations by Dr Seah Tian Ho

4th July 2014

Jointly organised by Geotechnical Engineering Technical Division and Malaysian Geotechnical Society

Time : 9.00 a.m. – 5.30 p.m.
Venue : Wisma IEM

Talk on Ground Improvement via Vacuum Consolidation Method in Vietnam by Dr Seah Tian Ho

5th July 2014

Jointly organised by Geotechnical Engineering Technical Division and Malaysian Geotechnical Society

Time : 9.00 a.m. – 10.30 a.m.
Venue : Wisma IEM

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Design and Development of Intelligent Buoy System for Coastal Zone Monitoring Application



by Assoc. Prof. Dr Mohd. Rizal Arshad, Abdul Sattar Din and Herdawatie Abdul Kadir

Buoy

- Cardinal Buoy
- Cautionary Buoy
- Anchorage Buoy
- Mooring Buoy
- Control Buoy
- Hazard Buoy
- Information Buoy
- Swimming Buoy
- Diving Buoy
- Keep Out Buoy
- Scientific Buoys (O.D.A.S.)
- Fairway Buoy
- Isolated Danger Buoy

1.0 INTRODUCTION

According to the Oxford Dictionary, buoy is defined as navigation aids with floating object, fastened to the bottom of the sea or a river, that indicates reefs or other hazards, or for mooring [1]. Usually, they indicate shoals, obstruction, dangers and mark channels. Each types of buoy have their own specifications, with different sizes, colour, shape, top mark, number and light colour/ characteristics.

A special IALA mark is used to indicate special areas which include:

1. Ocean Data Acquisition System (ODAS) Buoys
2. Traffic separation marks
3. Spoil ground marks
4. Military exercise zone marks
5. Cable or pipeline marks
6. Recreation zone

An existing ocean or coastal observation/monitoring system features a stationary single or multiple measurement points with built-in data logger. Multiple data obtained (conductivity, tide/depth, temperature variation, dissolve oxygen, acoustic noise, etc.) is stored inside the data logger. Measurements of surface parameters require sensors that are mounted on an anchored buoy while the measurements of the bottom parameters require anchor-mounted sensing modules. The latter still requires a buoy as a marker or at least an anchored point whose coordinate is locked. The contributions of all these observations and measurement method have been proved for several decades by providing us with significant amount of oceanographic data.

However, there is still plenty of room for improvement for increasing the efficiency of the system. Existing monitoring and observation systems are passive systems, whereby periodic data collections are required for further processing and interpretations. For time-sensitive data, daily or weekly data collections have become standard operating procedures. Such a passive monitoring and observation approach can be replaced by the active method.

Recently, an active monitoring and observations system was implemented for early tsunami warning and underwater seismic monitoring observations. The enabling technology is satellite communications/remote sensing. Up to date, remote sensing is not a cost effective solution for coastal area monitoring and observations (less than 10 nautical miles from the shores). Passive observations system is exposed to several conceptual and technical disadvantages.

In this article, we will focus on design and development of scientific buoys, also known as Ocean Data Acquisition System (ODAS) Buoys. Generally, ODAS buoys are smaller in size and are bright orange or yellow in colour with vertical stripes on moored buoys and horizontal bands on free-floating buoys. They are also equipped with strobe lights for night visibility. Figure 1 shows some examples of existing ODAS buoy.

2.0 DESIGN CONSIDERATION OF AN ODAS BUOY

There are many factors to consider when designing an ODAS buoy, to ensure it serves the intended purpose for the intended duration of time.

Sensor

The first step when designing an ODAS buoy, is to decide on the types of parameters to be collect and how they will be collected. Common parameters collected from an ODAS buoy are sea surface temperature, air temperature and humidity, barometric pressure, wave height and direction, wave period and tide, current speed and direction, wind speed, wind direction and gust, and salinity. Some buoys have visual, audio observation equipment and several specialised sensors. For example, the Coral Reef Monitoring manual for the Caribbean and Western Atlantic [8] included temperature, dissolved oxygen, salinity, pH, light transmission, sedimentation, nutrients and current speed and direction in the list of parameters that may affect

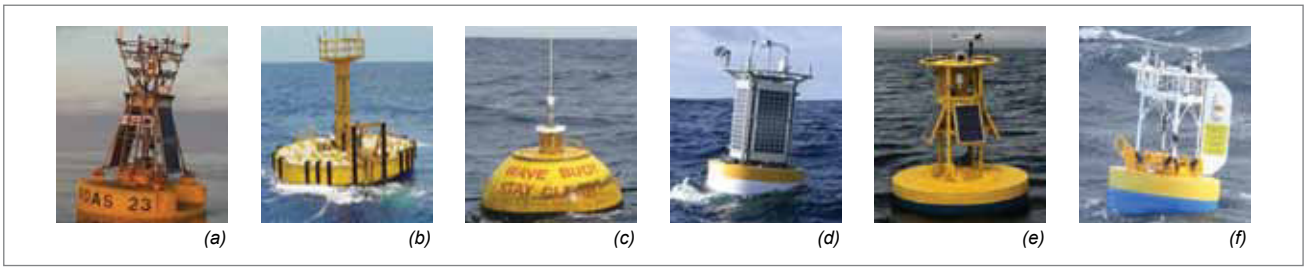


Figure 1: Examples of O.D.A.S Buoy (a) ODAS [2] (b) Integrated Ocean Observing System (IOOS) [3] (c) Wave Buoy [4] (d) Monterey Ocean Observing System [5] (e) NARACOOS Buoy [6] (f) Integrated Marine Observing System (IMOS) [7]

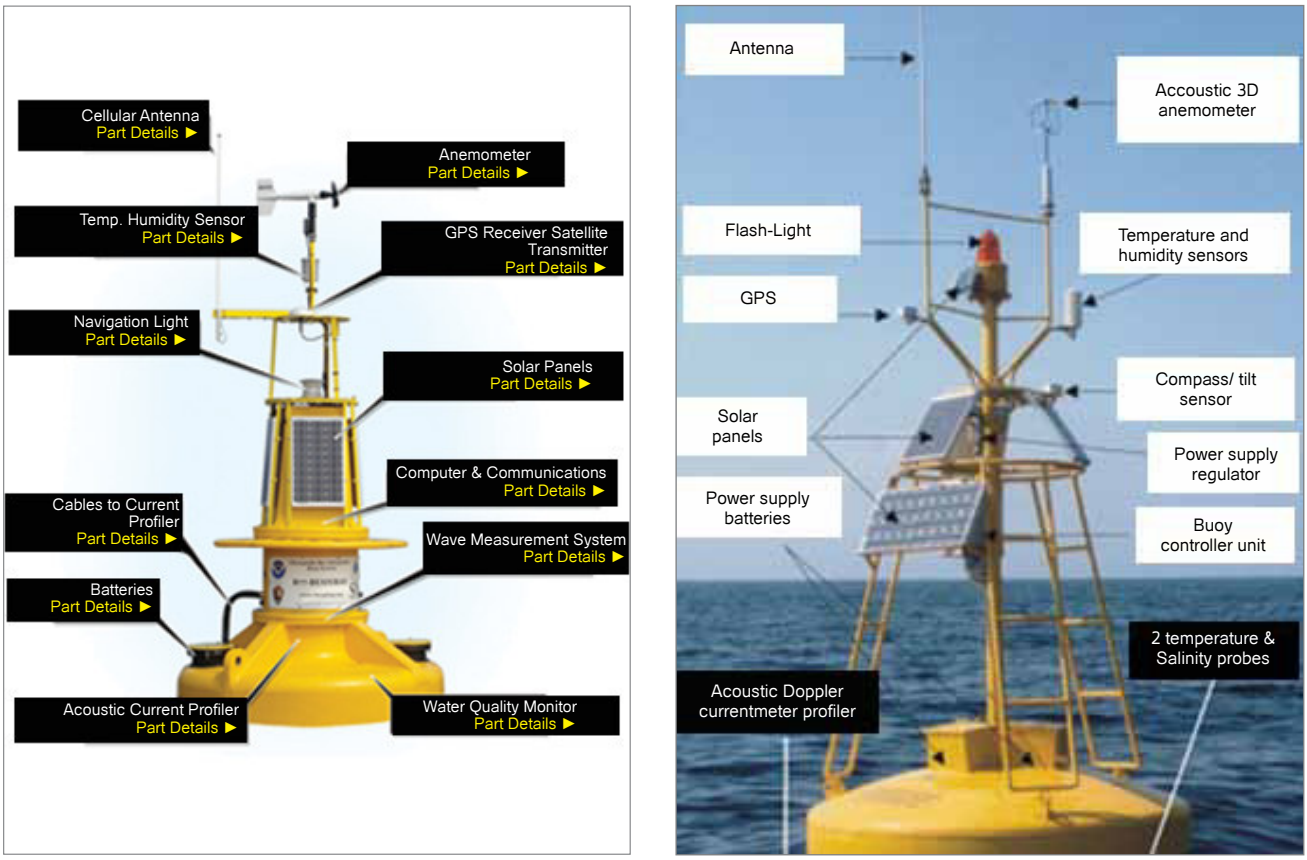


Figure 2: Sensor placements on (a) CBIBS Buoy and (b) Oceanographic buoy by Sirio d.o.o. Koper

the growth and survival of reef organisms, and therefore should be monitored. Figure 2 shows placements of various sensors on CBIBS buoy and oceanographic buoy by Sirio d.o.o. Koper respectively.

Telemetry

The next consideration in designing an ODAS buoy will be the type of telemetry used. The choice of telemetry will depend on whether the data needs to be communicated in real time, the bandwidth requirement, the distance between the buoy and the ground station, and the operating cost. Communication through electrical or optical cable can be reliable and unlimited in terms of the bandwidth, which is ideal for real time data communication. However, installation of undersea cabling can be very expensive and requires various environmental and other considerations. Satellite communication is among the most popular choice of telemetry for weather or ODAS buoys owing to the widest coverage. The downside however, is the limited and high cost of bandwidth. Table 1 compares data size and cost for different satellite telemetries.

In an area which receives cellular network coverage, cellular communication may well be an option. The bandwidth and cost may vary, depending on the data plan and service provider. Another good telemetry option for coastal buoy is RF communication, which is free of charge and can provide a bandwidth higher than that provided by satellite communication.

Table 1: Data size and cost comparison of satellite telemetries [9]

System	Message size	Airtime cost	Monthly price, 1 message/day	Monthly price, 1 message/hour	Terminal power consumption (during transmission)
Iridium SBD	<340 bytes	$13/ mo+ $0.0015/byte [10]	$14.24 (30 bytes)	$31.48 (30 bytes – bulk tariff)	1.8W
IsatM2M	25 bytes	$0.06 for 10 bytes or $0.120 for 25 bytes	$5 (25 bytes – minimum spend)	$89.28 (25 bytes)	9W
ARGOS	32 bytes	$21/mo + $3.50/6hr slot[11]	$124	$437	<1W
DCP	650 chars (roughly 400 bytes)	Free	$0	$0	50-100W
Orbcomm	<2000 bytes?	Unlimited for $60/mo	$60	$60	24W
Globalstar simplex	<36 bytes	$30/mo for 100 9-byte message	$30 (9 bytes)	$165 (36 bytes-bulk tariff)	5W

Power

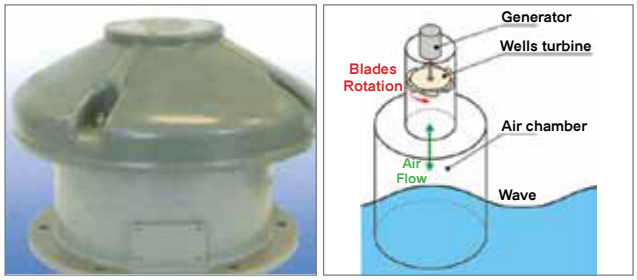
Power requirement for the buoy depends largely on the number and types of sensors used, sampling frequency, type of telemetry and frequency of communications. There are several options for generating power on a buoy system, the most popular of which are batteries, solar panels, diesel generators, wind turbine, and wave-activated generators (WAG). In regions that receive a large amount of sunlight, such the tropical region, solar panels provide access to free energy. However, buoys in other regions which don't have the luxury of sunlight, may opt for diesel generators or other sources of renewable energy such as wave-activated generators (WAG). Figure 4 shows an example of a WAG and the working principal. Some low-power buoys can even operate on batteries for several years.

(a) (b)

Figure 3: Satellite transceiver for (a) Iridium satellite and (b) Inmarsat D+ satellite

Mechanical Structure

All the telemetry, sensors, controller unit, and power generation equipment constitute the payload of the buoy that must be taken into consideration when designing its mechanical structure. The mechanical structure should include the mountings for the telemetry unit, sensors and power generation equipment such as solar panels as well as safe compartments for the controller boards and batteries. Another aspect of the mechanical design of the buoy is the mooring, i.e. how it will be fixed to the seabed. There are



(a) (b)

Figure 4: (a) Wave-activated generators (WAG) by Ryokuseisha Corporation (b) Principal of operation

several types of moorings which, according to American National Weather Service, depend on the hull type of the buoy, the location and the water depth. Figure 5 illustrates four types of mooring for buoy by the American National Weather Service.

A moorinsg system consists of a mooring line, anchor and connectors. The mooring line can be made of synthetic fibre rope, wire and chain or a combination of the three. An anchor attaches the mooring line to the seabed and can be of several types, namely a mushroom anchor, deadweight anchor, or screw-type anchor. The choice depends on the condition of the seabed. The overall mechanical structure design of the buoy should provide the buoyancy to hold the total weight of the structure, the payloads, and the weight of the mooring structure, while maintaining the required stability under various sea conditions.

3.0 DEVELOPMENT OF AN INTELLIGENT ODAS BUOY

Our Intelligent Buoy is a type of ODAS buoy that provides an intelligent observation of various oceanographic and meteorological parameters and which can integrate with other underwater, surface, and aerial platforms to form a larger and comprehensive integrated ocean observation system. Its target deployment area is a coastal marine park.

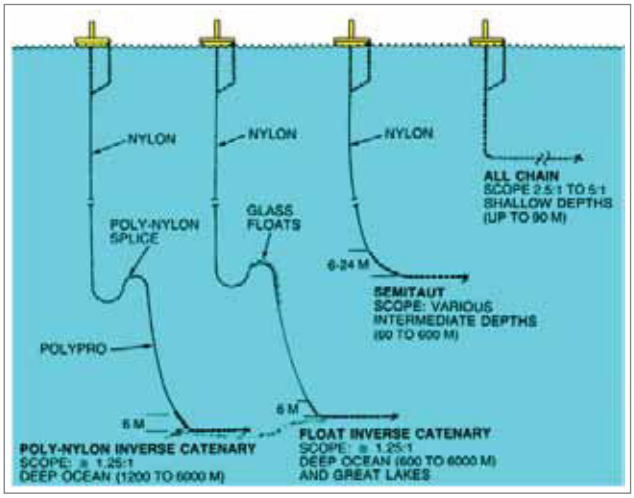


Figure 5: Four types of buoy moorings

It is called an Intelligent Buoy because, apart from collecting various scientific data, it can relay data from other platforms to the ground station and, at the same time, act as a beacon to help with localisation of some other mobile platforms.

Sensors

Listed in Table 2 are the various types of sensors installed on the Intelligent Buoy to measure oceanographic and meteorological parameters. In addition to some common sensors, the buoy is also equipped with a hydrophone, an underwater camera, and an omni-directional surface camera to capture audio and visual information from the marine environment. This hydrophone and camera can be configured to automatically respond to certain trigger to initiate the recording and capturing. Time information provided by on-board GPS is used to update the system real-time clock, hence keeping it from drifting.

Table 2: List of sensor on Intelligent Buoy

Sensor	Parameter
Anemometer	Wind speed and direction
Vapor Pressure, Temperature and Relative Humidity Sensor	Air temperature, humidity and vapor pressure
CTD sensor	Water salinity and sea surface temperature
Depth and temperature transducer	Water depth
Hydrophone	Underwater sound
Underwater camera	Underwater image
Sea surface omni-directional camera	Sea surface surveillance
Inclinometer	Sea surface roughness
Compass	Used in combination with anemometer for wind direction
GPS	Positioning and real-time clock update

Telemetry

Data acquired from the sensors are transferred to the ground station through wireless communication in a timely manner which eliminates the need to personally collect data from the buoy except for large audio and visual data which cannot be supported by the communication bandwidth. In addition to sending data from the buoy to the ground station, the wireless communication will also be used to remotely configure the buoy from the ground station. This is done with the use of a bidirectional radio frequency communication module, which is capable of reaching up to 3 kms of communication range using a high gain antenna mounted 2 metres above the sea surface. Furthermore, the communication system uses a mesh topology, which allows the message to hop from buoy to buoy in order to reach the ground station in the event that the distance between the buoy (originating the message) and the ground station is more than 3 kms.

Data Acquisition, Processing and Control

All sensors, communication module and other equipment on the buoy are controlled by a main controller located on the controller module. The whole electronics of the buoy takes a modular design approach, which allows for easier future expansion of the system. In this approach the main controller module board consists of a low power controller which performs basic controls of storage, GPS and communication module, and provides generous I/O ports to control the power module and other sensor modules located on different boards as shown in Figure 6. Sensors that require heavy computation such as camera and sound recorder, will have their own controller which will be managed by the main controller. The main storage consists of an SD card located on the main controller board. SDHC card is selected for this system because of the high capacity and low price.

Power

A lithium-ion battery with a suitable capacity is selected to power the whole system, and this battery will be recharged by solar panels to ensure continuous operation without the need to replace the battery. The capacity of the battery and solar panels are selected based on the power consumption of the system, estimating various sensors sampling rates and frequencies, and the duration and intensity of the sunlight throughout the year. The power for the buoy is managed by a power module which is responsible for converting the battery voltage to 3.3v, 5v, and 12v supply as required by the various instruments on the buoy.

4.0 CONCLUSION AND FUTURE PLAN

The UCRG Intelligent Buoy is currently being finalised and will be tested in the near future for real ocean application. It will be an excellent test-bed for future near-shore inspection, monitoring and marine mitigation activities. Certainly, further research is needed to study the performance of the buoy in various environmental conditions and other related issues. The design and development of the Intelligent Buoy was initiated by the UCRG team based in Universiti

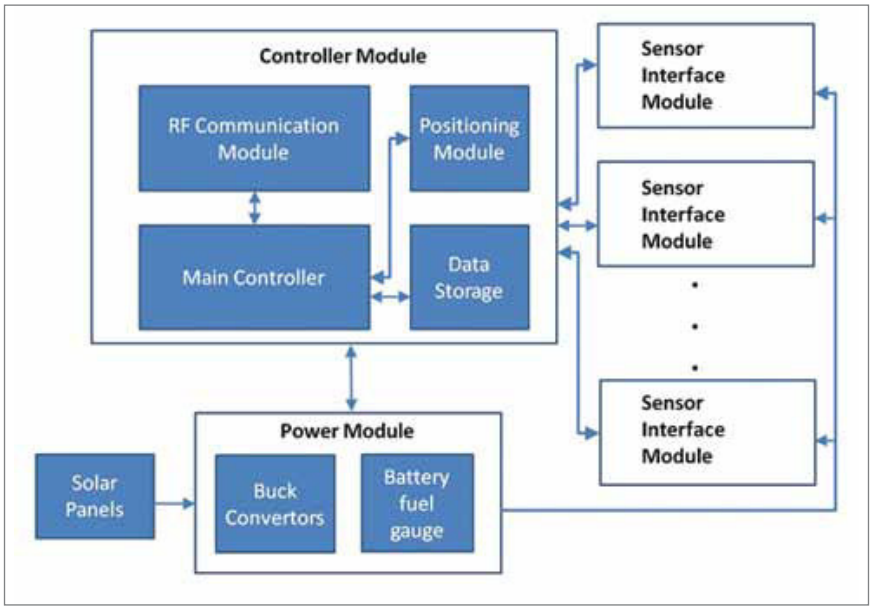


Figure 6: System design

Sains Malaysia (USM) in Nibong Tebal, Penang. We are also proactively looking for collaborative partners to expand our R&D works and potential field trials. This work was funded by the Ministry of Science, Technology and Innovation (MOSTI), e-Science 305/PELECT/6013410 and Universiti Sains Malaysia. ■

REFERENCES

[1] Miranda Steel (2009)," Buoy", New Oxford Dictionary, 2nd Edition, p.108

[2] National Oceanography Centre; "ODAS" , Retrieved Jan, 15, 2014 from http://noc.ac.uk/news/met-office-and-noc-enhance-ocean-observatory.

[3] National Ocean and Atmospheric Administration. "Integrated Ocean Observing System". Retrieved Jan, 13, 2014 from: http://oceanservice.noaa.gov/facts/ioos.html.

[4] Melissa M. Iwamoto; University of Hawai, "New Pacific Islands Ocean Observing System wave buoy deployed in Maui", Retrieved Jan, 13, 2014 from http://www.hawaii.edu/news/article.php?aId=4829

[5] Monterey Bay Aquarium Research Institute; "MOOS: Monterey Ocean Observing System, Retrieved Jan, 13, 2014 from: http://www.mbari.org/moos/mooring/mooring.htm

[6] NERACOOS; "Water Quality Monitoring", Retrieved Jan, 13, 2014 from http://www.neracoos.org/highlight/lis_buoy

[7] ABC Halbart;" Oceanographers expecting second buoy: " ,Retrieved Jan, 13, 2014 from : http://www.abc.net.au/news/stories/2011/06/09/3239691.htm?site=hobart

[8] National Park Service; "Coral Reef Monitoring manual for the Caribbean and Western Atlantic", Retrieved July, 17, 2013 from http://fl.biology.usgs.gov/Monitoring_Manual.pdf

[9] Michael Prior-Jones, "Satellite communications systems buyers' guide", Retrieved Jan, 21, 2014 from http://www.scor-int.org/Working_Groups/satellite-systems-buyers.pdf

[10] Links: http://urrg.eng.usm.my/

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Abdul Sattar Din obtained his preliminary and secondary educations in Bukit Mertajam, Penang. He obtained his first degree in Mechatronics from International Islamic University Malaysia in 2006. After graduation, he enrolled in an Industrial Skill Enhancement Program (INSEP) in microelectronic fabrication for one year, which was a collaboration program between Silterra Malaysia Sdn. Bhd., PSDC, and UNIMAP. From 2007 until 2010, he worked as a lithography process engineer in Silterra Malaysia Sdn. Bhd. He obtained his Master degree in Universiti Putra Malaysia in Smart Technology and Robotics under RLKA Fellowship program from USM.

Herdawatie Abdul Kadir received the Bachelor's degree in Electrical and Electronic Engineering from Universiti Teknologi Malaysia in 2001 and Master's degree in Mechatronic and Automatic Control in 2005. She is currently working toward the Ph.d degree in Computational Intelligence at URRG, School of Electrical and Electronic Engineering, Universiti Sains Malaysia. Her current research interests are Automatic control, Localization, Mapping and Cooperative System.

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1st Malaysian-Designed Offshore Support Vessel (OSV)

by Ir. Ahmad Fuaad Ahmad Sabki,
Rear Admiral Dato' Pahlawan Ir. Hj. Jasan Ahpandi bin Sulaiman (R)

THE tremendous growth of shipping activities in Malaysia over the years and its great potential underlines the value of the maritime sector to economic well-being and the importance of the seas to the lives of the people. With our present standing as a top merchant shipping industry, it is only natural to aspire to be a shipbuilding nation. We aim to achieve long-term industrial competitiveness on a global basis through the transformation and innovation of our ship building sector. Shipbuilding is seen as a major player to ensure economic growth as it encompasses a wide array of skills, services, SMEs and professional undertakings.

But Malaysia is lagging behind in her ability to capture a sizable portion of the world shipbuilding pie. There are adequate skills to build various types of ships but skills alone are not enough to compete with shipbuilding giants that do not rely on skill alone but on massive designs and knowledge. Numerous issues contribute to this situation but the one of the most critical would be design capability.

Malaysian shipbuilders have relied heavily on foreign technical know-how and design. Due to its failure to develop indigenous design and development capabilities, the local market continues to be flooded with foreign components and design know-how. This has adversely influenced the development of local support industries which can be translated to less than marginal export performance.

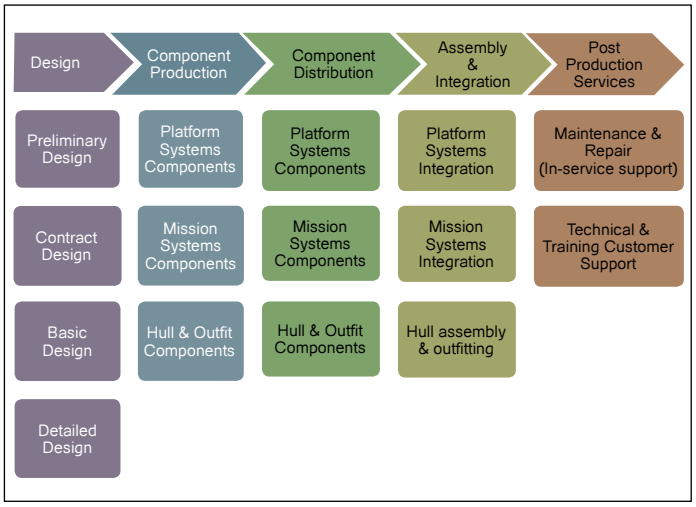

Figure 1: Shipbuilding Value Chain

MALAYSIAN SHIPBUILDING SCENARIO

The Malaysian Shipbuilding and Ship Repair Industry Strategic Plan 2020 aims to generate RM6.4 billion in GNI and to create an additional 55,500 jobs by 2020. This is in line with the growing demand for small to medium-sized vessels to meet the needs of the maritime and Oil & Gas industry for the next 10 years. Its recommendations are expected to boost the country's industrial competitiveness, which has come under increasing competitive pressure from Singapore, Vietnam, Indonesia, India, China and the Philippines.

The shipbuilding industry in Malaysia will not evolve by itself. For it to grow and be competitive, a comprehensive development plan was formulated and implemented. The factors considered to be of great influence are Policy, Institutional Framework, Regulatory Framework, Design and Technology, Human Capital, Finance and Incentives.

Modern shipbuilding involves multiple actors to design, construct and maintain a ship. Figure 1 illustrates the complex set of design, production, and post-production activities involving multiple actors across the shipbuilding value chain which comprises three major phases: Pre-production, production and post-production. Currently, the strength of the Malaysian shipbuilding industry lies in production but it is severely handicapped in the pre and post production.

DESIGN AND SHIP DESIGN

The standard of Design in a society reflects its intellectual, technological and organisational capabilities. Design is always associated with a creative act with developed ingenuity encompassing advanced knowledge, techniques and discipline which becomes the nerve centre for future innovations and discoveries.

Design is done in response to a challenge, a problem or a set of requirements, or as a planned action for the foreseeable future. The capability to design is a strategic act of consolidating perceived needs and the ability to act on it will create tremendous opportunities that will finally be translated into economic gain as well as a commanding status of a fully developed nation.

Design-led innovation has the potential to increase performance and the ability to compete on a global stage. Design is a strategic business capability that enables communities to grow locally and globally. The sophisticated application of design and the realisation that it is a valuable business tool will enable businesses to create new and more efficient ways to do things, increase exports and improve productivity. Figure 2 summarises the phases and activities of modern shipbuilding.

TECHNOLOGICAL DEVELOPMENT AND ECONOMIC GROWTH

Value-oriented benefits of product innovation are not the only reason to promote design activity which has far reaching influences on export and economic growth. International trade has long since shifted from raw materials to processed products. It is the design and the technological capability that give a competitive edge to the products in international market.

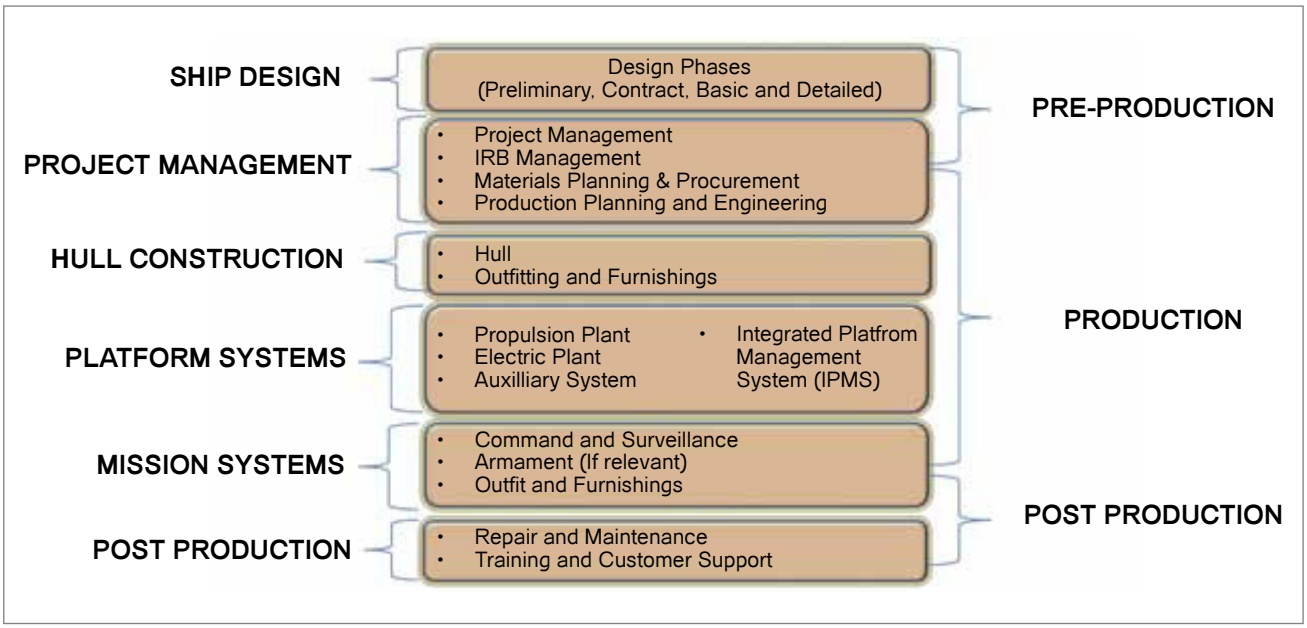

Figure 2: Modern shipbuilding activities

Design is recognised as a tool for development, especially in export trade, by the governments in industrialised countries as early as the first decade of this century. Most governments believe in and continue to promote design capability with greater vigour.

THE ACTION PLAN

With the full realisation of the strategic requirement for enhancing the full design capability of the Malaysian shipbuilding industry, the Shipbuilding and Ship Repair Industry Strategic Plan 2020 (SBSR 2020) was launched in 2011. Helming this initiative is the Malaysian Industry-Government for High Technology (MIGHT), with the Association of Marine Industries of Malaysia (AMIM). With this initiative comes the Entry Point Project (EPP) that specifically addresses SBSR 2020 with the aim of developing sustainable competitiveness in the industry.

Under this EPP project is the building of the First Malaysian-designed OSV and the stewardship of this milestone event has been given to Boustead Heavy Industries Corporation (BHIC). With its long involvement in national shipbuilding and ship repair, coupled with prime facilities and highly competent human resources, BHIC will be seen to champion the growth of the SBSR industry. With a basic hull developed earlier, a new design will be produced that will undergo extensive remodelling and review to undertake new requirements to fulfil current stringent international regulations as well as meet the expectations of local ship owners. The new design will be then utilised by BHIC to develop more design innovations in its path to harness the competitive advantage gained by the ability to design.

In order to execute the design of the vessel, BHIC has engaged a local research centre to undertake the enormous task of developing the design and conducting extensive design verifications and testing. Marine Technology Centre of Universiti Teknologi Malaysia (MTC-UTM) with its well-equipped design and testing facilities, has the ability to perform design, evaluation and model testing for the specific needs of the maritime industry.

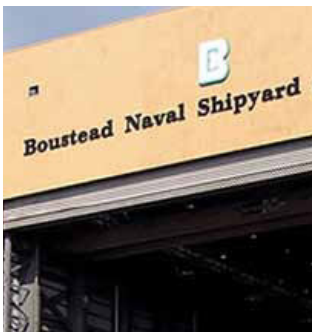

Figure 3: Boustead Naval Shipyard

Figure 4: A Typical Offshore Supply Vessel (OSV)

MTC-UTM which started as a marine hydrodynamics laboratory in 1997 to fulfil academic requirements, has transformed into a major research and consultancy centre. Over 100 model testings have been conducted in the past 15 years for international clients. With this vibrant activity, its laboratory was upgraded to a Marine Technology Centre (MTC) in 2012 with a strong focus on developing knowledge in marine technology through research and the development of the national marine industry.

Under the EPP project spearheaded by BHIC, MTC-UTM undertakes to provide design and model testing know-how. The design of the OSV, in particular the Anchor Handling Tug Supply (AHTS), is seen as the most strategic option in view of the number of local operators of the AHT in the Malaysian Oil & Gas industry.

The AHTS was designed using the latest technology in computational fluid dynamics (CFD) and advanced model testing. The method allows the ship's hull to be optimised prior to the model testing and is able to predict the influence of various hull geometry and environmental conditions on the final hull resistance. The hull designed at MTC-UTM demonstrates a reduction of 18% drag, which ultimately reduces engine size with savings in the final fuel costs.

Figure 5: Towing Tank Facilities at MTC-UTM

Figure 6: Basis Hull for AHTS

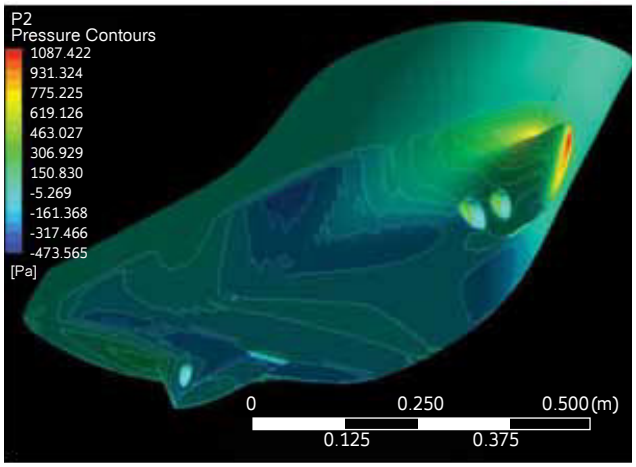

Figure 7: CFD Results of Optimise Hull of Type 7 Hull

MTC-UTM will conduct extensive resistance, propulsion and sea keeping testing in calm and turbulent waters. This knowledge and know-how is particularly important as the world governing body, the International Maritime Organisation (IMO), under the Environmental Protection Committee (EPC) have mandated the requirements of fulfilling the Energy Efficient Design Index (EEDI) starting January 2013.

THE WAY FORWARD

As the shipbuilding industry is crucial in facilitating the growth of trade and economic development in Malaysia, it is essential that efforts be made to bolster the capacity and performance of the sector by way of learning from the successful experience of leading shipbuilding nations. All the stakeholders, including policymakers, financiers, manufacturers, service providers, ship owners and shippers must close ranks to support local shipyards and spur the development of the industry.

For shipbuilding to prosper and to benefit other associations and downstream industries, the design capability must be nurtured, developed and protected. Design capability develops over time. It is the most expensive commodity to acquire and maintain but is definitely the most valuable asset in the shipbuilding value chain. It is the designers' prowess, not only in ship design but also in the general engineering sector which will ultimately develop the components.

BHIC and MTC-UTM are committed to overseeing the development of the SBSR industry. BHIC with its capital involvement in shipbuilding and ship repair will garner every effort to ensure sustainability in the shipbuilding sector as well as maximise its return on investments.

BHIC will continue to acquire opportunities to further develop the industry. MTC-UTM on the other hand will press on to acquire knowledge that would spur greater innovations through industry driven research. ■

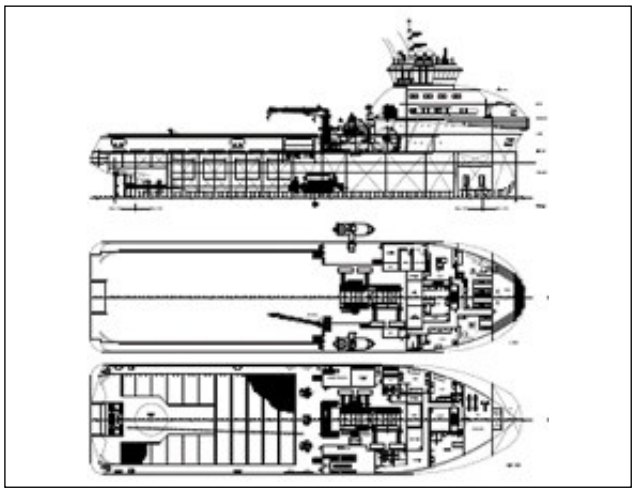

Figure 8: General Arrangement of Basis Hull

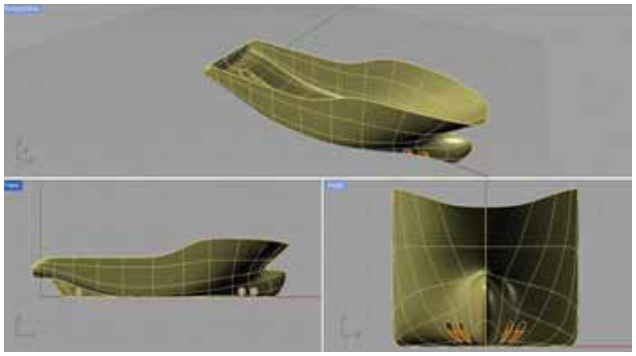

Figure 9: Type 7 Hull Developed

Figure 10: Conceptual Design of The OSV

Ir. Ahmad Fuaad Ahmad Sabki is a senior lecturer at the faculty of mechanical engineering specializing in Naval Architecture and Ocean Engineering. Graduated from PUO in 1983 and started his carrier as marine engineer with Malaysian International Shipping Corporation (MISC). He pursued his studies and graduated from University of Newcastle Upon Tyne, UK with a B.Sc (Hons) in Marine Engineering and subsequently obtained his Masters of Science from the same university. His main area of expertise is in ship design, propeller design, propulsion systems and model testing. Currently attached to Marine Technology Centre (MTC UTM) as head of contract research and consultancy. He is also a professional engineer registered with the board of engineers of Malaysia.

Rear Admiral Dato' Pahlawan Ir. Hj. Jasan Ahpandi bin Sulaiman (R) is currently the Head of Commercial Division at the Boustead Heavy Industries (BHIC). He has served in the Royal Malaysian Navy for 35 years.

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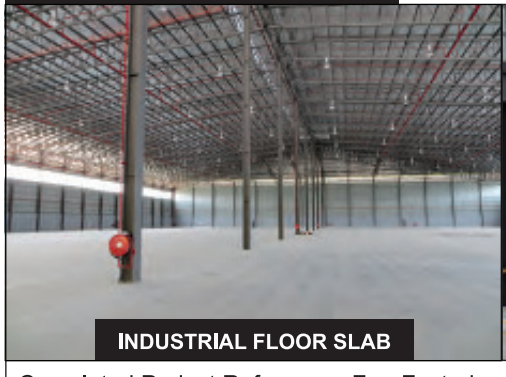

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Butterworth Ready For Penang Sentral

After a delay of seven years, the RM2 billion Penang Sentral project in Butterworth is set to take off and Penang residents and visitors can look forward to a state-of-the-art transportation hub in about three years, there are no further hitches.

The project's developer, Penang Sentral Sdn Bhd, has reportedly submitted plans to the local authorities for permission to proceed with the project, which will give the people of Penang and the northern states a transportation hub that will boost the tourism, logistics and transportation sectors.

Penang Sentral Sdn Bhd – a 49:51 joint venture between Malaysian Resources Corporation Bhd and Pelaburan Hartanah Bhd – is expected to offer segmented areas for buses and taxis, adequate retail spaces with escalators and elevators, and covered and air-conditioned walkways to the Keretapi Tanah Melayu train station and the Sultan Abdul Halim ferry terminal.

(Sourced from NST, 12 May 2014)

Research Universities' Role As Motivators Of k-Economy

The Media Event RU Success Stories programme organised by Universiti Putra Malaysia (UPM) recently at its campus in Serdang highlighted many of the inventions and benchmarks set by the local research universities (RU).

The programme also highlighted the talents behind important research and development undertaken by the RUs.

The event among others highlighted the prototype of a mobile breast scanner, the ambitious Serdang biomass town project and the accreditation system to benchmark tourists spots in the country.

All these are researched and developed by brilliant Malaysian minds with the RU serving as the enabler in putting forth their talents and abilities in driving the country's k-Economy and achieving the developed status by 2020. The five universities recognised as RU in two phases, namely in 2007 and 2010, are UPM, Universiti Malaya (UM), Universiti Kebangsaan Malaysia (UKM), Universiti Sains Malaysia (USM) and Universiti Teknologi Malaysia.

Apart from carrying out research independently or through collaboration with local or foreign parties, all the RUs also collaborate with one another in conducting research through a cluster system.

They are also entrusted with the responsibility of establishing collaboration with the private sector in commercialising the research outcomes to generate income.

(Sourced from BERNAMA, 10 May 2014)

More Spot Checks To Reduce Worksite Accidents

Spot checks at construction sites will be intensified to reduce the number of deaths and injuries, said Works Minister Datuk Fadillah Yusof. He said the ministry would work with local councils, the Immigration Department, the Department of Occupational Safety and Health and the Health Ministry to conduct integrated checks on worksites nationwide, beginning with Government-linked projects.

"Our goal is to reduce the number of accidents, deaths and injuries as well damage to property. We are not doing this to penalise anyone but to inculcate a culture among those in the construction industry that safety and health aspects need to be adhered to," he told reporters after visiting the UniKL-Malaysian Institute of Aviation Technology construction site in Subang Jaya yesterday.

He said a team of experts tasked to improve industry practices had cited carelessness in its report as among the reasons why construction accidents occurred in the country.

"Carelessness is definitely a factor. We are looking at whether guidelines are properly followed, and if there is a lack of enforcement or understanding of rules. Everyone needs to play his part to reduce the risk of accidents, including professional bodies which act as advisers to project owners, developers, local councils, contractors, health, safety and construction personnel," he said.

Fadillah said 164 accidents were reported at construction sites last year which resulted in 69 fatalities. 12 workers lost their ability to work and 83 suffered injuries.

(Sourced from The Star, 9 May 2014)

Bintulu Port To Expand Handling Capacity

Bintulu Port Holdings Bhd (BPHB) will invest RM400mil over three years to expand the port's container and cargo handling capacity, as well as support facilities for oil and gas (O&G) companies. The move will help the port operator to reduce its reliance on core liquefied natural gas business.

Chief executive officer Datuk Mior Ahmad Baiti Mior Lub Ahmad said the capital expenditure up to 2017 would include the conversion of a 300m general cargo wharf for container operation and building of a new 300m general cargo wharf at the second inner harbour.

The two projects are estimated to cost RM340mil. The new wharf would have facilities like warehouses, an open yard for paper products, logs and other general cargo.

Other new projects in the pipeline were the development of a 300m bulk fertiliser wharf, also at the second inner harbour and a 150m small barge berth at the port's edible oil terminal.

(Sourced from The Star, 10 May 2014)

Proposal For Goverment Buildings To Make Use Of Rainwater

Government buildings should have a rainwater harvesting system to help conserve the use of piped water, said Energy, Green Technology and Water Ministry secretary-general Datuk Loo Took Gee.

She proposed that the Public Works Department integrate rainwater harvesting technology into future designs of government buildings.

"Existing buildings should also be refurbished to include the system," she said. "This would set a good example and encourage more Malaysians to harvest rainwater at their homes."

Residents in Petaling Jaya were hit with water rationing between February and the end of April after the Sungai Selangor dam level dropped to critical.

While the rationing ended on May 1, experts have warned of more water cuts due to weather conditions until the completion of the Langat 2 water supply project in 2017.

(Sourced from The Star, 7 May 2014)

One-day Course on Health, Safety and Environment (HSE) in the Industry

MARINE ENGINEERING AND NAVAL ARCHITECTURE TECHNICAL DIVISION

by Engr. Shazlan Rahman

IN September 2013, the IEM Marine Engineering and Naval Architecture Technical Division (MNATD) organised a one-day course on "Health, Safety and Environment (HSE) In The Industry". The objective was to increase awareness on the importance of HSE in the engineering sector of the marine industry.

The course was presented by Prof. Ir. Dr Ab. Saman Abd. Kader, the Director of Marine Technology Centre of Universiti Teknologi Malaysia (UTM) and was chaired by Dato' Ir. Hj. Jasan Ahpandi, the deputy chairman of MNATD.

Prof. Saman started the course by discussing the HSE Law in Malaysia, mainly the Occupational Safety and Health Act (OSHA) 1994. He also explained the role of Department of Safety and Health (DOSH) in regulating the HSE laws.

He then covered HSE issues in plants, machinery and equipment. To make this topic interesting, Prof. Saman gave numerous examples from his past experiences as a marine engineer on board of the Malaysian International Shipping Corporation. He discussed the HSE issues that he had to face while operating, repairing and maintaining the power plant system of the vessels.

Prof. Saman then talked about the importance of HSE Management System in an organisation. He emphasised the importance of the manager's role in managing the HSE policy, operation and training to ensure the successful implementation of HSE procedure. To ensure that the HSE Management System is effective, the HSE team should audit its system regularly and appropriate measures should be taken to improve any procedure that is not used effectively.

For example, a recent audit may find that the workers are not wearing the required personal protective equipment (PPE) regularly when working. To solve this problem, the management should carry out regular training programmes and put up awareness posters to make the workers more aware about the importance of using PPE.

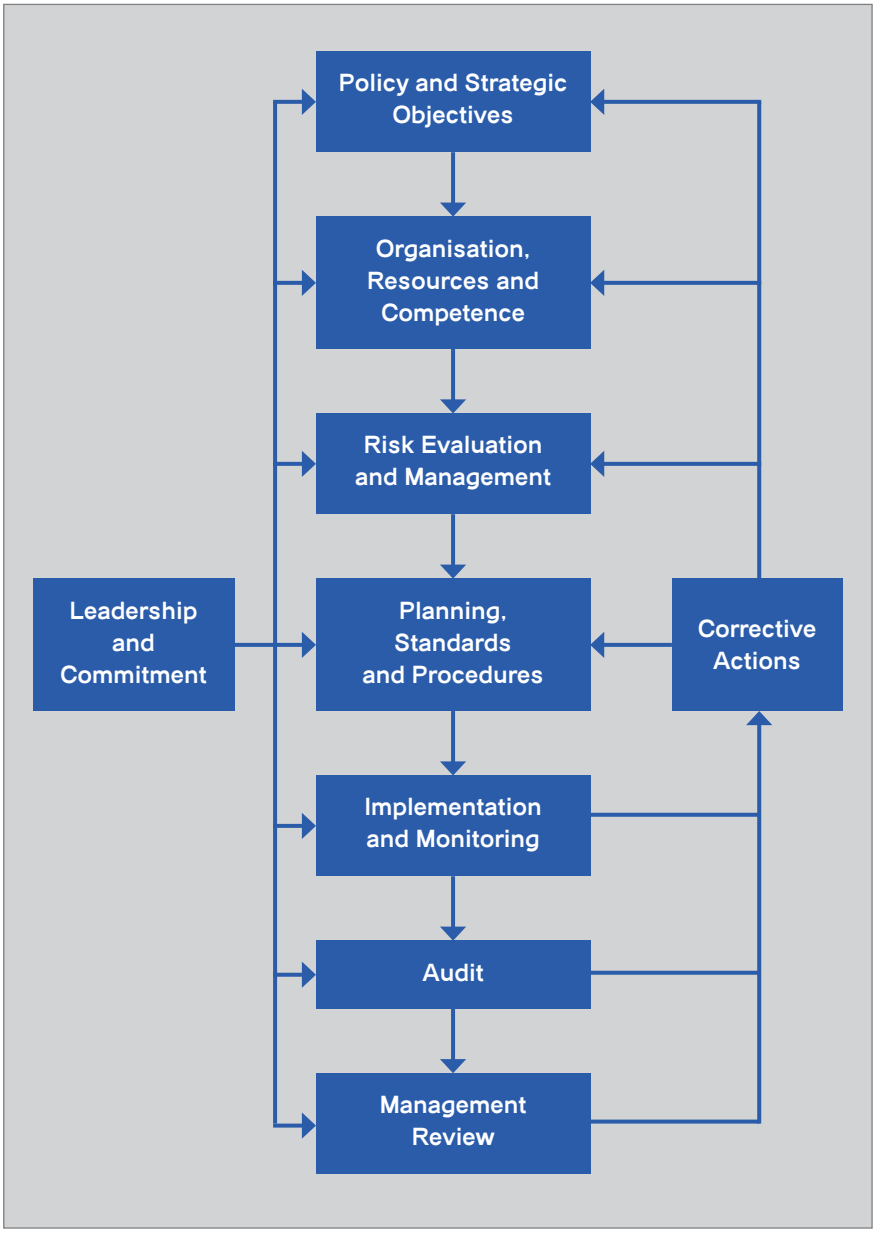

Figure: Typical Structure of a HSE Management System

The session ended with discussions on how to carry out HSE risk assessment and how these risks can be managed. Prof. Saman stressed that the first thing one should do is to eliminate or reduce the risks. Eliminating the risks will ensure no accident will happen in the first place. Effective communication is also important to ensure workers are aware of the potential hazards surrounding them. Personal protective equipment (PPE) should only be used as the final option.

The participants found the course was interesting as Prof. Saman's experiences as a marine engineer and his current role as the Director of UTM Marine Technology Centre, gave him a unique blend of examples in explaining the HSE issues. It was hoped that this course could be repeated again in the future. ■

Engr. Shazlan Rahman is a corporate member with the Institution of Civil Engineers UK (MICE) and a chartered engineer with the Engineering Council UK (CEng). He has experience in the structural design and integrity management of offshore structures. He is a committee member of the IEM Marine and Naval Architecture Technical Division.

Pengumuman yang ke-74

SENARAI PENDERMA KEPADA WISMA DANA BANGUNAN IEM

Institusi mengucapkan terima kasih kepada semua yang telah memberikan sumbangan kepada tabung Bangunan Wisma IEM. Ahli-ahli IEM dan pembaca yang ingin memberikan sumbangan boleh berbuat demikian dengan memuat turun borang di laman web IEM *http://www.myiem.org.my* atau menghubungi secretariat di +603-7968 4001/5518 untuk maklumat lanjut. Senarai penyumbang untuk bulan April 2014 adalah seperti jadual di bawah.

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39	25658	LIEW VOON HING
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47	13027	MO CHEE LIM
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Visit to Akademi Laut Malaysia (ALAM) in Malacca

MARINE ENGINEERING AND NAVAL ARCHITECTURE TECHNICAL DIVISION

by Ir. Hj. Rani bin Mohd. Raji

THE Marine Engineering and Naval Architecture Technical Division (MNATD) organised a visit to Akademi Laut Malaysia (ALAM) on Monday, 21st Oct, 2013.

On arrival we were received by Captain P.C. Nadkar, Director of Academic Affairs and Advisory. He has been with ALAM since its inception in 1977. First, we were briefed on the history of ALAM and given an overview of the training academy.

ALAM was initially known as the Maritime Training Centre (MTC). In January 1981, MTC was upgraded to Academy status with the award of Government Charter by the then Prime Minister Tun Dr Mahathir Mohamed. In January 1997, ALAM was privatised by a consortium of MISC, Petronas, PSC (now known as BHIC) and Klang Port Management.

Group photo

IEM delegates being briefed by Captain P.C. Nadkar

FACULTIES

The main faculties in ALAM are Marine Engineering and Nautical. Other courses include Maritime and Offshore Safety Training, Standards of Training, Certification and Watch-keeping (STCW) as well as Maritime Management.

The Marine Engineering Faculty trains future engineers for the real-life challenges. It provides the rigours of academic knowledge with the discipline of hands-on practical training. The faculty also conducts research in various fields, from Marine Engineering Technology to FPSOs.

We were also informed that ALAM is working to get its Engineering qualification recognised by IEM and the Board of Engineers. In countries such as the United Kingdom, courses offered by its Maritime Academy are recognised by its Engineering Council.

TOUR OF WORKSHOPS AND SIMULATORS

We were then taken on a tour of the academy, in particular the Marine Engineering workshops, the hostel and the simulators. ALAM's Maritime Simulation Centre consists of full mission ship handling simulator, full mission engine room simulator and liquid cargo operations simulator. These are installed with state-of-the-art software that provides high fidelity hydrodynamic effects, hence providing a realistic marine environment.

CONCLUSION

The visit to ALAM was a fruitful event that enabled the participants to gain knowledge on how it conducts its training. Simulators, for instance, are not cheap but their use allows students to better appreciate the real life situation of handling ships at sea. ■

Captain Ir. Haji Rani (age 67) is currently Chairman of Marine Engineering and Naval Architecture Technical Division (MNATD) of IEM. He was Director of Engineering with the Royal Malaysian Navy and later as Director of Shipbuilding Division at MSE (now known as MMHE).

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One-Day Short Course On "High Strain Dynamic Pile Testing and Analysis On Deep Foundation"

by Ir. Liew Shaw Shong

GEOTECHNICAL ENGINEERING TECHNICAL DIVISION

IT was a great honour for the Geotechnical Engineering Technical Division of IEM, to have a team of internationally recognized dynamic pile testing experts – Mr. Garland Likins, Mr. Ryan Allin and Ir. Richard Yu – deliver a one-day course on "High Strain Dynamic Pile Testing and Analysis On Deep Foundation" at Tan Sri Prof. Chin Fung Kee Auditorium, Wisma IEM on 2nd September 2013. The short course, chaired by Ir. Mun Kwai Peng, was attended by 144 participants.

The course started with an introductory background on dynamic pile testing development and a comparison with other pile testing methods. All methods are closely linked, with definition of failure criterion and also the validation process in line with the design philosophy. The use of impact wave travelling through the pile shaft by application of wave propagation theory to yield useful physical engineering behaviours of the installed pile was briefly explained.

First module gives basics of wave mechanics on the following aspects:

a. Wave propagation
b. Wave equation and solution
c. Proportionality Law: Forces in a pile are a function of pile impedance and particle velocity
d. Wave speed (square root of ratio between Young modulus and density of pile)
e. Upward and downward travelling wave: Pile forces (stress and strain) are proportional to positive particle velocity in a downward travelling stress wave and also an upward travelling stress wave
f. Restraint effects of pile toe (fixed end and free end): Pile toe force can reach twice force at top
g. Effects to travelling wave with soil resistance
h. Case-Goble capacity
i. Case damping factor (Separation of dynamic and static resistances)
j. Impact stress (Momentum collision impact, Ram mass effect). A few salient points on impact stress can be summarised below:
   i. Impact stress is a function of impact velocity.
   ii. Tension stresses can be equal to compressive stresses in free and fixed end pile.
   iii. Compressive stresses at pile toe can be twice those at impact.
   iv. High ram mass causes higher top stress than at impact at wave return.
   v. Stresses at a point along pile are the sum of the stresses in upward and downward wave.

k. Energy (Hammer performance assessment from transformation of potential energy to kinetic energy to derived rated energy of impact, and finally transferred energy onto pile).

Second module provides the basic practice of dynamic pile testing with following issues highlighted:

a. Potential problems: Lack of knowledge, pressure on tester from piling contractor, poor understanding of end user to the test and interpretation.

b. Dynamic Measurement and Analysis Proficiency test (on data acquisition, data quality, data interpretation and data communication) are recommended to testers. Specifying agencies can set their own requirements on the rank and validity period of this proficiency test for the field tester and office signatory for the test report.

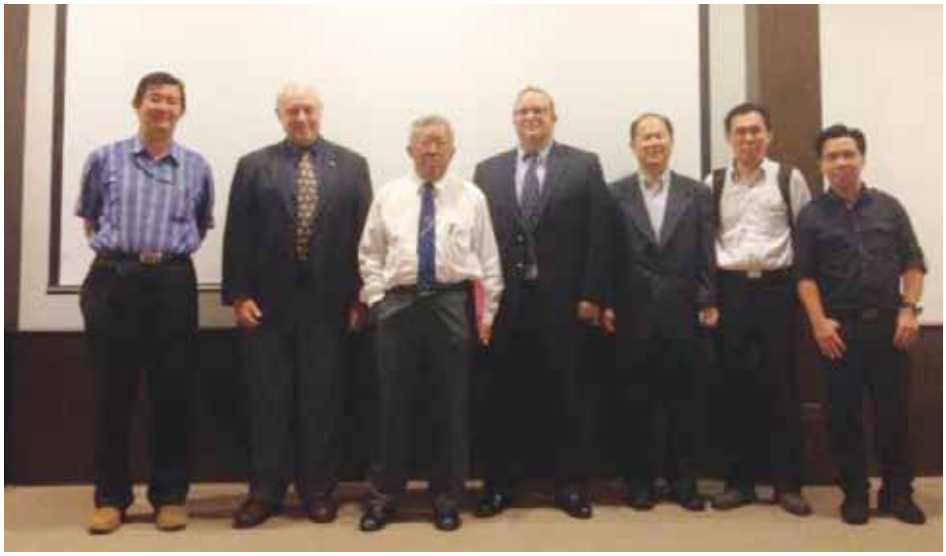
c. Location of sensors: At least 2 pile diameter/width below pile head for uniform impact stress.

Third module on Application of PDA and CAPWAP in pile design verification: Provision of various pile tests including dynamic pile tests in enhancing design confidence and design safety factor under the various design codes was discussed. Application of dynamic pile test results on potential pile capacity relaxation with time was presented.

Fourth module on PDA Workshop: (i) Compression and tensile stresses measured at pile top and assessing the calculated at pile body and toe, (ii) Real time beta value indicating pile integrity, (iii) hammer performance and appropriate hammer energy for productivity, and (iv) Method of end of drive and retriked pile capacity assessment (RSP, RMX and RSU).

Fifth module on models, procedures and parameter for CAPWAP. Measurements are done on impact load and the responded movements of pile, but the parameters on soil model system interacting with the tested pile are unknown. CAPWAP deploys iterative signal matching algorithm on damping resistance, resistance distribution and soil stiffness at both shaft and toe to reverse analyse the soil parameters with acceptably match quality. The CAPWAP output consists of total capacity, shaft and toe resistances, stiffness of soil at pile-soil interface, damping properties of soil, and static load-settlement curve emulating very quick static load test.

The short course ended at 5.00 p.m. with the presentation of mementoes and certificates of appreciation to the speakers. A group photo was also taken. ■



Group photo of the GETD committee and the lecturers (From left: Ir. Liew Shaw Shong, Mr. Garland Likins, Ir. Mun Kwai Peng, Mr. Ryan Allin, Ir. Richard Yu, Ir. Lee Peir Tien and Engr. Dr Gue Chang Shin)

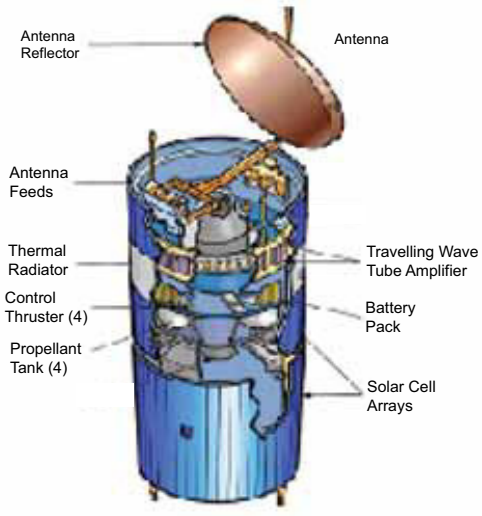
Ir. Liew Shaw Shong, is currently the Chairman of IEM Geotechnical Engineering Technical Division (GETD). He is the Senior Director of G&P Geotechnics Sdn. Bhd.

Satellite Failures, Anomalies and Space Environment

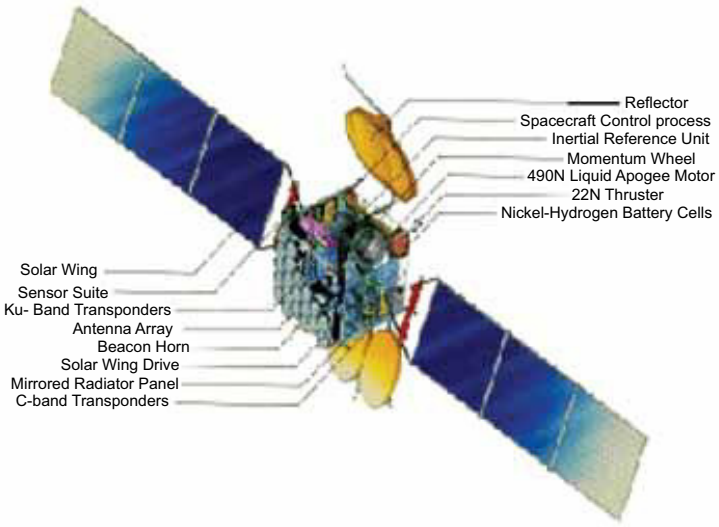
ENGINEERING EDUCATION TECHNICAL DIVISION

by Ir. Chew Weng Yuen

Types of Modern Communication Satellite



Spin-Stabilized Spacecraft



3 axis-Stabilized spacecraft

THE Engineering Education Technical Division organised a talk titled Satellite Failures, Anomalies And Space Environment, together with the Engineers Australia Malaysia Chapter and the Institution of Mechanical Engineers Malaysia Branch, on 1st October 2013, at the Auditorium Tan Sri Prof. Chin Fung Kee, 3rd Floor, Wisma IEM. The talk was delivered by En. Azih M Zin, Senior Advisor at Measat.

There were 70 participants. The talk commenced at 5.30 p.m. with En. Azih showing pictures of the various types of modern communication satellites.

He then elaborated on the geosynchronous orbit, geosynchronous satellite, geostationary orbit, and geostationary satellite. He said that most commercial and communications satellites including Measat's two (2) satellites operate in geostationary orbit which has an altitude of approximately 35,786 km directly above the Equator and that satellites here have a velocity of 3.00 km/s.

As the number of satellites in the geostationary orbit is very high, operators are allocated orbital slots to locate their respective satellites. This is to limit and manage the number of satellites in the geostationary orbit. Each orbital slot is able to stack (co-locate) up to a maximum of 8 satellites.

En. Azih described space as a dynamic place filled with energetic particles, radiation, and trillions of objects, both very large and very small, ranging from micrometeoroid showers to orbital debris. The velocity of these particles ranges from zero to the speed of light. Temperatures vary from being extremely high to being extremely cold. Charge particles continually bombard exposed surfaces. Magnetic field can be intense and the environment in space is constantly changing. All these factors influence the design and operation of space system.

He explained in length with regards the negative effects of surface charging, photoelectron current, difference of floating potential on dielectric surface material that causes arc-discharging, and deep dielectric or bulk charging (IESD) on spacecrafts. He said spacecraft charging is responsible for a number of operating anomalies such as telemetry glitches, logic upsets and component failures and spurious.

He continued with the space weather outlook for the years beyond. He said that designers will normally look at past events to forecast future occurrence. He then told the participants that the sun glows its brightest every 11 years.

The cycle whereby the sun is at its minimum to its maximum is known as a solar cycle (SC) and space scientists will benchmark these solar cycles for the future 15 years space flights.

En. Azih also talked about proton event which relates to energies released by the sun and which ionises heavy iron. He said proton and ionised irons are hazardous to spacecraft and are primarily responsible for anomalies. As such, designers will design spacecrafts based on the solar maximum to mitigate the effect of these solar energetic particles.

He further mentioned the radiation effect caused by Galactic Cosmic Ray, Solar Flare, Solar Proton Event and Coronal Mass Ejection. Passive electronics such as cable, wiring, solar array and sensors can be seriously affected by radiation. As such, space components have to be radiation hardened (RAD HARD), with shielding and grounding in order to mitigate the above threats.

Next, En. Azih moved on to the threats caused by space debris. It was shown that space debris had increased by a thousand-fold since 1960. This debris was generated by spacecraft explosion, collision, etc and the size of the debris varies from less than 0.01cm to those greater than 10cm. Damage caused by space debris, even small ones, can be relatively significant, because of the extremely high orbital velocity which varies from 8 to 10 km/sec.

To observe and track space debris, various ground-based radars or telescopes, detectors aboard satellites or orbiting equipment recovered on the ground (i.e. Hubble telescope panels) are available.

En. Azih then discussed mitigation methods carried out by operators to lessen damage to their spacecraft caused by space debris and the current regulations imposed on spacecrafts operators by international space regulators.

Active discussions followed with questions raised by the participants after the talk. En. Azih answered all the questions and the talk ended with the presentation of a memento to En. Azih and a round of applause from the participants. ■

Deputy Chairman of IEM Engineering Education Technical Divison, Ir. Mathew Thomas presenting a momento Encik Aziz M. Zin

Ir. Chew Weng Yuen is a committee member of the Engineering Education Technical Division of IEM. He is currently the Deputy General Manager of Forefront Tiara Sdn. Bhd., a property development company.

Source of Innovation

CHEMICAL ENGINEERING TECHNICAL DIVISION (CETD)

by Dr Chong Chien Hwa

WHAT is innovation? What are the barriers and key factors to promote effective innovation? These were questions answered at a half-day workshop organised by Chemical Engineering Technical Division (CETD) on 7th Sept 2013. Assoc. Prof. Dr Edwin Chung from the School Of Engineering at Taylor's University and Head for Taylor's Technology Innovation Centre (TTIC) was invited to conduct the workshop.

Dr Chung started by requesting all participants to introduce themselves and to state their expectations for the workshop.It was noted that most of the participants wished to learn more about innovation, how to start to innovate, tools and techniques to generate ideas, what comes after innovation, how to apply innovation techniques to research and development as well as how to generate high impact innovation.

Next, participants were engaged in the second session with a simple paper game to illustrate how we limit our thinking with a self-imposed barrier. Participants were pushed until they had no choice but to think pass the artificial barrier for a solution and they awakened to the realisation that it was they themselves who put a limit on their thinking.

SESSION 2

Innovation is not only good for business but it also creates shareholder value. A report in Business Week in 2006, indicated that the top 25 most innovative companies at the time achieved a median profit margin growth of 3.4% a year since 1995 compared with 0.4% for the median S&P1200 company. Dr Chung also related the story behind Honda's CVCC engine development to illustrate the benefits of innovation.

Figure 1: Participants trying to solve the paper challenge at the workshop

The taxonomy for innovation was introduced. Dr Chung said that when we talk about innovation, we normally think of innovation in the form of product and services but there is more to innovation that just product and services. He then introduced participants to the 10 types of innovation as defined by DOBLIN. This model is as depicted in Figure 2.

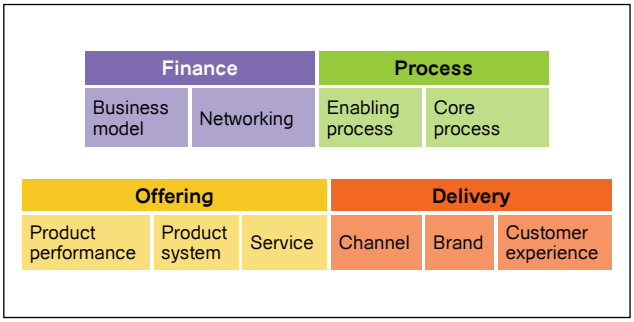


Figure 2: Types of innovation defined by DOBLIN

SESSION 3

After this, he introduced a framework for innovation based on Design Thinking. Based on the simple process of Understand, Observe, Ideate and Prototype, Dr Chung first illustrated this with a short video presentation and then followed up by going through some of the underlying techniques for each of these steps in turn.

In conclusion, it was emphasised that effort is extremely important, for nothing happens without effort. Finally, Dr Chung engaged the participants in a discussion about the source of innovation. He stressed that if we know where the source of creativity is and that innovation is within us, we will become more creative and innovative by constantly nurturing this source. He kept at it until most of the participants finally realised what he was talking about.

The workshop ended at 1.00 p.m. ■

Dr Chong Chien Hwa is the Associate Dean (Learning & Quality), School of Engineering, Taylor's University. He is a Chartered Engineer and a member of Institution of Chemical Engineers (IChemE), UK.

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IEM INKS MoU with CIArb

IEM ACADEMY SDN. BHD.

by Ir. Dr Ooi Teik Aun
Chairman of Executive Council of IEM Academy Sdn Bhd

THE Institution of Engineers, Malaysia (IEM) through its wholly-owned subsidiary IEM Academy Sdn. Bhd. (IEMASB) and the Chartered Institute of Arbitrators (CIArb) Malaysia Branch signed a memorandum of understanding (MoU) on 6th February 2014. The MoU was signed by Ir. Choo Kok Beng, the then IEM President cum Chairman of IEMASB Board and Ar. David Cheah Ming Yew, CIArb Chairman.

This sets the platform for CIArb to provide education and training for IEM members and others interested in structured courses in Dispute Resolution Practice/Management (DRP/DRM), to be carried out through IEM Academy Sdn Bhd.

In his welcome speech, Ir. Choo said the MoU was the result of a dialogue held between IEM and CIArb in October 2013. It was hoped that with the combined learned experiences of IEM and CIArb, the good practice of Disputes Resolution in Malaysia will be greatly enhanced and that the expertise of IEM members will be increased, thus improving their marketability overseas especially in the ASEAN region. IEM is the ASEAN Engineers Secretariat and there are ample opportunities for CIArb to work with IEM in this region.

Welcoming the signing of the MoU, Ar. David Cheah Ming Yew said that IEM is the first institution with which CIArb has signed the MoU. He expressed appreciation that IEM had invited CIArb to be part of this collaboration.

Moving forward from the MoU, a series of talks and courses will be held over the next few months, such as that on "The Role & Responsibilities of an Expert in Dispute Resolution", "Good Preparation of Expert Report" and "Going To Court". With the MoU, both IEM and CIArb hope to see the participation of all industry players and professionals.

Also present to witness the Signing Ceremony were several IEM Council Members, members of the Subcommittee on Dispute Resolution Practice (DRP) of IEM, Council members of CIArb as well as the Board and senior management of the IEMASB and the IEM secretariat. ■

Photo 1: *Dialogue between IEM and the delegation from CIArb prior to the signing*
Photo 2: *(L-R) Dr Ir. Ooi Teik Aun, IEMASB Executive Council Chairman; Ir. Choo Kok Beng, IEM President cum Chairman of IEMASB Board; Ar. David Cheah Ming Yew, CIArb Chairman and Ir. Leon Weng Seng, a Fellow of CIARB as well as a member of IEM's Panel of Arbitrators.*

Photo 3: *Exchange of the duly signed MoUs*
Photo 4: *Group photo comprising the office bearers and staff of IEM, IEMASB and CIArb*

Ir. Dr Ooi Teik Aun is the current Chairman of Dispute Resolution Practice (DRP) Subcommittee. He is also an Advisor for Consulting Engineering Special Interest Group (CESIG) as well as that of Tunnelling and Underground Space Technical Division (TUSTD). Ir. Dr Ooi is an Honorary Fellow of IEM, Fellow of the Malaysian Institute of Arbitrators and Past President and is ICE Country Representative for Malaysia. He is Organizing Chairman of the International Tunnelling and Underground Space Conference in March 2015 in Kuala Lumpur as well as Chairman of the Foundation Course promoted by the International Tunnelling Association (ITA-AITES) to be held in Kuala Lumpur in February 2015. He is President of Southeast Asia Geotechnical Society (2010-2016).

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- A complete list of all current IEM Honorary Fellows, Fellows, Members, Graduate and Student Members.
- List of major Engineering related events, seminars and exhibitions in Malaysia.

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Welcome to Polar Bear Country

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

OUR Boeing 737 took less than 1½ hours to cross the Barents Sea from Tromsø in northern Norway to Longyearbyen in Svalbard.

Welcome to polar bear country!

When I was planning my trip to the Nordic countries, I did not forget to include Svalbard in the itinerary. Svalbard first caught my attention when my wife and I visited Caerlaverock Wetland near Dumfries in Scotland in late November 2008. Every year, some 25,000 barnacle geese fly a few thousand kilometres from Spitsbergen to overwinter in the Wetland and nearby areas. Spitsbergen is the largest of the islands that make up Svalbard.

The Svalbard archipelago, with a total land area of 61,022 sq km, is situated midway between continental Norway and the North Pole. It is the northernmost place on earth with a permanent settlement.

Dutch explorer Willem Barentsz discovered Svalbard in 1596. He named the islands Spitsbergen or "sharp mountains". Spitsbergen became a whaling base 15 years later, and whaling activities continued there until 1820s. In the meantime, other hunters arrived to hunt walrus, seal, polar bear and arctic fox. Coal was discovered on the islands and mining commenced in 1899. It is still on-going in the Russian settlement of Barentsburg and the Norwegian settlement of Sveagruva.

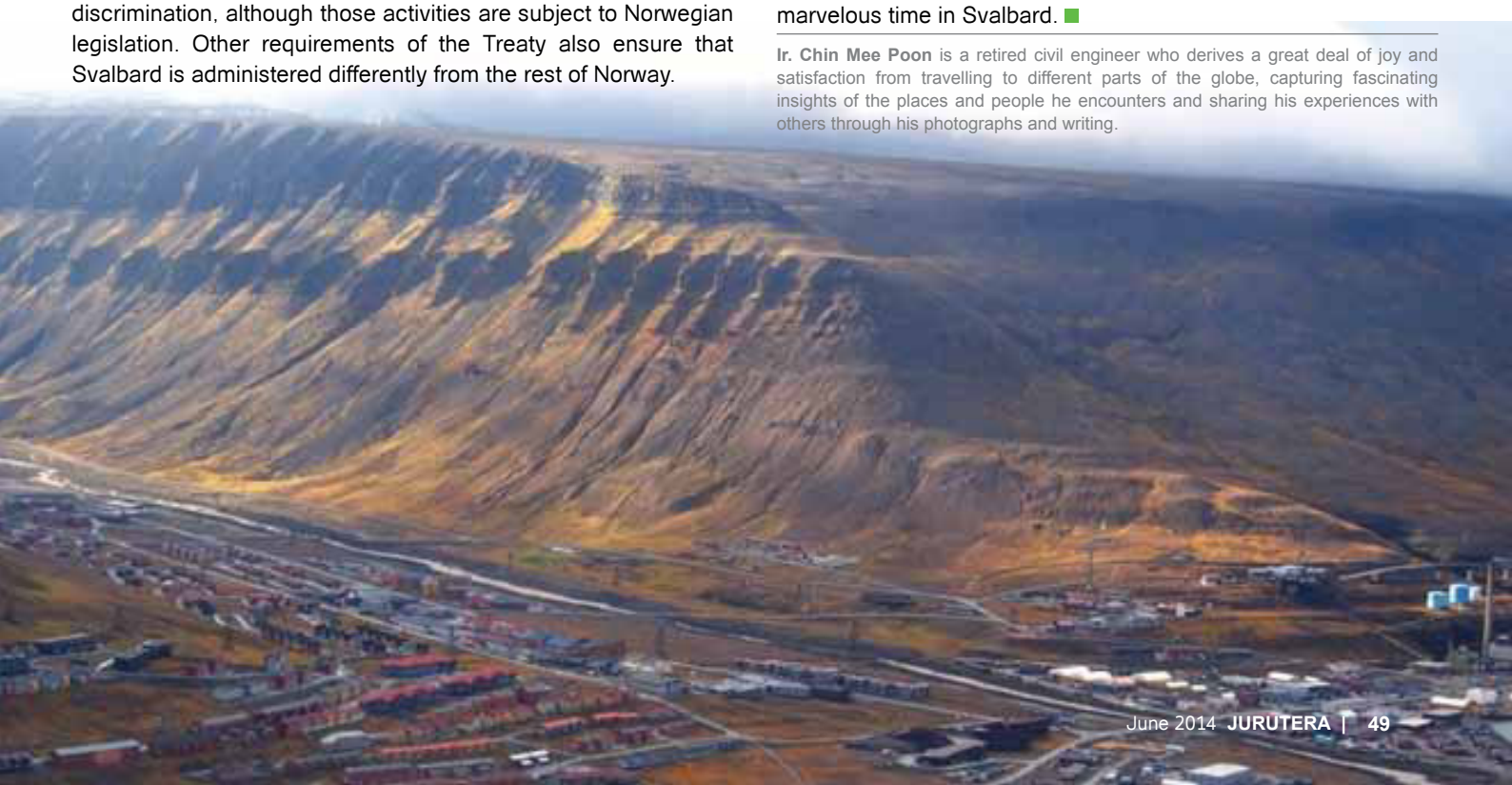
According to the Svalbard Treaty of 1920 that came into effect in 1925, Norway has sovereignty over the archipelago. All 40 signatory countries of the Treaty, however, have the right to conduct commercial activities on the archipelago without discrimination, although those activities are subject to Norwegian legislation. Other requirements of the Treaty also ensure that Svalbard is administered differently from the rest of Norway.

My wife and I spent 3 nights in Longyearbyen, the largest settlement in Svalbard. Longyearbyen is situated near the centre of Spitsbergen. We arrived on 9th September and missed the midnight sun by more than half a month. At a latitude of 78.2°N, Longyearbyen experiences midnight sun from 20th April to 23rd August. It also has a long polar night that runs from 26th October to 15th February. We spent most of our time in the town. A tourist information office shared a large avant-garde building with the Svalbard Museum and the University Centre in Svalbard. Nearby was the Spitsbergen Airship Museum. Longyearbyen also had a hospital, schools, cultural centre, sports centre, cinema, library, church, bank, art galleries, supermarkets, restaurants, hotels, travel agencies and a coal-fired power station to generate electricity. It is a full-fledged little town. There are no roads linking Longyearbyen to other settlements on Spitsbergen though.

Longyearbyen is also where the Svalbard Global Seed Vault is located. The vault, officially opened on 26.02.2008, preserves a wide variety of plant seeds that are duplicate samples, or "spare" copies, of seeds held in gene banks worldwide.

We did get away from Longyearbyen by joining a cruise that took us to see Esmark Glacier and to visit the Russian mining settlement of Barentsburg. It was a pity that we did not come across any polar bear, walrus, fox or reindeer during our stay in Svalbard. But we did see two ringed seals basking on separate ice floes as well as puffins and fulmars. We also saw quite a number of barnacle geese and some Arctic terns. And we had an exhilarating experience dog-sledding on the road! We had a truly marvelous time in Svalbard. ■

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.



TEMUDUGA PROFESIONAL

Tarikh: 12 May 2014

Kepada Semua Ahli,

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Mengikut Undang-Undang Kecil IEM, Seksyen 3.9, nama-nama seperti tersenarai berikut diterbitkan sebagai calon-calon yang layak untuk menjadi Ahli Institusi, dengan syarat bahawa mereka lulus Temuduga Profesional tahun 2014.

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Ir. Gunasagaran Kristnan
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28 June 2014

Organised by Senior Special Interest Group

Time : Time: 9.00 a.m. – 11.00 a.m. (CPD/PDP: 2 hours)

Venue : Wisma IEM

INTERNATIONAL CONFERENCE

7th International Conference on Cooling and Heating Technologies 2014 (ICCHT 2014)

Theme: Innovation and Sustainability in Heating and Cooling Technologies

4 – 6 November 2014
Grand Dorsett Subang Hotel, Selangor

Organised by Mechanical Engineering Technical Division, IEM

The Conference proceedings will be published by IOP Conference Series: Materials Science and Engineering (MSE) and will be indexed in Scopus.

In conjunction with the Conference, a Technical Exhibition will be organized as an integral part of the Conference. Project experiences, product solutions, new applications and state-of-the-art information of heating and cooling technologies will be highlighted. The standard booth space is 4 metre by 4 metre with rear and dividing walls of 2500mm high using white powder coated aluminium system. The cost of one booth is **RM12,000.00**.

IMPORTANT DATES	
Submission of abstract	30 June 2014
Notification of acceptance of abstract	30 June 2014
Submission of full paper	31 July 2014
Notification of acceptance of full paper	30 Sept 2014

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Note: *This is a continuation of the list which was first published on page 48 of the May 2014 issue.*

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66802	DAYANG NORULFAIRUZ BINTI ABANG ZAIDEL	B.E.HONS.(UMIST) (CHEMICAL, 2003) M.SC.(UPM)(FOOD, 2008)
66800	DENESH A/L VISYAN	M.E.HONS.(NOTTINGHAM) (CHEMICAL-ENVIRONMENTAL, 2013)
66534	GANESSWARAN A/L KRISHNAN	B.E.HONS.(UTAR) (CHEMICAL, 2014)
66701	HAZREENA BINTI MOHD HAMZAH	B.E.HONS.(CURTIN) (CHEMICAL, 2009)
66677	HII KING HUNG	B.E.HONS.(UTM) (CHEMICAL, 2006)
66538	LEE ENG HAW	B.E.HONS.(UTAR) (CHEMICAL, 2014)
66729	LEE WEE SIONG	B.E.HONS.(CANTERBURY) (CHEMICAL & PROCESS, 2012)
66540	LEOK WOON YANG	B.E.HONS.(UTAR) (CHEMICAL, 2014)
66684	LEONG DONG GUO	B.E.HONS.(UTP) (CHEMICAL, 2013)
66535	LEONG HENG ONN	B.E.HONS.(UTAR) (CHEMICAL, 2014)
66728	LING TIING TIING, IRENE	B.E.HONS.(CURTIN) (CHEMICAL, 2007)
66539	TAN SZE LE	B.E.HONS.(UTAR) (CHEMICAL, 2014)
69477	TAN WENG KHIM	B.E.(UMP) (CHEMICAL, 2013)
66809	VANITHA SILVARAJHU	B.E.HONS.(USM) (CHEMICAL, 2004)
66797	WAN MOHD AZFAR BIN WAN ABDULLAH	B.E.HONS.(UTP) (CHEMICAL, 2008)
66537	WONG KA LIK	B.E.HONS.(UTAR) (CHEMICAL, 2014)
66536	WONG WEI LONG	B.E.HONS.(UTAR) (CHEMICAL, 2014)
66803	YONG SIEW CHING	B.E.HONS.(UTAR) (CHEMICAL, 2012)
KEJURUTERAAN MEKANIKAL		
66676	AEDE HATIB BIN MUSTA'AMAL @ JAMAL	B.E.HONS.(UTM) (MECHANICAL, 1998)
66828	AHMAD NIZAM BIN MOHAMED AMIN	B.SC.(WASHINGTON) (MECHANICAL, 1993)
66703	ARVIND A/L POOBALAN	B.E.HONS.(UTM) (MECHANICAL-MATERIALS, 2005)
66819	CHONG MUI SEN	B.SC.(MANITOBA) (MECHANICAL, 2007)
66529	DING JU LIANG	B.E.HONS.(MONASH) (MECHANICAL, 2008)
66527	DR. PAUZIAH BINTI MUHAMAD	B.E.HONS.(UTM) (MECHANICAL, 1998) M.E.(UTM)(MECHANICAL, 2002) P.HD.(SHEFFIELD) (MECHANICAL, 2011)
66748	FAIZ BIN KASIM	B.E.HONS.(UMS) (MECHANICAL, 2012)
69507	FOO REN HAW, HUDSON	B.E.HONS.(RMIT) (MECHANICAL, 2011)
66470	HAZZIQ SHUKRI BIN AB RAZAK	B.E.HONS.(UNITEN) (MECHANICAL, 2012)
66787	HOOI JEN XIUNG	B.E.HONS.(UTAR) (MECHANICAL, 2012)
66693	JOSHUA ANAK GOING	B.E.HONS.(UTHM) (MECHANICAL, 2008)
66685	KHAIRUL AMILIN BIN ZAINAN ABIDIN	B.E.HONS.(KUiTTHO) (MECHANICAL, 2006)
66705	LAU CHIN SHENG	B.E.HONS.(NUS) (MECHANICAL, 2008)
66823	LIM JIN WEI	B.E.HONS.(UNITEN) (MECHANICAL, 2009) M.E.(UPM) (ENVIRONMENTAL, 2013)
66736	MOHD AFIQ ZARIF BIN BAHAROM	B.E.HONS.(UNITEN) (MECHANICAL, 2012)
66795	MOHD AHADLIN BIN MOHD DAUD	B.SC.(HANYANG) (MECHANICAL, 1991)
66793	MOHD BARIQ BIN MD YAZID	B.E.HONS.(UTP) (MECHANICAL, 2011)
66532	MOHD FADZIL ALI BIN AHMAD	B.E.HONS.(MANCHESTER) (MECHANICAL, 2006) M.E.(UTM)(MECHANICAL, 2011)
66688	MOHD FARID BIN ALADDIN	B.E.HONS.(IIUM) (MECHANICAL-AUTOMOTIVE, 2010)
66707	MOHD FIRDAUS BIN ABD LATIF	B.E.HONS.(UTEM) (MECHANICAL-DESIGN & INNOVATION, 2011)
66670	MOHD HAFIZ BIN ABDUL HALIM SHAH	B.E.HONS.(USM) (MECHANICAL, 2006) M.E.(MALAYA) (MECHANICAL, 2013)
66808	MOHD HANIF BIN ABDUL RASHID	B.E.HONS.(UTM) (MECHANICAL-TECHNOLOGY MARINE, 2007)
66694	MOHD HANIFF BIN OTHMAN	B.E.HONS.(UTM) (MECHANICAL, 2011)
66836	MOHD NOOR FAHMIE BIN MD RONI	B.E.HONS.(UNITEN) (MECHANICAL, 2012)
66531	MOHD RIZAL BIN LIAS	B.E.HONS.(KUiTTHO) (MECHANICAL, 2005)
66711	MOHD SANUSI BIN ABDUL AZIZ	B.E.(KANAZAWA) (MECHANICAL SYSTEMS, 2008) M.E.(KANAZAWA) (MECHANICAL SCIENCE, 2010) P.HD.(KANAZAWA) (INNOVATIVE TECH. & SCIENCE, 2013)
66530	MUHAMAD NAZRI BIN MOHD RIFFIN	B.E.HONS.(UTHM) (MECHANICAL, 2010)
66790	MUHAMMAD ALIF ANWAR BIN MOHAMAD SAA'RI	B.E.(ADELAIDE) (MECHANICAL, 2010)
66724	MUHAMMAD ALIF BIN AZIZ	B.E.(RITSUMEIKAN) (MECHANICAL, 2011)
66749	MUHAMMAD AZHANUDIN BIN BORHAN	B.E.HONS.(UiTM) (MECHANICAL, 2011)
66746	MUHAMMAD FATHULLAH BIN IDRIS	B.E.HONS.(UPNM) (MECHANICAL, 2011)
66752	NG KAH CHONG	M.E.HONS.(NOTTINGHAM) (MECHANICAL, 2012)
66739	NIK LATIFAH BINTI NIK RAMLI	B.E.HONS.(MALAYA) (MECHANICAL, 2007)
66462	NOORAZIZI BIN MOHD SAMSUDDIN	B.E.HONS.(UTM), M.E.(UTM)
66816	NUR AKMAL BINTI HANIFFAH	B.SC.(IBARAKI) (MECHANICAL, 2008) M.E.(IBARAKI) (MECHANICAL, 2010)
66743	PRAGASH KRISHNASAMY	B.E.HONS.(NOTTINGHAM TRENT)(MECHANICAL, 2004)
66730	RAJA MOHD AZLAN BIN RAJA AZREN	B.E.(UMP)(MECHANICAL-MANUFACTURING, 2008)
66696	RALPHAEL ROMEL ANAK RIJET	B.E.HONS.(UNIMAS) (MECHANICAL & MANUFACTURING, 2012)
66751	SUKHANIA A/P SEVAH	B.E.HONS.(UNITEN) (MECHANICAL, 2011)
66810	THAM YI EEI	B.E.HONS.(UTHM) (MECHANICAL, 2010)
66549	TING DING LEE	B.E.HONS.(UTAR) (MECHANICAL, 2014)
66831	YUSNANI HAJAR BINTI ARIFIN	B.E.HONS.(UTHM) (MECHANICAL, 2012)
66824	ZURIANA MARIATI BINTI MAT YAJID	B.E.HONS.(UTM) (MECHANICAL-AERONAUTICAL, 2007)
KEJURUTERAAN MEKATRONIK		
66785	CHAN HON LOONG, LENNARD	B.E.HONS.(MONASH) (MECHATRONICS, 2012)
66551	CHUA WEN XIN	B.E.HONS.(UTAR) (MECHATRONICS, 2014)
66552	GANESH A/L KRISHNAN	B.E.HONS.(UTAR) (MECHATRONICS, 2014)
66550	LIM YEE HERN	B.E.HONS.(UTAR) (MECHATRONICS, 2014)
KEJURUTERAAN PEMBUATAN		
66820	AZNOR BIN HASSAN	B.E.HONS.(UNIMAP) (MANUFACTURING, 2008)
66712	EFFENDI BIN MOHAMAD	B.E.HONS.(MALAYA) (MANUFACTURING, 2002) M.SC.(COVENTRY) (ENGINEERING BUSINESS MANAGEMENT, 2007) P.HD.(TOKUSHIMA) (INTELLIGENT STRUCTURES & MECHANICS SYSTEM, 2013)
66719	JOSHUA A/L JAYA PRAKASH	B.E.HONS.(USM) (MANUFACTURING ENGINEERING WITH MANAGEMENT, 2010)
KEJURUTERAAN PETROLEUM		
69497	MUHAMMAD YUSUF BIN HASHIM	B.E.HONS.(UTP) (PETROLEUM, 2011)
66718	WONG HAN SZE	B.E.HONS.(UTP) (PETROLEUM, 2011)

PERMOHONAN MENJADI AHLI 'INCORPORATED'

No. Ahli	Nama	Kelayakan
KEJURUTERAAN ELEKTRONIK		
66463	MOHD YUSKHAIRY BIN YUSOFF	B.E.HONS.(TWINTECH) (ELECTRONICS & INSTRUMENTATION SYSTEM, 2011)
KEJURUTERAAN MEKANIKAL		
66826	LAU CHOO CHONG, FELIX	B.E.(DEAKIN) (MECHANICAL, 2012)

PERMOHONAN BARU / PEMINDAHAN AHLI

Persidangan Majlis IEM yang ke-392 pada **19 April 2014** telah meluluskan sebanyak **828** ahli untuk permohonan baru dan permindahan ahli. Berikut adalah senarai ahli mengikut disiplin kejuruteraan:

DISIPLIN	GRED KEAHLIAN									
	FELO	SENIOR	AHLI	COMPANION	SISWAZAH	"INCORPORATED"	"AFFILIATE"	"ASSOCIATE"	SISWA	JUMLAH
Aeronautikal										**0**
Aeroangkasa										**0**
Pertanian										**0**
Automotif										**0**
Biokimia										**0**
Bioperubatan					2				1	**3**
Biosistem										**0**
Perkhidmatan Bangunan										**0**
CAD/CAM										**0**
Kimia	2		3		9				80	**94**
Awam	1		13	1	36				175	**226**

Komunikasi										**0**
Komputer					1					**1**
Sistem Komputer										**0**
Komputer & Komunikasi										**0**
Pembinaan										**0**
Sistem Kawalan										**0**
Elektrikal & Elektronik										**0**
Elektrikal			8		20				39	**67**
Elektronik					5				116	**121**
Elektronik & Kawalan Instrumentasi										**0**
Elektromekanikal										**0**
Tenaga										**0**
Alam Sekitar									16	**16**
Proses & Makanan										**0**
Geoteknik										**0**
Lebuhraya										**0**
Industri					1				5	**6**
Sistem Maklumat										**0**
Teknologi Maklumat										**0**
Instrumentasi										**0**
Kawalan & Instrumentasi										**0**
Pembuatan			1		4				32	**37**
Sistem Pembuatan										**0**
Marin										**0**
Bahan					2				1	**3**
Metallurgi										**0**
Mekanikal			11		32				196	**239**
Mekatronik					1				12	**13**
Mikroelektronik					1					**1**
Mineral										**0**
Sumber Mineral										**0**
Perlombongan										**0**
Arkitek Naval										**0**
Petroleum					1					**1**
Polimer										**0**
Pengeluaran										**0**
Struktur										**0**
Telekomunikasi										**0**
Sumber Air										**0**
JUMLAH	**3**	**0**	**36**	**1**	**115**	**0**	**0**	**0**	**673**	**828**

Senarai nama ahli dan kelayakan adalah seperti di bawah. Institusi mengucapkan tahniah kepada ahli yang telah berjaya.

Ir. Gunasagaran Kristnan
Setiausaha Kehormat
Institusi Jurutera Malaysia

PERMINDAHAN AHLI KEPADA AHLI FELLOW

No. Ahli	Nama	Kelayakan
KEJURUTERAAN AWAM		
06697	NG SIN CHIE	BSC HONS (GLASGOW) (CIVIL, 1981)
KEJURUTERAAN KIMIA		
25748	ABDUL AZIZ BIN ABDUL RAHMAN	BE HONS (MALAYA) (CHEMICAL, 1989) MSC (MALAYA) (ENG, 1996)
17029	RAZMAHWATA BIN MOHAMAD RAZALLI	BA (CAMBRIDGE) (1994) ME (CAMBRIDGE) (1995)

PEMINDAHAN AHLI KEPADA AHLI KORPORAT

No. Ahli	Nama	Kelayakan
20976	LIM SIONG KANG	BE HONS (UTM) (CIVIL, 2001) ME (UTM) (CIVIL-CONSTRUCTION & MANAGEMENT, 2002) PHD (UTM) (CIVIL, 2008)
08022	MAT HUSSIN BIN GHANI	BE HONS (UTM) (CIVIL, 1981)
60625	MOK KEN LOONG	BE HONS (UKM) (CIVIL & STRUCTURAL, 2004) MSC (YONSEI) (CIVIL & ENVIRONMENTAL, 2011)
46764	NAIZIMIN HISHAM BIN RAMLI	BE HONS (UITM) (CIVIL, 2007)
29221	SUKHVINDER SINGH HARBANS SINGH	ME (PORTSMOUTH) (CIVIL, 2003)
18658	TIONG TOH OH	BSC (OKLAHOMA STATE) (CIVIL, 1984)
25553	YEOH KEAT YEW	BE HONS (UMS) (CIVIL, 2004) MSC (USM) (PROJECT MANAGEMENT, 2007)
43765	YU KOK LOON	BE HONS (UTM) (CIVIL, 2005)
KEJURUTERAAN ELEKTRIKAL		
38026	CHONG YEE HWA	BE HONS (USM) (ELECTRICAL, 2008)
16387	LEONG KIM CHEONG	BE HONS (STRATHCLYDE) (ELECTRICAL &ELECTRONICS, 1992)
62035	MUHAMMAD KHAIRUL BIN MOHD DILIF	BE HONS (UTM) (ELECTRICAL, 2008)
45817	ROHAN BIN AHMAT	BE HONS (UPM) (ELECTRICAL & ELECTRONICS, 2002)
61963	SARIZA BINTI YAHAYA	BE HONS (UM) (ELECTRICAL, 2006)
41256	SOH SIANG LONG	BE HONS (UPM) (ELECTRICAL & ELECTRONICS, 2008)
20220	TAN KHENG BOON	BE HONS (UTM) (ELECTRICAL, 2001)
KEJURUTERAAN KIMIA		
47560	KHAIRUL ANWAR BIN MOHAMAD ZAWAWI	BE HONS (UTM) (CHEMICAL-GAS, 2008) ME (UKM) (CHEMICAL, 2012)
KEJURUTERAAN MEKANIKAL		
28846	AHMAD FAIRUZ BIN YAHAYA	BE HONS (UTM) (MECHANICAL, 2004)
38790	KHAIROL NIZAM BIN MANSOR	BE HONS (UTM) (MECHANICAL-MARINE TECHNOLOGY, 2002)
37997	MOHD AZMI BIN HASHIM	BE HONS (UTM) (MECHANICAL, 2003)
39956	TANG JENQ HANN @ TAN JENQ HANN	BE HONS (NEW SOUTH WALES) (MECHANICAL, 2009)

Note: *Remaining list would be published in the July 2014 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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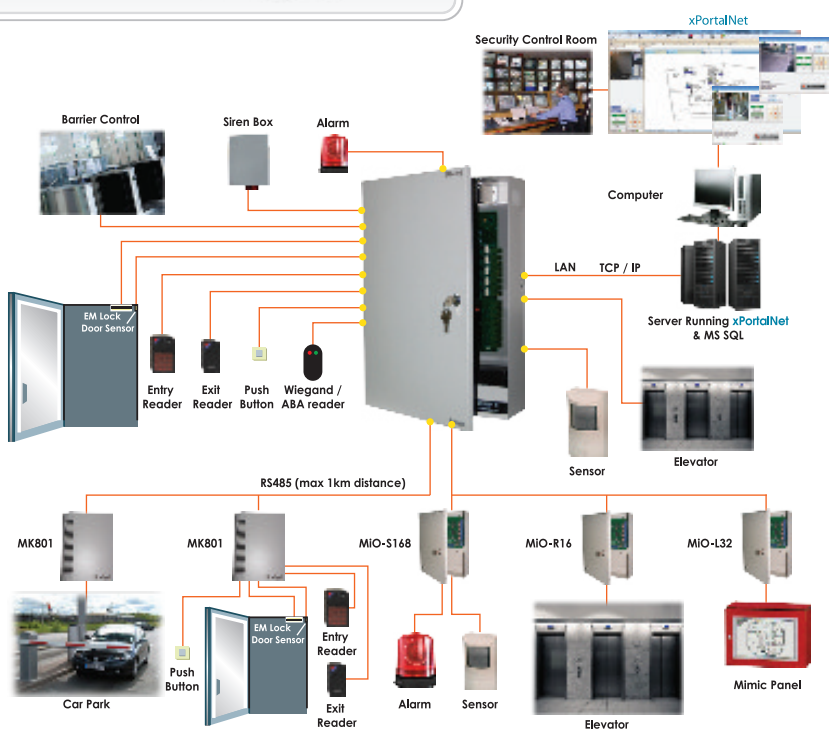

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