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Oil and Gas Industry in Malaysia – An Overview

Malaysian Oil and Gas Engineering Consultants – Moving Forward

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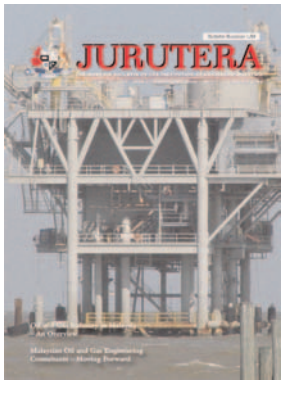

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UNIVERSITY-INDUSTRY INTERACTION : A Forgone Conclusion?

By : Ir. Prof. Abang Abdullah bin Abang Ali, IEM President

As a young Dean of Engineering in the early 80s, university-industry interaction was my favourite topic because I strongly believe the university and the industry were inseparable twins in the business of education and training of the country's technical human resource. Prior to this and almost immediately after my appointment as a lecturer, I was myself spending 4 to 5 days a week in industry as a design engineer in my effort to gain the necessary practical or professional experience which is a necessary prerequisite to building that important bridge to the private sector. This was made possible after proposing a professional training scheme for engineering lecturers to the university council. As a dean I was encouraging and indeed prodding lecturers to work hard towards building a good rapport with the industry in order to expose them as well as their students to the realities of the workplace.

Paper after paper have been presented and deliberated on in major national and international conferences and seminars on this issue over the years implying that this is one issue which will not fade away. There is also an annual national level dialogue between university leaders and captains of industry chaired by the Minister of Education (now, Higher Learning) on this issue. Unfortunately much as we would like to see this close cooperation between universities and the industry to develop and after some three decades of talking about it, it did not seem to work fully in Malaysia. Universities often say that the industry is hardly interested and the industry on the other hand appear to consider university lecturers and students too academic to be of any good to their business.

With the recent renewed emphasis on research and development (R&D) in Malaysian universities, given the larger amount of R&D funds made available through the Intensification of Research in Priority Areas (IRPA) programme, involvement in the industry has gone further to the back burners. The latest craze in the universities is for journal papers, R&D achievement medals and patents at the expense of the highly elusive university-industry interaction.

It is as if we are unable to excel in both. And yet in more established universities abroad, lecturers are successful researchers and are also able to stand tall amongst professional engineering practitioners. They publish in order not to perish in the university but at the same time are respected leaders in their professional institutions. They have journal papers as well as major design achievements in practice.

Striking a balance between academic and professional excellence would not be too difficult if there is close cooperation between universities and the industry. Universities must through their active involvement in R&D be able to offer new knowledge and technology to the industry and the industry must be willing to come forward to support teaching and R&D activities in the universities through endowments, chairs and grants. Cooperation in innovation and commercialisation activities is a sure way forward. But then there must be political will to make all these happen. ■

We wish all IEM Members and Readers a
HAPPY & PROSPEROUS CHINESE NEW YEAR

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MALAYSIAN ENGINEERS AND THE OIL & GAS INDUSTRY

By : Ir. Dr Samad bin Solbai,
Chairman, Oil, Gas & Mining Technical Division

Thirty years ago the Malaysian Parliament passed the Petroleum Development Act (1974) and laid down the groundwork for the development of the oil & gas industry in the country. Since then the industry has developed to become one of our most important economic sectors. It is also a sector which has taken advantage of the most demanding, challenging and exciting engineering and technological advances and therefore should be of great interest to engineers.

The country's oil & gas industry has developed from mere production of crude for export to value-added downstream production of commodity and engineering plastics, petrochemicals and fertilizers. Local engineers have numerous opportunities to contribute to the various facets of the industry, from front-end engineering design of oil production facilities to the design and construction of chemical plants.

Despite these opportunities many of the local engineering positions are still occupied by expatriates. There are still relatively few truly-local companies (and individual engineering specialists) which are directly involved in areas like front-end conceptual and process engineering design. Fortunately, the number is steadily increasing especially in detail design and management of the construction of offshore oil & gas platforms and petrochemical plants. In some of these areas Malaysian engineers have also successfully lend their expertise (as expatriates) in other countries.

Perhaps the time has now arrived for IEM to address this issue directly and get into dialogues with oil companies like Petronas, Exxon-Mobil, Shell and Murphy Oil in order to increase the awareness of oil & gas opportunities amongst local engineers. The main objectives of such dialogues would be to promote the services of Malaysian engineers and identify areas where the Institution can play a role in enhancing and complementing the local oil & gas industry.

The oil & gas industry is multidisciplinary in nature. The input and contribution of every discipline of engineering have significant roles to play in the industry. Due to its unique requirements, the industry has developed standards and practices almost at par with the high standards of requirements in aeronautics. Many of these standards and practices such as the selection of materials and safety management will probably find their way into the general construction industry as the latter tries to meet the ever demanding public expectations. The same applies to quality assurance and control in construction, non-destructive testing, corrosion and welding practices – to name just a few. ■

THE MALAYSIAN OIL AND GAS INDUSTRY : An Overview

By : Ir. Razmahwata bin Mohamad Razalli

Introduction

The Oil & Gas (O&G) industry has seen no small amount of attention during recent months. One item attracting attention is crude prices rising above USD50 per barrel ($0.159m^3$) and the simultaneous rise of petrol prices due to reduction in government subsidies. News of discoveries of new potentially producing fields has increased interest in O&G related stocks, whether in suppliers to the industry or oil refineries. To encourage and maintain this level of interest, IEM held a symposium in July 2004, attempting to put forward a forum where people outside the O&G industry could be exposed to issues within the industry. As a follow-up, this article attempts to present a basic picture of the oil and gas industry in Malaysia.

History of Production Sharing Contracts

Petroleum exploration in Malaysia started at the beginning of the 20th century in Sarawak, where oil was first discovered in 1909 and first produced in 1910. Prior to 1975, petroleum concessions were granted by state governments, where oil companies have exclusive rights to explore and produce resources. The companies then paid royalties and taxes to the government. This state of affairs ceased on April 1, 1975 as a result of the Petroleum Development Act, whereby PETRONAS became the custodian of petroleum resources with rights to explore and produce resources. The national oil company retains ownership and management control in exploration, development and production of oil resources. Expenditure and profits are managed under instruments called Production Sharing Contracts (PSCs). The Production Sharing Contractor assumes all risks and sources all funds for all petroleum operations. The Contractor receives an entitlement through production. Each PSC may have different terms and conditions. For example, different time periods are allowed for exploration of acreage, developing and installing infrastructure

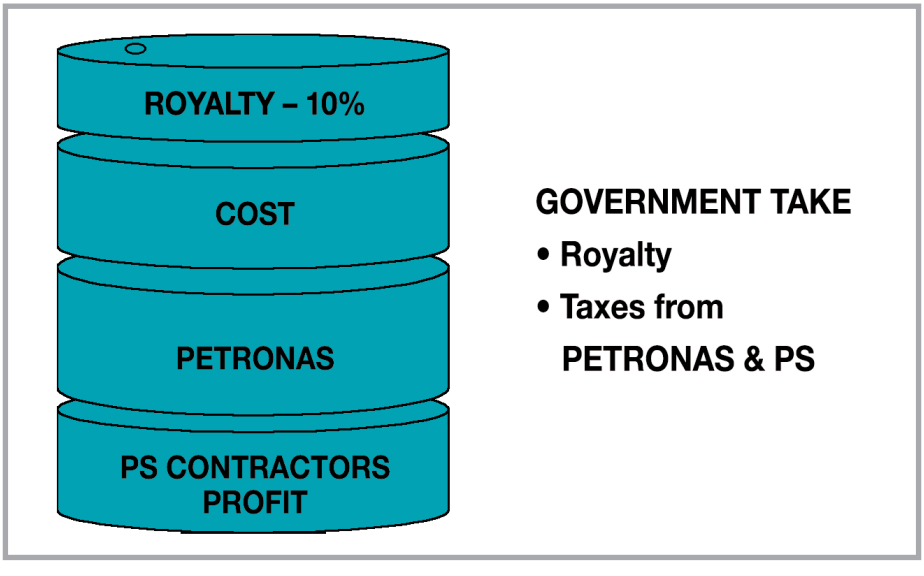

Figure 1 : Production Sharing Contractor Entitlement

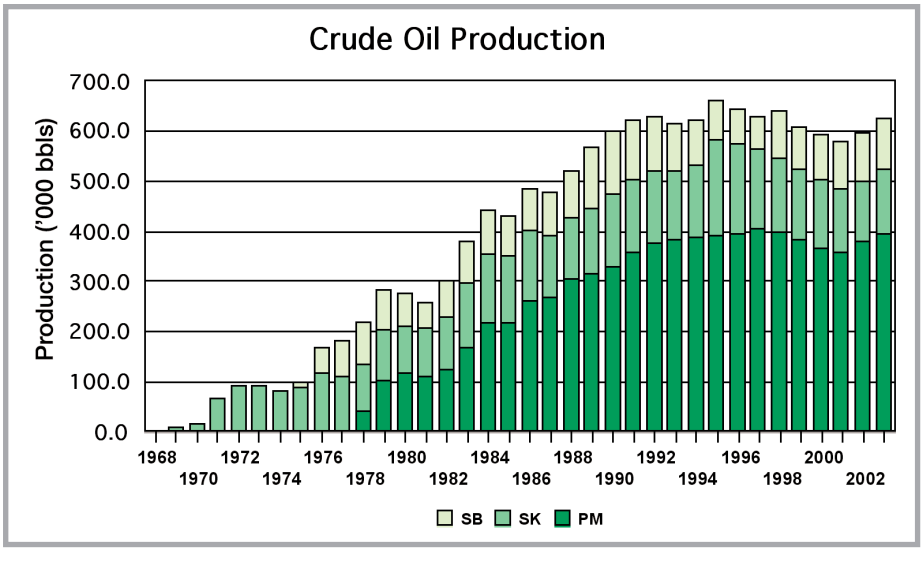

Figure 2 : Historical Crude Oil Production (bbls : barrels per day. SB : Sabah contribution. SK : Sarawak Contribution, PM : Peninsular contribution.)

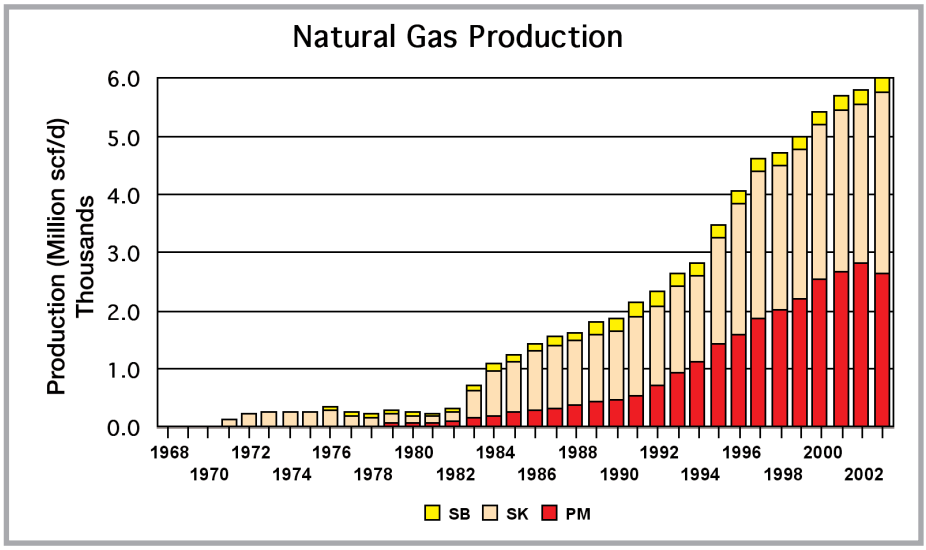

Figure 3: Historical Natural Gas Production

to produce any hydrocarbons discovered, and the actual production period.

Malaysia has the 25th largest oil reserves and the 14th largest gas reserves in the world. The total reserves is of the order of 18.82 billion barrels oil equivalent (boe), with a crude production rate of 600 thousand barrels per day. The average natural gas production stands at approximately 5.7 billion standard cubic feet per day.

Malaysia has 494,183km^2 of acreage available for oil and gas exploration, with 337,167km^2 in the offshore continental shelf area, and 63,968km^2 in deepwater. The acreage is split into 54 blocks, out of which 28 (a total of 205,500km^2) are currently operated by Petronas Carigali Sdn. Bhd. plus seven other multinational oil companies.

Industry Players

Among the PSC Contractors operating in Malaysia are Petronas Carigali (PETRONAS's operations company), ExxonMobil Exploration and Production (Malaysia) Inc (EMEPMI), Nippon Oil, Sarawak Shell, Murphey Oil and Amarada Hess. These companies are involved in upstream operations, which is generally understood to mean all O&G activities taking place prior to processing and refining of hydrocarbons. Among the activities would be:

- **Exploration:** analysing and interpreting seismic data to determine the potential of hydrocarbon reserves; drilling of test wells.
- **Conceptual development:** performing screening studies to determine the most efficient and cost effective method to produce potential hydrocarbon sources. This would include selection of facilities (floating or moored structures), transport of hydrocarbon from field to customer (pipeline, floating storage and offloading (FSO) vessels), corrosion mitigation strategies, and safety aspects of the operations.
- **Development:** project management of construction, detailed engineering, optimum well location, transport of facilities to location and commissioning of facilities.
- **Production:** maintenance strategies, planning budgets, analysis of supply and demand, and retrofit work to maintain or meet new production targets.

The O&G industry is involved in downstream activities as well. Here, 'downstream' means processes taking place after oil has been transported from the reservoir, and into crude oil terminals. Investment opportunities include processing and refining of the crude, petrochemical plants, logistics and retail transactions. Downstream has different players, and a more diverse range of interests. In oil refining, there are Petronas Penapisan (with plants in Terengganu and Melaka), Shell, ExxonMobil and Conoco. Petronas Gas and MLNG are involved in gas processing and transmission. Gas distribution is handled by Gas Malaysia. The retail arm has many interests, including Petronas Dagangan, Shell, ExxonMobil and ConocoPhillips (under the Projet brand). Petrochemicals have the most diverse range of companies, including Optimal, BASF, BP, Amoco and Idemitsu.

Challenges in the Upstream

The Malay Basin is a relatively mature location, with well-known hydrocarbon reserves. Therefore, a lot of work is in progress to increase current production by improving the amount of hydrocarbon recovered from existing sources and by finding new reservoirs in areas that have been previously overlooked. New exploration and interpretation of data in currently producing regions have resulted in new finds. One find is the Sumandak Complex, where oil is being found in regions previously thought to be devoid of hydrocarbons.

In addition to exploring old areas, new fields are being sought. One upcoming production area is in what is known as deep waters (water depth more than 1000ft or

300m.) To produce the hydrocarbon resources found in these areas, technology new to Malaysia are required. This technology would cover aspects such as the ability to drill wells in deep waters, and the ability to analyse and install sea bottom facilities to deliver the hydrocarbon to the topside facilities at sea level. On the operational side, Malaysia would need to develop a support base that can handle the challenges of maintaining deep water facilities at a competitive cost within reasonable turnaround times. An example of a recent development is Kikeh, which has a water depth of 1,300m (4,000 ft), whereas reservoirs developed to date have been in waters typically 60m (200 ft) deep.

One example of change in the Malaysian production strategy is looking towards producing gas fields that have contaminant gases that would affect the metallurgy of the production facilities. Among these gases are carbon dioxide (CO_2) and hydrogen sulfide (H_2S). As these gases are unsaleable, and may cause corrosion in piping, fields with a high percentage of these gases were originally not deemed commercially attractive, as infrastructure has to be put in place to remove the gases from the hydrocarbons before being sent to onshore terminals. Currently, with a larger demand for gas and new technologies, these fields have become financially attractive. Examples of fields with high CO_2 content are Bunga Raya (Peninsular Malaysia), and Chakerawala (Joint Development Area between Thailand and Malaysia.)

There is also an opportunity to increase production by rejuvenation (see Figure 4) of existing production facilities. This concept can be applied both to topside and subsurface facilities. As an example, more than 50% of Malaysian assets have been producing for longer than 15 years. There are definite opportunities to debottleneck facilities, looking at design and current operating conditions, and maximising the use of existing equipment. New technologies may be retrofitted into existing equipment, increasing capacity at an acceptable cost.

Engineering Contributions

In all of the above, engineers play an important role in the development of O&G resources. They are involved in a whole slew of areas, from conceptual or front end engineering design (FEED), to detailed engineering, procurement services, construction management services, and special studies. The main bodies of engineers involved in O&G upstream work reside in five engineering companies licensed by Petronas as Umbrella Design Contractors (UDCs): Technip, Ranhill Worley, MMC, Kvaener Petrominco and Sime Engineering. When required, specialist companies are enlisted to participate in special studies, for example subsea facilities, blast analysis, dynamic simulation and flow assurance. Among such companies present in Malaysia are JP Kenny, ERM, Trident, DNV and IGL.

Engineers play an important role in the construction of O&G facilities. OSFAM (Offshore Structure Fabricators Association of Malaysia) is an organisation dedicated to the advancement of Malaysian fabrication facilities. Its members, compromising of Brooke Dockyard and Engineering Works Corporation, Penang Shipbuilding and Construction Sdn. Bhd., H. L. Engineering, Ramunia Fabricators, Malaysia Shipyard and Engineering, and Sime Sembcorp Engineering Sdn. Bhd., aspire to make OSFAM a fabrication hub, and establish themselves as Engineering, Procurement and Construction (EPC) contractors. OSFAM members plan a step change in their fabrication yard capacity, but this is dependent on a number of factors. More jobs are required to support and justify the investment and the need to increase the members' ability and expertise to undertake Engineering, Procurement, Construction and Commission (EPCC) and technically advanced projects. To achieve and maintain these aims, there is a need

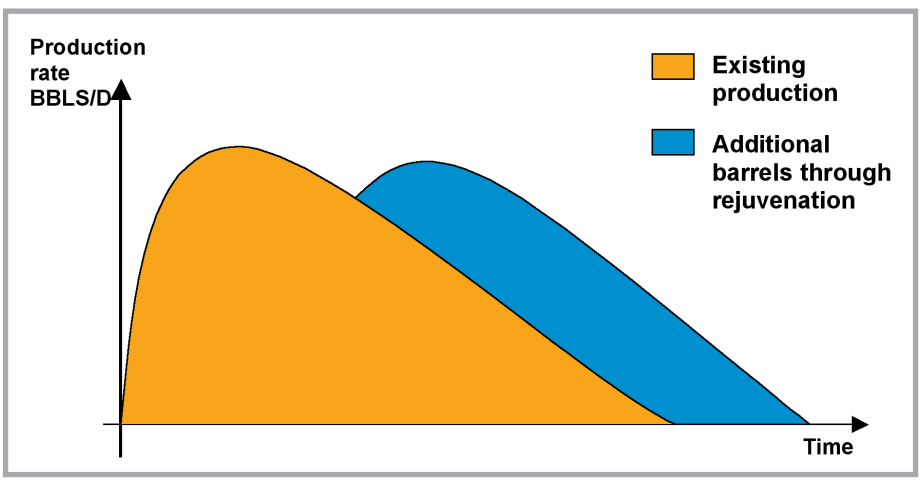

Figure 4: Increased production through rejuvenation

for more skilled resources in the O&G construction industry. For example, the industry is always on the lookout for project management and planning engineers up to the challenge of working within the O&G business environment. This can be seen as being different from the construction sector, as project timing and budgets are more critical when dealing with hydrocarbon facilities.

To further the interests of Malaysian engineering, Mogec (Malaysian Oil and Gas Engineering Contractors) was formed in 2001. It comprises of the UDC companies plus other consultant firms. Among its objectives are to provide a forum for discussion on issues of common interest, to promote cooperation between members and to promote the use and development of local resources in the Oil, Gas and Petrochemical industry.

An example of how engineers play important roles at all levels of modernising and improving engineering processes can be seen in one multinational's innovative approaches in developing marginal

fields. Historically, offshore developments have been structured around large gas and oil fields, which were produced through manned facilities. Locations which were further away were produced via unmanned facilities (satellite platforms) that were large and had numerous utilities on-board, of which examples are air compressors and air dryers, active fire suppression systems, and generators that run on liquid fuel. These projects usually had long project cycles from conception to commissioning, typically along the lines of 36 months. In addition, the costs then associated with the capital and operational expenditure did not make good economics when developing small fields.

A number of innovations to increase the economic viability of the program have been done. Among them is a step change in deciding the minimal acceptable facilities installed on-board a platform. To maximise economies of scale, similar components are simultaneously fabricated, and drilling and installation programs have been combined. To maintain continuity and leverage on lessons learnt, a single project management team is established for multiple developments.

Local Companies

The growth of the Malaysian Oil & Gas industry has spawned a whole support industry, providing services and products to operators. Local contractors and suppliers who wish to do business with PETRONAS are first required to register with its Licensing and Registration Department. This has encouraged the growth of Malaysian-owned businesses, and opened up opportunities to expand outside national borders.

One company is Trenergy FPSO Sdn. Bhd., a wholly owned subsidiary of Trenergy (Malaysia) Bhd. It was established to spearhead Trenergy's foray into the upstream oil and gas sector. A 9-year leasing contract with Petronas Carigali saw the emergence of FPSO Perintis, which started production in May 1999 in the MASA oilfield situated about 155 kilometers offshore from Terengganu, Malaysia.

The O&G industry has also spawned industrial sites that came about due to their strategic positions with respect to raw products. The sleepy town of Kertih, Terengganu, has been modernised due to the presence of the Kerteh Petrochemical Complex. Offshore Peninsular oil and gas are

collected at the Terengganu Crude Oil Terminal (TCOT) and Onshore Gas Terminal (OGT), respectively. The hydrocarbons are processed by the local Petronas refinery, and Petronas Gas plants, which in turn supply the raw material to plants such as Optimal and Polyethylene Malaysia, which are also located on-site. This congregation of high-tech and non-local workforce help in developing local commerce and social activities.

Community Relations

One must not forget that the O&G companies operating in Malaysia would also like to be seen as responsible corporate citizens. To this end, various companies have spent time and effort in giving something back to the community. PETRONAS offers scholarships to deserving students to further their education, both locally or abroad, via its own Educational Sponsorship Programme. At Zoo Negara, PETRONAS sponsors a section called "Children's World", offering families visiting the national zoo a whole new experience of interacting with animals and understanding some of their peculiar behaviours.

Ranhill Berhad had pledged its support of RM50,000 to Malaysia's 2004 Olympic Team. According to the late Datuk Zahari Ab. Wahab, Deputy Chief Executive, "As a caring corporate citizen, Ranhill will continuously lend its support to our Malaysian athletes in the global arena. This is one way to show our athletes that they have our support and encouragement to strive for the best at the Olympics." In addition, Ranhill has adopted a blood donation campaign as an annual company event, and holds an annual "Majlis Berbuka Puasa" for Orphaned Children in conjunction with the holy month of Ramadan.

Closing

It is hoped that this article has renewed interest in the oil and gas industry. There are sound reasons for Malaysia to be optimistic about O&G opportunities in the foreseeable future. There are organisations in place to promote and encourage the growth of Malaysian talent and expertise to involve themselves in this field. However, the basics of the industry must be correctly understood and appreciated to extract the maximum amount of benefit.

The writer gratefully acknowledges the various companies who have made available information in the public domain, via press releases, public presentations and web site publications.

MALAYSIA AS A REGIONAL HUB FOR OIL AND GAS ENGINEERING SERVICES

By : R.G. Candiah

The Association of Malaysian Oil and Gas Engineering Consultants (MOGEC) may not be known to the lay person in Malaysia but in the Oil and Gas industry, it is starting to create waves in developing Malaysia to be a regional hub for engineering services for the oil and gas industry. This involves providing engineering services from front end engineering design (FEED) right up to de-commissioning and covering both upstream and downstream sectors.

According to Ir. Mohd Suhaimi Baharuddin, MOGEC's president, Malaysia has the potential of providing engineering services for the Oil and Gas industry to the Asean region. The services include engineering design services, project management, construction supervision, quality assurance and control, contracting and procurement.

"If there is a project in the region or even worldwide, Malaysian Oil and Gas engineers can do the engineering design in Malaysia as our Oil and Gas engineering services are competitively priced and our standards are up to par with foreign Oil and Gas engineers," he said.

Baharuddin, who is also the Director and Senior Vice President of Technip Consultant (M) Sdn. Bhd., a founding member of MOGEC, said that in terms of cost, engineering services for the oil and gas industry in Malaysia are relatively cheap in comparison to our European and American counterparts.

"We are somewhere in the middle in terms of cost," he said adding that currently India benefits from a large in-flow of revenue and technology as it provides competitively priced oil and gas engineering services to the region.

Although there are few lower cost centres in this region, the international clients still prefer Malaysia due to its high quality engineering produced and availability of up to date technology knowledge. *(See Figure 1)*

"When we win a job, say in Indonesia, we will try as much as possible to do the engineering services here in Malaysia. Once we design that particular plant in Malaysia, we use the design and commence construction in the client's country," he said adding that in some cases this was not so straightforward as the government in a given country would want their local engineers involved in the engineering. In such a case where possible, the work is split; some work is done in Malaysia whilst the remainder is done in the respective country of the client.

"If we develop the engineering expertise here, then we can also create a hub here to support the region. For instance, we can have offices offering engineering services in Jakarta but it will not be an expert in all fields. We can have experts here

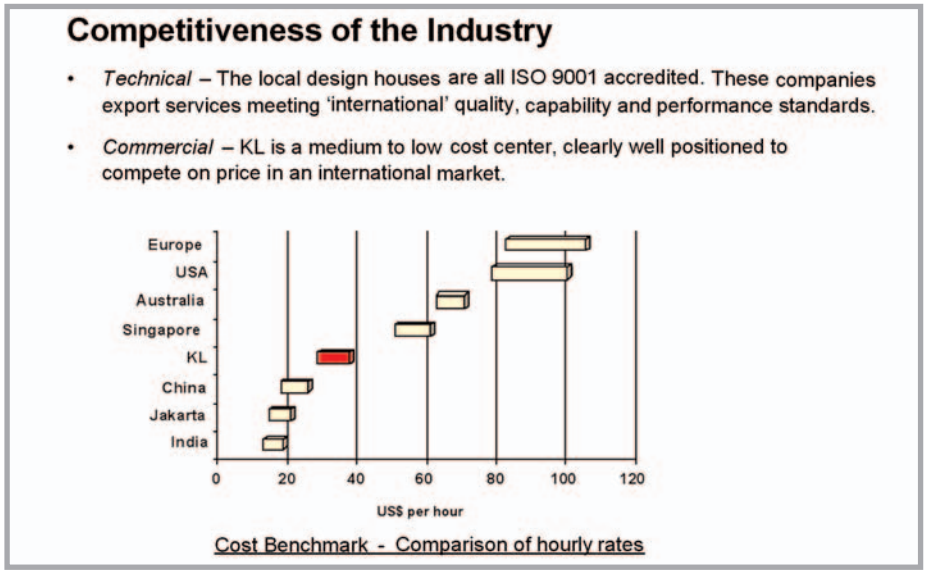

Figure 1

in Malaysia to support and give expertise to that country," he added.

Development of the Oil and Gas Engineering Services Industry

The Oil and Gas industry can be split into upstream and downstream sectors. The upstream sector includes the exploration and the extraction of crude oil.

In the Malaysian Oil and Gas sector, it has been the upstream sector that has traditionally been developed. The Petroleum Development Act 1974 governs the upstream and the downstream sectors of the petroleum industry under which Petronas is party of. Petronas has a licensing system. All work which is contracted out in the upstream sector is through licensed contractors. One of the objectives of the Act was to make sure local players were involved. One of the requirements to obtain a licence is being a local company.

It is because of this that the oil and gas engineering industry was fully developed by the mid 80s. From the mid 80s to late 80s, all engineering design work had to be done locally.

According to Ir. Dr Torkil Ganendra, Secretary of MOGEC and Director of Aker Kvaerner Asia Pacific, the Oil and Gas industry in Malaysia is a regulated industry, thus all upstream engineering works have to be performed locally if there was local technical capability. Some specialised areas are done overseas.

The Umbrella Contract (Frame Agreement) system was introduced in the mid 80s and it became mandatory for all design work (where possible) to be performed locally by Petronas licensed contractors.

"This forced the local engineering services industry for Oil and Gas to develop," he said. The main clients of MOGEC members include Petronas Carigali, the operating arm of Petronas, ExxonMobil, Shell, Talisman, Murphy Oil, etc.

According to Baharuddin, the government regulation and Petroleum Development Act 1974 involving local engineering companies was very beneficial to the Malaysian Oil and Gas engineers. "If there was no such regulation, a lot of work would have been done overseas," he said

"This is understandable as the petroleum companies are mainly foreign," he said. "For upstream activities, we are able to perform as our local engineers have gone through the learning curve," he said adding that local engineering companies also do have ties with overseas engineering companies to obtain knowledge and benefit from technology transfer. The Oil and Gas industry is a high tech industry and many engineering services companies here have overseas links as there are many specialised areas in the oil and gas industry.

Baharuddin said his company, Technip, is a regional headquarters for the Asia Pacific region. "We give engineering support to the whole area. If a given office in the region gets a project in the respective country, if the expertise is not available in the given country, Malaysia will be able to give them support by doing the project here in Malaysia and transferring the technology back to the respective country," he said.

"We do the job here using Malaysian engineers who in turn will benefit from on-the-job training. They go through a learning curve, learning from various problems and all these experiences are kept in the country. If foreign engineers are used, the experience they gain will be kept in the foreign country. In addition, foreign exchange flows out of Malaysia as foreign currency is used in the Oil and Gas sector," he added. "If we keep our experiences from projects done here, then we have a strong expertise base and this will enable us to export our services and expertise further," he added.

Baharuddin added that Malaysian Oil and Gas engineering companies are big enough to do turnkey projects, i.e. from scratch to the handing over of the plant to the

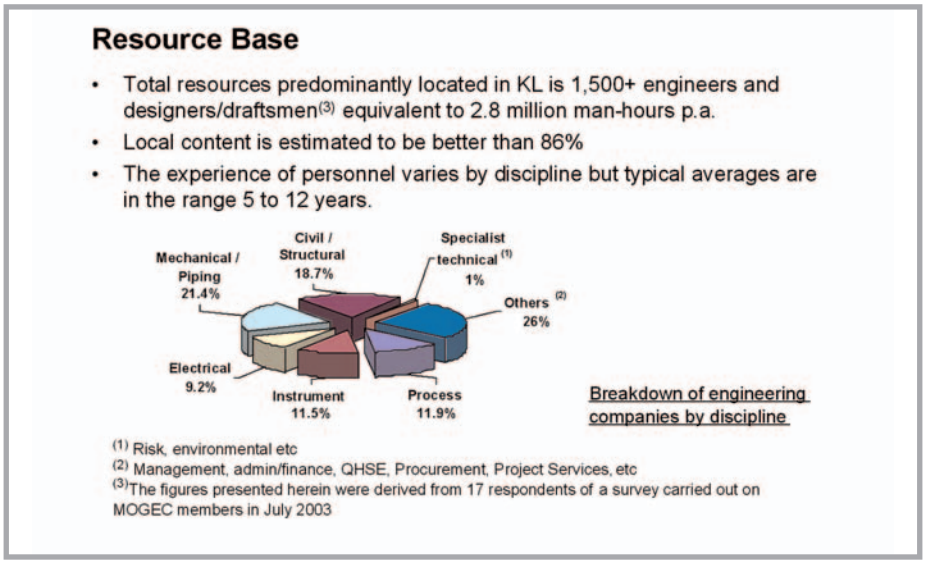

Figure 2

owner (client). "There are a lot of jobs around the world especially the Asia Pacific region, especially China," he said adding that there was a lot of room to export our engineering services.

Besides Technip and Aker Kvaerner Asia Pacific, the other founding members of MOGEC include MMC Oil & Gas Sdn. Bhd., Sime Engineering Sdn. Bhd. and Perunding Ranhill Worley Sdn. Bhd.

Constraints

Ganendra highlighted several constraints in making Malaysia an engineering hub for oil and gas. Many engineering consultant firms are small and this would pose as a hindrance in obtaining contracts.

"The owners/clients need a certain level of comfort and want to see the engineering company being financially stable," he said assuring that many MOGEC members were however big players and this should not pose a problem.

Ganendra added that the main constraint was the fact that there was a lack of local engineers who have 3 to 10 years well rounded experiences in the oil and gas industry and in particular 4 to 5 years experience.

"When local oil companies get engineering services firms to do jobs, they are very specific on who is working on their job and they actually approve each and every individual engineer position. They would not approve a graduate engineer with no experience to work on a project. Thus the entry level for graduates into the industry is difficult because the clients have specific requirements. They don't allow the flexibility of having a certain number of graduates on the job," he added.

He said when companies give the project, the tender specifies that the categories of engineers that can work on a given project must have a certain number of years of experience.

"We are currently working and discussing with the clients on this matter. We are looking into making a requirement that for all projects carried out, a certain number of graduates get training. This is the main reason why there is a shortage of engineers in oil and gas," he said.

Ganendra said Malaysia had a big market to tap into as Malaysian Oil and Gas engineers were highly regarded by local and foreign oil companies. He added that although Malaysia was not as cheap as India, it had several advantages:

- Oil and Gas resources local and regional
- Established engineering industry
- Petronas is a global player
- Good infrastructure, low operating cost base, politically stable – attractive for foreign companies to set up base
- Quality and technology knowledge

"We are centrally located to springboard to Asean countries. With the advancement of Information Technology (IT), location becomes less critical. Work can be done here for the Middle East for instance," he added.

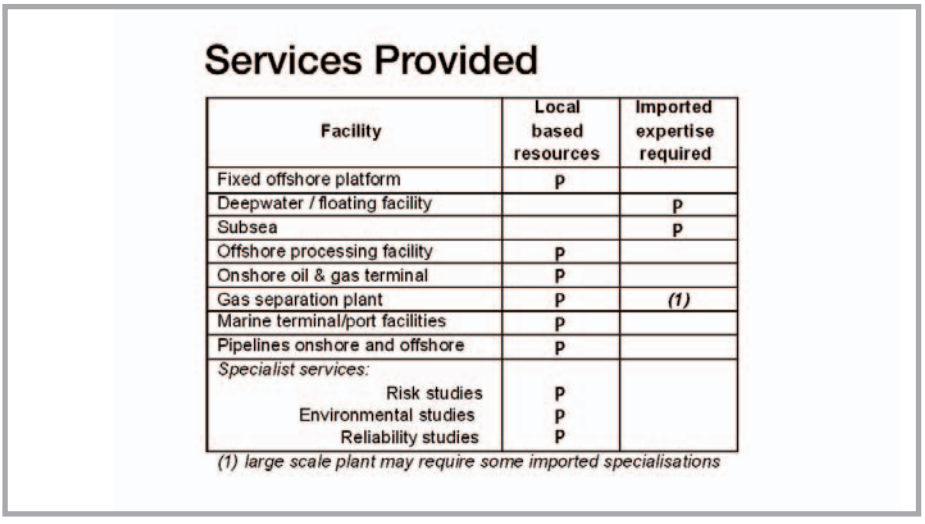

Figure 3

FROM SAILING THE SEA TO SURFING THE NET

By : Ir. Chin Mee Poon, Standing Committee on Publications

I was on the way back to Kajang from Melaka by the coastal road one day and I decided to pull to the beach for a rest. With me were my wife and a friend from China. Without realising it we got into the garden of the Royal Port Dickson Yacht Club and, you know what, I bumped into my old friend Ir. Aw Kong Koy, better known as KK Aw to his IEM friends.

KK was my classmate in the Engineering Faculty of the University of Malaya. He graduated with a first class honours degree in mechanical engineering in 1973. He soon became deeply interested in the new field of information technology and in 1988 he set up his own practice to concentrate on the development of computer software. He is of course no stranger to IEM, having served as a council member as well as a member of several standing committees. He was the founding chairman of the IT Special Interest Group and is still actively involved in it.

Having hailed from Sitiawan, a coastal town in Perak, KK developed an early interest in the sea and he wanted to have his own boat. He wanted to build one himself. He managed to obtain the plan of a dinghy from the British Council library in Kuala Lumpur and spent 9 months building himself a wooden dinghy. He soon learned to sail and became very good at it. In fact he was so good that he became the President of the Perak Yacht Club in Lumut in 1979, just 4-5 years after he became a member of the Club. KK won many prizes in local sailing competitions and was once the national champion. He represented the country in many international sailing competitions too.

I did not know about this until I bumped into KK in Port Dickson that day. It is a pity that even though we have known each other for more than 30 years, I only got to know about his interesting hobby by accident.

For almost 30 years KK has pursued his hobby with zest and dedication. When he left Lumut to work in the Klang Valley in 1981, he became a member of the Royal Port Dickson Yacht Club. He has been one of the Club's most active sailing members since. In fact he has been a member of the Club's sailing sub-committee for more than 20 years, almost continuously.

Founded in 1927, the Royal Port Dickson Yacht Club was originally known as the Port Dickson Club. In 1958, it became the Port Dickson Club & Yacht Club. In 1988 it was known as the Port Dickson Yacht Club. It adopted its present name in 1991. It has more than a thousand members and its facilities include a bar, billiards, darts, tennis, squash, gymnasium, swimming pool, restaurants and an accommodation of 7 rooms. The Club is a member of the Malaysian Yachting Association based in Port Klang, and KK was once a council member of M.Y.A.

With the completion of the Seremban-Port Dickson Highway several years ago, driving from Kuala Lumpur or Petaling Jaya to Port Dickson has become a breeze and it takes only slightly more than an hour to get there. KK drives to the Royal Port Dickson Yacht Club every Sunday morning (well, almost) to enjoy his hobby, even though his wife and 2 children somehow do not share his interest. His present fibreglass Laser-class dinghy is his third boat, and he has been keeping it for more than 15 years.

Sailing in the high sea

Once a keen Hash House Harrier who had participated in many runs in different parts of the country, KK has stopped running since he injured his knee. He now concentrates on only one sport. As he also has stopped participating in competitive sailing, he contributes his knowledge and experience in the

Ir. KK Aw and his passion

sport by acting as officials in regattas and coaching new sailors.

Even though sailing was introduced to our country back in the colonial days, its development has lagged far behind many other sports. KK, however, sees the sport gaining popularity among young people, and he is certainly prepared to contribute his time and energy to help in its development.

The "Optimist" regatta of Sukma '04 was held in Port Dickson. The Port Dickson Open Regatta, which attracted more than a hundred boats from Singapore, Indonesia and Australia in addition to local participants, was concluded recently on 28.11.2004.

The America's Cup International Sailing Competition attracts worldwide attention, but it is a development kind of competition where the competitors can design their own yachts as long as they are within the rules. Nevertheless the interest generated will definitely help in the development of the sport. At the last competition in New Zealand, sailing fans could follow the races real time using the "Virtual Spectator" software. They could view the relative positions of the yachts on the course, the wind strength, their sailing angles and velocity, and much more. The instruments on the yachts could also be viewed and compared. Technological advancements like this will certainly spur further developments in the sport.

"Have sail will travel," said KK. He reminisced that in his younger days he used to represent the country in regional competitions. Nowadays the youngsters representing the country have much broader scope for travel. They have the opportunity to travel to some far-flung corner of the world for competition. For example, 6 boys and girls represented Malaysia in the regatta in Myanmar on 12–18 December 2004.

Is sailing an expensive sport? KK gave a definitive *No* in his answer. A Laser-class (one of the Olympic classes) dinghy costs about RM15,000. With proper care, the dinghy will last for years and years. His own dinghy has been giving him faithful service for more than 15 years. About the only recurring cost is the cost of replacing the sail once every two to three years at about RM2,000. The other costs are incidental: getting to the yacht club, food, etc.

Ir. KK Aw with his dinghy at the Royal Port Dickson Yacht Club

The youngest boy or girl allowed to take up the sport is 8 years old. This minimum age is imposed because the boy or girl will be alone out in the sea when sailing and it is imperative that he or she is able to communicate with the instructor or friends. There is, however, no upper age limit. Among the active sailing members of the Royal Port Dickson Yacht Club is a gentleman 78 years old, and the oldest Olympic gold medallist was 59 years old when he won his medal at the Los Angeles Olympics.

After just 6 lessons, which means 6 Sundays on the beach and in the sea, one should be able to sail, and the damage done is only about RM350. Lessons will cover topics such as the theory of sailing (how to sail the boat and sail it into the wind), basics on tide and current, wind prediction, effects of surrounding topography on air movements, and racing rules (International Sailing Federation (ISAF) Rules). Theoretically one does not even need any swimming skill to learn sailing, as one will always put on a buoyancy aid when sailing, but an ability to swim certainly helps.

On whether the sport is dangerous, KK believes sailing is just about as dangerous as any other sport. Just always bear in mind the potential risks of carrying out any activity in the sea and be prepared for them, the sport should be safe enough for many years of enjoyment. To-date there has been no major mishap in the record of the Royal Port Dickson Yacht Club.

MINING AND QUARRYING IN MALAYSIA : The Industry and Education

By : Ir. Dr Mior Termizi bin Mohd. Yusof, School of Materials and Mineral Resources Engineering, Universiti Sains Malaysia

To most Malaysians, mining is synonymous with tin – a long gone industry after the tin industry collapsed in 1985. To them, the mining industry will never be revived, hence the term "sunset industry". However, those who knew the geology and the mineral resources of Malaysia thought otherwise. The country has the mineral resources to meet some, if not all, of the requirement of the manufacturing industry and of rock materials for construction.

The country has to take advantage of its own mineral resources. In order to do that, knowledge in mineral resources and mineral extraction has to continue to be developed and expanded. The only way to do this is through education and research at local universities and research institutions.

Its importance is clear as at present we import most of the raw materials needed for the manufacturing industries. This includes tin of which at one time Malaysia is the world's number one producer of tin.

A bit about the History of Mining in Malaysia

Malaysia was colonised from 1511 until 1957 by the Portuguese, Dutch, Japanese and British. The colonial powers tried to maintain their control of the region because of the strategic location, spices and tin. When the British was in control of the Malay Peninsula, they built good roads and railway systems to transport tin and rubber to the United Kingdom for export.

Alluvial tin reserves were mined by several European companies using dredges, which were during that time the most efficient method. Mining could still be carried out even when dredges were at times attacked by communist terrorists. This was one of the advantages of the dredge, as a dredge acted like a tank in the middle of the mining pool.

In comparison to previous colonists, the British exploited the natural resources in more systematic ways.

The British introduced mining laws to control local miners and at the same time to maintain their interest. Large areas of virgin ground rich in tin deposits were leased to European or British mining companies. Local miners were only given the dredged out areas to be mined using the gravel pumping method.

British or European mining companies had ventured deep for primary mineral deposits, resulting in a gold mine in Raub and an underground tin mine in Sungei Lembing, Pahang, that claimed to be the world's deepest underground tin mine in the world. It ended its operation in 1987 due to the low price of tin.

There were signs that several exploration activities were carried out deep in the jungle of Kelantan but their activities was somewhat constrained by the First World War (1914–1919), the Second World War (1939–1945) and the communist insurgency that began in 1948 and lasted until 1960.

Mining, including quarrying, is the mainstay for the continuing prosperity of any nation besides manufacturing, as mining provides the basic raw materials for manufacturing. This will in a way save or even earn some foreign exchange. Many argued that we do not have enough appropriate raw materials (or minerals) for some particular manufacturing processes.

Even when we do, the general comment from most manufacturers is that the grade is not good enough or not economical enough to be exploited. It is much cheaper to import. The irony of it all it that there are foreign investors (mining companies) who have shown interest in mining and quarrying in Malaysia. According to them, Malaysia has the potential mineral resources and the political stability.

Prior to 1999, the blame for the slow development in mining was put on the antique mining laws that had few provisions for large scale mining. Not long ago however, Sabah adopted its new State Mineral Enactment in 1999, followed by Kelantan in 2001. The effects of the new policies has yet to be seen.

High grade mineral deposits are long gone, while low grade mineral deposits can only be mined economically on a large scale. The same applies to quarrying, and this has resulted in the taking over of some small quarries by a few big companies.

The government has taken steps to encourage mining such as introducing new mining and quarrying laws (the Mineral Development Act 1994, the State Mineral Enactments and the Quarrying Rules under the National Land Code.)

Mineral Resources in Malaysia

The consumption of minerals by any society is related to the size and prosperity of the population and industrial activity. According to Chen (2000), reserves of tin ore are still available in the Kinta Valley and Klang Valley. Other minerals are shown in Table 1 as extracted from Chen (2000). Chen concluded that there are a substantial amount of mineral resources available in Malaysia. Strengthening of existing

non-metallic minerals industries and the establishment of new ones to come up with new products, through collaborative R&D, would be an important factor for consideration.

Tertiary Education for the Mining and Quarrying Industry and Prospects of Graduates

To meet the demand of human resources, mining or quarrying companies are seeking appropriate staff to run their mines or quarries efficiently. This is true especially in quarrying where it seems that the country does not have enough engineering graduates to fill up the posts of quarrying engineers or quarry managers.

Table 1: Mineral resources of Malaysia (after Chen, 2000)

PENINSULAR MALAYSIA	
Metallic Mineral Resources	
Gold	Significant occurrences or prospects for alluvial and primary gold in Kelantan, Pahang and Negeri Sembilan
Base Metals	Ulu Sokor Pb-Zn deposit in Kelantan, Mengapur and nearby Chini. Cu-Mo-Zn deposits in Pahang.
Tin	Reserves of cassiterite ore are still available, especially in the Kinta and Klang Valley
Industrial Mineral Resources	
Silica Sand	Natural deposits are found as beach ridges mainly in Johor and Terengganu. Smaller deposits exists in Perak and Kelantan. A second source of silica sand is the tailings sand deposits, a resource made available as a result of tin mining activities.
Kaolin	Mainly found in Johor and Perak and smaller deposits in Pahang.
Ball Clay	Occurs in abundance in all the states. Both varieties, that is, the white-firing plastic variety – extensively used in the ceramic industry and the brownish red-firing type, used for structural clay products.
Limestone	Kedah (790 Mt), Perak (780 Mt), Johor (40 Mt), Kelantan (1,150 Mt), Terengganu (86 Mt), Pahang (1,293 Mt), Perlis (437 Mt), Selangor and Negeri Sembilan.
Granite	Abundant resources. Largely exploited as construction aggregate.
SABAH	
Metallic Mineral resources	
Precious Metal	Gold, Silver and Platinum group minerals
Base Metals	Copper
Iron-Nickel	Tavai Plateau
Industrial Minerals	
Silica Sand	Pulau Balambangan (30 Mt), Paitan (20 Mt), Sipitang (5 Mt) and Klias Peninsula (2 Mt)
Limestone	Reserves of 300 Mt.
Energy Mineral Resource	
Coal	Maliau (215 Mt), Malibau (44 Mt), Silimponpon (14 Mt), Labuan (9 Mt)
SARAWAK	
Metallic Mineral Resources	
Gold	Bau district, Lundu-Sematan, Gunung Moi-Santubong, Subang, Bukit Deman, Bukit Selanjan-Murup, Bukit Subong and Bukit Batu Tiban.
Industrial Mineral Resources	
Limestone	Occurring in Bau-Penrissen- Serian area covering about 285 km^2. Also occurs at Subis, Mulu, Long Lama, Arip, Kukus, Tatan, Beluru and Selindong.
Granite	For dimension stone and aggregate.
Silica Sand	Combined reserves of 57 Mt
Energy Mineral Resources	
Coal	Five coal deposits with combined reserves of 725 Mt

*Mt – million tonnes

Most mining companies will look for staff that have some basic knowledge in geology and mining or mineral processing engineering. When mining engineers are hard to come by, the company has to "retrain" civil or mechanical engineers or chemical engineers or non-engineers to do mining and mineral engineers' work. However the fact is that, there is no such retraining, as the engineers employed are left on their own to learn by themselves on-the-job, so most of them are still stuck in their civil or mechanical ways or whatever ways they used to with little or no regard to the effect of geology or mineralogy of the rock in their operation.

As a result they end up with quarries producing aggregate from good marble or they are puzzled why the granite hill they are working on is not producing the quality of aggregate as expected.

Most of the Malaysian mining engineers and mineral processing engineers were graduates from overseas until Universiti Sains Malaysia (USM) began offering a four-year B. Eng. Mineral Resources Engineering Programme in 1986. USM is the only university in the country that is offering such an engineering programme. Many would question, why did our local university offered the programme after the tin market collapsed in 1985 and after hundreds of our tin mines closed down?

Despite that, the government has continued to offer the Mineral Resources Engineering Programme at USM since the importance of mining and quarrying to the nation cannot be denied. In the early stages of the programme, there were hiccups since it was difficult to attract experienced mining engineers to teach at the university full time since the salary scale for a lecturer is not that attractive. With that constraint, the emphasis at USM was more on mineral processing and the earlier graduates are registered with the Board of Engineers under the discipline of Mineral Processing Engineering. Most of the graduates employed by

Penjom Gold Mine, Pahang

a gold mine in Pahang are assigned as metallurgists or mineral processing engineers.

So in effect, the then USM graduates can attain their professional status in the discipline of mineral processing engineering. The prospect of jobs as a professional mineral processing engineer in the industry is not that wide as compared to a professional mining engineer. That is one of the reasons, until now, none of them has attained professional engineer status.

Realising the situation, the curriculum was modified to include more mining subjects in the core courses, thus after 2004, graduates of the programme can be registered under the discipline of mineral resources engineering.

Since 2004, the curriculum in the Mineral Resources Engineering Programme at USM is on par with any mining engineering degree in other universities. However there is still room for improvement. Thus the USM graduates when they have attained their professional status in mineral resources engineering, can practice in the same way as the "old" mining engineering graduates.

Graduates working with mining or petroleum companies are well off and employee turnover is low. However for those working with the quarries, the salary offered is usually lower than the salaries of engineers in the government service, despite having to work under the hot sun and handling explosives as well. So those graduates with good grades at the university will not stay long in the quarry and it won't be long until they get an offer to work in an air-conditioned factory with a better pay.

Reference:

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THE BLASTING DILEMMA

By : Ir. Hj. Look Keman bin Sahari, B.Sc (Mining Eng), M.Sc (Explosives Ordnance Eng), DIS FIEM, P.Eng(M), FIQ, MiSEE Mining, Quarrying and Explosives Consultant

SYNOPSIS

When hard rock is encountered in civil engineering work, it must be removed mechanically through the use of machines or it must be blasted using explosives. However, fear of damage claims, accidents and limited knowledge of blasting work and also difficulty in getting a license to blast has caused more and more contractors to opt for mechanical rock excavation methods. In most cases mechanical excavation is much slower and more costly than using controlled blasting methods.

This article discusses the concerns and issues that affect this method of excavation and offers a practical approach for developing controlled blasting programs. Current public perceptions about blasting and risk analysis issues are also explored.

Blasting of outcrops and boulders

INTRODUCTION

To blast or not to blast. This is a common question that engineers and contractors ask themselves when faced with a hard rock excavation in urban areas. Increasingly, they opt for the mechanical excavation method or sometimes chemical means that are more costly than drilling and blasting in nearly every case. Why is this?

Often there is pressure from government agencies to avoid blasting, wherever possible, in urban construction work. Blasting creates public relation problems for project owners and their design consultants. The general public's perception on blasting is negative, having been forced by events in Iraq, Palestine and also by bombings in Kenya, Oklahoma and the recent suicide bombing in Egypt where more than 30 Israelis holidaying in Sinai were killed. This creates great fear among the public about using explosives near their homes and has great impact on the choice of excavation method.

A recent newspaper report indicated that a municipal council in Selangor has rejected an application to do blasting work at a construction site because of fear by the neighbours that the blasting work may endanger them. The public is fearful that the blasting work may damage their homes and result in flyrocks, ground vibration and also noise. This may force the contractor to use mechanical means such as breakers to break the granite outcrop and boulders, and also chemicals to fragment these rocks. The residents will then be subjected to months of continuous hammering of rocks by breakers instead of weeks if blasting weeks were carried out properly. The cost of breaking rock will therefore increase enormously and the nearby residents will have to suffer noise, dust and other disturbances for months. At the end of the day the house buyers have to pay a premium price for the houses they buy there.

While litigation for alleged blasting damage is common in the United States, it is not yet a culture in Malaysia. While contractors have been threatened with lawsuits in Malaysia by many quarters, many have not materialised because of the lack of knowledge on the effect of blasting on various structures and the failure of the litigant to prove

that he is in fact the victim, especially if the blasting contractor is backed by competent consultants.

Many house owners are sincere in their belief that blasting causes new damage to their properties, despite blasting having vibration magnitudes well below the limit imposed by the authorities, normally below 10 mm/s. This limit is actually well below the threshold limit of possible cosmetic damage as recommended by USBM at 50 mm/sec. Regardless of the validity of the claims, these claims can be costly to the contractor who needs to hire consultants to investigate such claims and lawyers to defend them, and who also need to address the threat of a stop work order – the "stop first and investigate later mentality" from the authorities when there are complaints. Since the cost can be high, the blasting contractors must plan their work carefully. The blasting work must be carefully chosen and monitored and controlled to prevent damage complaints and possible litigations.

Blasting Perception Versus Reality

People are primarily concerned about blasting in urban areas because they believe that it is dangerous or it may cause property damage. When a blasting accident occurs, it is well publicised in newspapers and as such local people have a negative attitude towards rock blasting. Many of these accidents have been caused by human error or by lack of expert knowledge from the contractor such as poor decision making, incorrect blast design, unsuitable loading and improperly controlled measures. It can also be due to lack of consistent regulations from the authorities.

Human error can be reduced dramatically by improved training and experience requirements for all blasters. Currently there is no institution in Malaysia that offers training for blasting in urban and other sensitive areas and there is no requirement that a blaster who want to do blasting work must attend such a course. The Institute of Quarrying, Malaysia and the Police conduct a Shotfiring Course that is more tailored for quarrying work. However, due to security reasons only those on a need to know basis are allowed to attend such a course.

Blasters are only required to possess a Shotfirer's Certificate issued by the Police or the Department of Mineral and Geoscience. However the certificate is more suited to those who want to work in quarries where the blasting techniques are different and the risks involved are of a different magnitude. The blasters and the engineers can only learn through trial and error, and through reading of journals if they are members of a society such as the International Society of Explosive Engineers. It is very difficult for blasting engineers to gain proper experience in blasting at close quarters since there is no requirement for a blasting contractor to hire them.

Generally, the blasting contractor do not want to hire professional engineers to oversee blasting work on the pretext that the blasters do not need their services, because in many instances the engineers rely on the blaster to make decisions. In fact, many blasting contractors argue that the hiring of such engineers only increase their cost. There is therefore a clear need for training for blasting engineers to improve their competence and prove their worth. The other is the lack of interest in engineers to learn and do blasting work because the work is hard and also most of the time it involves working in the hot sun.

However, there is definitely a need for proper training for blasters and engineers in blasting work in urban areas as such requirements will improve technical expertise and this will lead to fewer accidents. This will also increase the confidence of the public in professional engineers and result in less anxiety.

Blasting Approach

Before a project owner considers a proposal for blasting, he must consider several factors. Blasting work in urban or sensitive areas is definitely much more costly than blasting work at quarries and mines. He has to consider that the risk of accident is higher and he has to take better precautionary control to ensure that the neighbours next door are safe. The volume per blast is very low, measured in hundreds of cubic metres compared to several ten thousands of cubic metres per blast at a quarry.

Quite often civil consultants simply copies specifications for blasting at quarries or other blasting sites that are inappropriate for the location. Many simply choose initiation methods that are not correct, for example, safety fuse and detonating cord for blasting near a residential area or an electrical system near areas where there are underground power lines for the sake of reducing cost.

Some choose explosives that are non-existent in the country showing clearly that the specifications are simply copied from foreign books that are outdated.

At present there are no blasting standards for vibration and airblast control in our country. Different consultants tend to copy standards from different countries such as Australia, United Kingdom and the USA. Some consultants tend to choose the lowest possible limit to

ensure that they are approved by the authorities only to find out later they are unsuitable for the location and are very expensive to comply. While the Australian Standard limit of 10 mm/sec for vibration and 120 dB(L) for airblast are applicable for most cases, in some circumstances a lower or even higher limit may be considered appropriate. It is therefore essential that the specifications proposed for implementation must be appropriate and practical for the location chosen to avoid problems of cost overrun and the need to appeal to the authorities to modify the specification later.

It is quite common in Malaysia where consultants are hired only to write the blast specification when the authorities request a method of statement to be written, but after that he is not required by the project owner or blasting contractor to oversee and supervise the job to save cost.

One very important requirement in blast specification is the need to record the blasting work correctly. The blast design must be clearly recorded. Burden, spacing, depth, blasting location, explosive used and the protection methods to control flyrock must be recorded and shown on the plan. Videos or photographs of blasting work must be taken. Vibration and airblast monitoring programs must be implemented and recorded correctly to check compliance. This is actually a necessity to protect the owner from possible complaints from the public and as supporting documents in discussion with the authorities during their routine inspection work and also in case of litigation in court.

Finally, the most important element in controlled blasting is public relations. The blaster, the project manager, the owner and also the engineer must develop good relations with the neighbours, keep them informed of the development and show to them that we care about their safety and well-being. Make them feel safe. They will also make you feel safe.

CONCLUSION

Blasting work is actually very safe if performed by competent and qualified people. It is also much cheaper and faster compared to rock breaking by mechanical and chemical means. However, the blasters and the engineers must be willing to improve their knowledge of blasting work and prove that they can do so profitably and safely and minimise disturbance to the public. They must also be knowledgeable in the effect of blasting work to nearby structures and understand the psychological effect of blasting on the public. Many blasting works have been completed safely and successfully in the past and will continue to be so in the future. Blasting can be very satisfying when it is well done. ■

IWRM: EMPOWERING THE PUBLIC

By: Ir. Abas bin Mohamad Noordin, B. Sc. Hons. (Leeds), MIEM

As of now, perhaps, there is only a little more than 1 person in every 10,000 in the country that has any satisfactory idea of what IWRM is all about. Check: it stands for "Integrated Water Resources Management". And any proponent of IWRM will tell you that it is the only (?) smart way (currently known to man) to go about managing the water resources in the country – notwithstanding the fact that it often rains cats and dogs in this part of the world. That is if: (a) Malaysia does not want to be facing a very acute shortage of water well before its anticipated graduation to the developed nation status come the magical year 2020; and (b) it does not also want to spend the lion's share of whatever little money that it has on securing its vibrant water resources, and guaranteeing clean, refreshing and wholesome drinking water for its citizens. Excuse me for the longish expression.

Be that as it may, the pundits are already singing to the tune of RM200 billion plus in capital outlay to be required for the purpose of staving off the projected water-related crisis. That is, if you could take, at its face value, whatever the 'specialists' are saying. Just ignore whatever is spewed out from the mouths of self-proclaimed insiders, if you want to continue to enjoy your good night's sleep and not worry about having to pay higher and higher taxes.

The opportunists among us, especially the smartest and the most 'well-connected' must have, by now, gained years of lead time in devising their clever ways and means, and putting their stakes all over the place on the big money. But as usual, the most upright among us – usually and unfortunately the less smart, and worst still, the less resourceful too – most probably would need at least a decade of public education before they can be expected to know (sufficiently) what this (and IWRM) is all about. Whoever did tell you that the playing field has to be level; life isn't meant to be so. Right? Wrong.

They (the proponents of IWRM) will probably elaborate further: that IWRM calls for participatory management which endeavours to involve all the stakeholders in order to be successful. They will go on to tell you that the public is a very critical group among the stakeholders; and needless to say, its participation (or engagement) is the keystone that holds the arch in its place.

What beast is 'public participation' anyway? 'Public Participation' (in IWRM) may be understood as "an essential part of the process (of IWRM) where effective representation from the public is intentionally sought, its requirements appreciated, its expertise and resources tapped, its unwavering support garnered, and its valued role recognised (as in full-fledged co-partnership) in the operational conduct of IWRM – from inception through implementation and to successful conclusion." Quite a mouthful; but it does mean that the 'resources' that you and I have – expert or otherwise – are now being positively sought after by the powers-that-be. So as not to insult your intellect, you could actually find yourself a fair number of equally appropriate (in fact, better) definitions of 'Public Participation' in the public domain; just visit appropriate IWRM websites the world over.

The question is: is the nation (read: you and I) ready to enjoy this newly-discovered fruit of political democracy? The answer perhaps lies in the so-called 'Empowering the Public'. Now, is this beast another incomprehensible kind? 'Public Empowerment', like its cousin 'Public Participation', is "an essential part of the process (of IWRM);" but it is the part (of the process) that "seeks to mobilise, facilitate, legitimise and authorise the participation of the public – politically, administratively and otherwise." But it does not mean that the duly elected 'representatives of the people' or the public administrators will now find undesirable competition on their hands. Quite the contrary, they should instead find partners – as opposed to political nemesis – who will complement and support them in ways that they could not have imagined before. Their newfound partners may now complement them – if they were to play their own roles correctly – as their extended eyes, ears, and even mouths, not to mention their intellects as well.

But don't get to be so naïve as to believe that you and I – if and when we get to be 'so empowered' by the process of IWRM – would (like a saint we are not) abstain from tasting the sweetness of 'power'. This experience (and the opportunities that it entails) could eventually make the complacent politicians run helter-skelter for their money. Boy, do I love this kind of competition already – and democracy, especially if and when it assumes this expanded new meaning. But you and I had better beware though, "Power corrupts, and absolute power corrupts absolutely." Doesn't it ring a bell? We don't want to end up at the bottomless pit when we are dead, do we?

So, you could soon expect to be invited (together with fellow stakeholders) to jointly man various IWRM committees, work groups, think tanks, boards, councils, and whatever-have-you, where you could sit pretty, walk tall, and make smart contribution as you should in the name of 'Public Empowerment'.

In anticipation of that, you should now brush up on your paper writing and presentation skills; you could soon be recognised as important discussants of IWRM-related topics, or as able managers of public discussions such as facilitators, moderators and organisers. Your hitherto dull intellectual life could soon light up; you could help electrify IWRM workshops, seminars, forums, and conferences etc., which are held as a matter of routine at various local, regional and international scenes. Wow!

Closer home, you should learn the art of working – as coveted partners – with regulators and authorities to enforce their rules and regulations, and in the monitoring of their enforcement. The best part yet is that you get to participate in the drafting of the desired regulations, not to mention in the governance of the entities too. Now, whoever said that democracy is only about going to the ballot box every five years (to kick out the deadwood or corrupt representatives, and/or to elect fresh new faces in their places)!

Don't expect to be amply rewarded for the participation though (that's the essential spirit); at least until the country – well the taxpayers (a.k.a. you and I) – can very well afford it. In any case, should you 'prove your real worth' convincingly enough – when you get to become the most critical part of the whole process – you could actually 'compensate yourselves appropriately' in ways that you deem fair; no enlightened taxpayers should ever complain, should they? After all, you do represent them too, remember? And this empowerment thing is supposed to eliminate the communication gap between the participating public – who are now the driver of actions – and their partnering regulators and authorities – whose staff are well-oiled competent executives! Sounds too good to be true? Well, just try it. ■

DOING THE DITTY DOWN UNDER : INSTITUTE OF ENGINEERS SINGAPORE 38TH ANNUAL DINNER & DANCE

Reported by : Sdri. Trudy R. Ganendra

It was with great pleasure that IEM G&S Vice-Chairman Yau Chau Fong, Honorary Secretary and Treasurer Kee Wai Fun and Committee Members Karthigesu Muniyandi and I, Trudy R Ganendra, accepted the invitation of the Institution of Engineers Singapore (IES) to attend their 28th Annual Dinner & Dance on Friday, 5 November 2004. We had high expectations of a grand event and a productive weekend of learning about IES Young Engineers (YE) and discussing our mutual cooperation.

The event was at the Ritz Carlton, Millenia hotel and after some trouble with transport (all the taxis were full so it was all down to our own two feet and our map reading skills!), we managed to arrive at their Grand Ballroom where there were about 50 tables of IES members and guests. We were seated at the IEM YE committee table with their Chairperson Chew Chee Yong, Co-Chairperson Chan Hsien Hung, Honorary Secretary Jina Tan, Business Manager Andy Wee, Event Director Heng Kok Leng and Committee Member Eng Ming Yao. After the typical engineers' introductions of "My name is..., I am a civil/mech/etc. engineer," we began to learn more about each other.

We discovered that IES had just undergone a radical change where now fresh graduates could be admitted as Members of IES, instead of Graduate Members. This is to encourage fresh graduates to join IES and to give young members more say in the running of IES. The separate AGM of the Graduate Members was abolished as a new IES YE section would take over the functions of the previous Graduate Members committee. A new grade of membership, Senior Member was also introduced for members who have made substantial contributions to the Institution. These changes would not affect the present endorsement of drawings policies, i.e. endorsement of drawing is still by Professional Engineers (PE) who are governed by the PE Board.

As yet, the effect of these changes are unknown but the IES YE Committee hope to take advantage of these changes to increase IEM YE membership and activities while integrating Young Engineers into the mainstream IES structure. It will be interesting to observe what effect these changes will have on the standard of engineering in Singapore and the culture and membership of IES and we wish them the best in their endeavours.

Certainly, the culture of IES is different from that of IEM as was evidenced by the grand opening ceremony of the Annual Dinner and Dance which consisted of 4 skimpily-clad women dancing sexily to rock music. A far cry indeed, from Malaysia's usual UKM-or-similar dikir barat or other traditional cultural show! The rest of the dinner was much more normal though the MC did play some very cerebral games. I have never been asked to think so much at a dinner before! Our Karthigesu was even asked to show his knowledge of Indian culture when he went on stage to compete, which he did and won a prize! After the dinner, we were lucky enough to meet with the IES President, Er. A/Prof. Foo Say Wei, who had some kind words of encouragement for us.

On Saturday, 6 November 2004, we, the four Musketeers, I mean, the four IEM G&S representatives met up with Chew, Chan and Heng again and were also introduced to Hon. Treasurer Chin Chee Chung. We spent the day at East Coast Park, a lovely development in Singapore allowing people to cycle, rollerblade, walk, run, picnic, barbeque and swim in well-maintained facilities at any time of the day or night, promoting healthy lifestyles to Singaporeans. In between cycling and blading on the smooth tarmac runways, we discussed how each committee worked and how we could cooperate for our mutual benefit. Some items of discussion were: the IEM G&S procedures for organising activities which may also be useful to

After IES dinner and dance with Er. Assoc. Prof. Foo Say Wei

IES YE, the next IEM/IES meet and other collaborations. Another notable point was how fresh Singaporean graduates tend to be older and more mature than Malaysian graduates as they have undergone at least 2 years of National Service. After a late lunch and a quick visit to our hotel, the New Seventh Storey Hotel, to see its over 40 year-old manual "cage" lift, we were sorry to say goodbye to our kind hosts but thanked them for a lovely weekend and hoped that we would see them again soon at Myanmar's YEAFEO or at the next IEM/IES meet! ■

PS: The next IEM/IES meet is being planned for a weekend in May 2005 on Batam Island to allow IEM G&S and IES YE members to meet each other for networking and socialising. Other activities of the IEM G&S External Affairs portfolio include an upcoming membership drive in Terengganu and a Technical Delegation to Japan in April 2005 which will include visits to several innovative flood prevention, water quality and other engineering works and local authorities. These activities will be advertised shortly by flyers in Jurutera and via the iemgs@yahoogroups.com emailing list; but if you would like more information on how to join these activities or would like to assist the G&S External Affairs sub-committee, please email me at iemgs@yahoo.com. Thank you!

REPORT ON TWO DAY CONFERENCE ON GEOTECHNICAL ENGINEERING THEMED "Design & Construction of Pile Foundation: The Malaysian Experience"

Reported by: Ir. Tan Yean Chin, Geotechnical Engineering Technical Division

A two-day conference on geotechnical engineering themed "Design & Construction of Pile Foundation: The Malaysian Experience" was held at Casuarina Hotel, Ipoh, Perak, on 29-30 September, 2003. The event was jointly organised by Jabatan Kerja Raya of Perak, Perak Branch and the Geotechnical Engineering Technical Division of The Institution of Engineers, Malaysia. Over 300 participants from both the public and private sectors attended the conference.

The conference focused on the design and construction of pile foundations in Malaysia. The special lecturers invited to speak in the conference and the topics of their presentation are as follows:

Ir. Neoh Cheng Aik
- Pile Foundation Design & Construction – An Overview
- Site Investigation for Civil Engineering Projects
- Case Histories of Pile Foundation Design (co-authored with Ir. Sobri Aziz)

Ir. Yee Yew Weng
- Case Histories of Pile Foundation Failure

Ir. Mun Kwai Peng
- Testing of Piles

Ir. Liew Shaw Shong
- Design and Construction of Micropiles (co-authored with Mr. Fong Chew Chung)

Ir. Tan Yean Chin
- Design and Construction of Bored Pile Foundation (co-authored with Mr. Chow Chee Meng)

A copy of the proceedings for the above conference is available in the IEM library for reference.

Participants were given the opportunity to seek the opinion of the speakers on various topics of interest in the last session of the conference. Many aspects of pile design and construction were raised, ranging from foundation design to evaluation of performance. Of these, two topics which attracted considerable interest were:

1) How do engineers plan, supervise and ensure that proper subsurface investigation (S.I.) is carried out?
2) What criteria should be used to define pile failure when carrying out maintained load test? For example, should a pile be considered to have failed and the design deemed to be unacceptable when it experiences settlement of more than 40mm at twice the design working load?

Generally, the panelists strongly recommended that S.I. should be properly planned and supervised by the consultant. The Uniform Building By-Laws 1984 (Act 133) stipulates that the consultant who is responsible for the design and construction of the foundation or structure should also supervise the field works, which includes S.I. This requirement has been reiterated by the Board of Engineers Malaysia (BEM) in a recent circular to all Professional Engineers.

It was recognised that many specifications state that a test pile is considered to have failed and the design becomes unacceptable if the pile settles more than 40mm at twice the design working load. However, from a geotechnical engineering point of view, a pile should only be considered to have failed if it exceeds the serviceability limit for the particular structure for which the pile was designed to support. The serviceability limit will vary depending on the structure and should be defined clearly by the designer. ■

A VISIT TO KL MONORAIL SYSTEM

Reported by: Ir. Nah Teik Ong, Highway & Transportation Engineering Technical Division

A group from IEM consisting of 32 members visited the KL Monorail System (KLMS) on 8 May 2004 at KLMS headquarters in Brickfields.

The program for the visit started by a briefing on the Kuala Lumpur Monorail System given by Tuan Haji Ahmad Zainuddin Jamaluddin, Director of KL Monorail System Sdn. Bhd. The briefing touch on various aspects of the project including the planning, design, construction, operation, safety and manufacturing of the trains.

KL Monorail Project

The project costing about RM1.18 billion is a privatized project implemented to ease the traffic congestion in the city of Kuala Lumpur. It is an intra-city public transport system that serve the central business, hotel and shopping districts of Kuala Lumpur. The KL Monorail System has started operation on 31 August 2003.

The alignment of the 8.6km long dual guideway elevated monorail system begins from the Jalan Tun Razak Bus Terminal in the north and passes through Kuala Lumpur's

"Golden Triangle", ending next to KL Sentral in Brickfields.

The system has 11 stations and operates with 12 units of 2-car trains. The system is operated manually by a driver with full Automatic Train Protection System.

Monorail Trains

The KL Monorail System uses the first made-in-Malaysia monorail trains which are manufactured at the manufacturing facility in Rawang. The plant is equipped with advanced and high precision machinery including laser cutting machines, vacuum forming machines, robotic welding systems, etc. Within the manufacturing facility, there is a one-kilometre test track built to simulate gradients and curves for operational testing of the trains.

The monorail train is air-conditioned and consists of a 2-car unit, measuring 20m in length and 3m wide. Each train is capable of carrying 214 passengers (22% seated and 78% standing). The train has a maximum speed of 80km per hour and operates on a peak hour frequency of 3 to 5 minutes.

Train Control Center

After the briefing, the group proceed to visit the Train Control Center located in Wisma Monorail, where all the monorail trains in operation are being monitored at this center. Apart from monitoring the operation of trains, the control center can also monitor any incident happening at all the stations.

IEM participants led by Ir. Nah Teik Ong visiting KL Monorail System

Monorail Depot

The group also made a brief tour to the monorail depot located in Brickfields. The depot is equipped with facilities that provides for general inspection, maintenance and cleaning of the trains. It is also used to store the trains when they are not in operation.

Monorail Ride

Finally, the visit ended with a ride on the monorail train. The ride took us through a number of stations where we were briefed on some of the important facilities provided for the safety and convenience of the users. The group also managed to observe how the track switch works to enable the trains to switch tracks. ■

VISIT TO STEPPING STONES HOMES

Reported By: Ir. Hjh. Juliah binti Tan Sri Mohd. Hassan, Sub-Committee on Ladies Engineers

Meeting the children of Stepping Stones Homes.

Seated on the floor doing their homework.

Eager minds yearning for knowledge and a brighter future.

One fine sunny Saturday morning on 7 August 2004, a visit to Stepping Stones Homes was made by the subcommittee on Ladies Engineers as one of the activities for the 2004/05 session. Stepping Stones Homes, located in Jalan Sungai Dua, Taman Seputih is a home for children who are from broken families or from single parents. When we arrived at the home, we were greeted by a cheerful Mrs. Johnson who gave a short brief on how the home came about.

The homes founded by Mrs. Johnson's husband, Mr. Pastor Johnson in 1998 started initially with three children. The house which we visited was formerly a dilapidated house which was then full of undergrowth, with leaking roofs and without proper sanitation facilities. However, after being cleaned, the roof repaired, walls painted and sanitation facilities constructed, the house is currently a modest and presentable home to ninety-one children consisting of boys and girls with their age ranging from two years to twenty-one years old. The younger children and elder girls are housed here whilst the older boys are placed in another house across the road. The children goes to school until they are Form 3 and after that are trained in other skills so as to prepare them to be able to work to earn a living. Volunteers provide tuition classes and in the evenings biblical classes are conducted.

The homes survive on kindness from the public and private institutions. Some of the older boys who are already working contribute towards some of the homes's expenses. In fact, due to the generosity of some, the home is able to have its own bus to ferry the children to and from school, which does help to solve transport problems. While we were there, a group from Citibank dropped by to find out more about the homes and to see where they can be of help.

We were there for one hour or so talking and playing with the smaller lovely children who were delighted and very excited to see us. As gesture of goodwill we brought with us bags of rice, sugar, cooking oil, onions, milk powder, biscuits, chocolates, sweets, some toys and story books to give to the children.

The home is in need of any form of contribution and those interested to donate in kind or otherwise, please contact Mr. Pastor Johnson at 016-3858161.

The team would like to take the opportunity to thank the staff of IEM who have helped in one way or another to make the visit a success. ■

IEM SABAH BRANCH : BLOOD DONATION

Reported by: Sdr. Martin Ng Chee Hou, IEM Sabah Branch

In conjunction with the Engineering Week, The Institution of Engineers, Malaysia (IEM) Sabah Branch successfully conducted a blood donation campaign on Sunday, 11 April 2004, at the Palm Square Shopping Complex, 4th Floor, Centre Point Sabah. IEM (S) has promoted the campaign to the public as a programme to help in promoting self-awareness in donating blood as part and parcel of a caring society.

The event started at 10.30am, officiated by Y.B. Ir. Edward Yong, who is the present Assistant Minister of Local Government and Housing of Sabah. As the campaign proceeded, Y.B. Ir. Edward Yong himself even volunteered in donating blood along with others. The Branch Chairman was present during the event. The response from the public was better than expected; approximately 130 people participated in the blood donation drive. On top of that, to encourage positive feedback from the public, donors were not only given lunch vouchers, but also an opportunity to join a lucky draw contest, which offered attractive prizes sponsored by Sutera Harbour Management and other volunteering organisations.

The blood donation campaign was organised by the cooperative efforts of IEM graduates, Sabah Branch sub-committee members and volunteers from the Blood Department of Queen Elizabeth Hospital. The campaign was made more exciting with interesting contests such as the Mental Arithmetic Competition and the Children Art Competition. The Children Art Competition started at about 10.30a.m., and lasted until 12.30p.m. at the Wong Kwok Show Unit venue. An estimated 53 children took part in this art competition with the open title of "Water" (In Engineering), which is aligned with one of the campaign objectives in promoting love and care towards natural resources. These competitions reaches out particularly towards the younger generation in order to get their involvement and participation in the campaign, with the added benefit of exposing them to becoming more civic-conscious towards the environment.

Refreshments were provided to all participants during breaks, sponsored by the Wong Kwok Group Holding. The Mental Arithmetic Competition lasted until 3.00pm. This contest is opened to three different categories: Group A for 5 to 6 year old participants, Group B for 7 to 9 year old participants, and Group C for 10 to 12 year old participants. To the organisers' surprise, about 80 participants turned up and joined in, encouraged by an enthusiastic and supportive crowd. At the end of the blood donation campaign, prizes were given to all deserving winners. The event officially ended at 3.30p.m. The IEM would like to express their heartfelt gratitude to co-sponsors Sutera Harbour, co-organisers Wong Kwok Holdings and other volunteer associations in making this eventful campaign a successful one. ■

REPORT ON THE GSM-IEM FORUM: "The Roles of Engineering Geology and Geotechnical Engineering in Construction Works"

Reported by: Assoc. Prof. Tan Boon Kong, Geotechnical Engineering Technical Division

A GSM-IEM Forum on "The Roles of Engineering Geology and Geotechnical Engineering in Construction Works", jointly organised by the Working Group on Engineering Geology & Hydrogeology of the Geological Society of Malaysia (GSM), and the Geotechnical Engineering Technical Division of IEM was held on 21 October 2004, at the Department of Geology, University of Malaya, Kuala Lumpur. This forum was the 12th in the series of such forums organised by GSM/IEM, initiated by GSM since 1992.

This 12th forum was made very general in nature in order to encourage more paper contributions. It covered practically every topic, and was targeted as a compilation of local case histories of construction projects. A total of 16 papers were presented at the forum – 3 by geologists and 13 by engineers. Topics range from engineering geology, soil and rock slopes, slope failures and stabilisation, karst, foundations, ground improvement, construction problems, etc., all illustrated by various case studies.

Response to the forum was overwhelming, with around 100 participants attending. Due to constraints of space at the lecture hall, several late requests had to be turned down. Fortunately, extra copies of the proceedings were prepared for the late comers. Ample time was allocated for questions and discussions, and this were fully utilised, resulting in very lively and fruitful discussions after every presentation.

Limited copies of the proceedings are available for sale at RM30. Please enquire at GSM secretariat. (Tel.: 03-7957 7036, Fax: 03-79563900, E-mail: geologi@po.jaring.my) ■