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Agricultural Engineering in Malaysia
11th YEAFEO Conference
Time to say Goodbye

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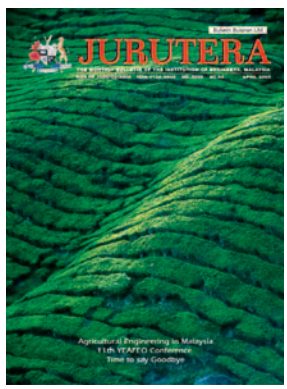

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Time to say *Goodbye*
Starting the Locomotive for Change

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

This being my last President's Corner, I would like to take the opportunity to say thank you to all IEM members and staff for your strong support. It has indeed been heartening to note that members appear to read my Corners regularly and find them as good starters for deliberations on the state of the institution. And that fits my intention of encouraging interest and debate on the current performance and future prospects of the institution.

It has indeed been my expressed intention to reach out to the general membership and make IEM more transparent and the leadership more accountable to members as stakeholders. The aim is to get more members concerned and involved in the affairs of the institution. The response thus far, positive as well as negative, shows that members are indeed reading my Corners and responding well. This is good for whatever it takes. We should strive towards transparency and accountability in our learned society. We should not be afraid to discuss our problems openly, washing dirty linen in public notwithstanding, provided we do not indulge in personal attacks, which I religiously try to avoid. It is for the good of the institution that we positively scrutinize and evaluate our management system, culture and attitudes and migrate to a more modern, positive and dynamic work environment.

The trend towards transparency and accountability is a worldwide phenomenon. The Institution of Civil Engineers (ICE), the Association of Consulting Engineers (ACE), the British Consultants & Construction Bureau (BCCB), and Transparency International (TI) in the UK have recently joined forces to found the Anti-Corruption Forum. The Forum has called on 30 of the UK's leading civil engineering consultants and contractors to come together to stamp out corruption and bribery in the construction industry. The European Commission estimates that the global cost of corruption is equivalent to 5% of the world economy. And according to anti-corruption lobby group TI, construction and engineering is the most corrupt business sector in the world. ICE past President Douglas Oakervee said "ACE, BCCB, ICE and TI believe that it is important that the industry speaks out against corruption, and takes a lead in working towards its elimination." (ICE New Civil Engineer, December 2004.) Down in Malaysia, the government is also stressing on the importance of transparency and the need to stem corruption. The need for greater efficiency in the civil service has been in the news of late. And we do experience better service nowadays from many government departments because of this initiative.

My two-year term as President has been mainly spent on efforts to reinvent the profession, rejuvenate the institution and revitalize the membership. There is now more interest on engineering education, research as well as professional practice at various forums in the country. In education, the current emphasis is on capacity building and outcome based learning (OBE) with efforts to revamp the Engineering Accreditation Council (EAC) manual and get Malaysia to be accepted as a signatory of the Washington Accord underway. In research, a position statement has been prepared and a foresight study is on the way, while involvement in preparation of the 9th Malaysia Plan focuses on lobbying for engineering to get a fair share of funding for R&D. In professional practice the indulgence is in exporting professional services supported by various engineers' registers such as AER and APEC/IMF. Our involvement at the international and regional level is encouraging. We get a stream of visitors to the IEM from overseas including the Presidents of ICE, IMechE, Engineers Australia as well as visitors from Korea, Vietnam and other countries in this region. I had been recently invited to address the Saudi Council of Engineers in Riyadh. The institution has a good Strategic Plan, which is being updated after a Council Brainstorming Session at Port Dickson recently, a Quality Management System that is in place while an IEM Organisational and Administrative Review Report, which has been completed recently, should enable the Council to reengineer the institution.

I have to admit that I have taken this controversial and perhaps crude approach to leading the institution but with a firm belief that it was the only way to shake up the institution from its slumber and get members to respond to the call. I believe I have done what is humanely possible given that the effort is unique and may be strange to some members but the challenge now is to follow up with definitive action plans. Agreeing to what need to be done is half of the struggle and it does take a lot of my effort and time; getting things done is the other half, which I have to admit I have not had the opportunity to accomplish much, given the time and resources currently available. But I hope I have successfully provided members with a start, which will facilitate others to finish the job. The spotlight is now turned on the leadership and the Secretariat to provide their best for our beloved institution. I would then retire happily, knowing that the locomotive for change is indeed underway. ■

Assalamualaikum
(Peace be upon you) and Good Bye.

JURUTERA

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Agriculture Engineering

By : Ir. Dr Lee Teang Shui

The incentives for investments granted to corporations willing to put their money into agricultural production and agro-based industries is very good. When things were down in the late nineties, the agricultural sector that was still on a sound footing, albeit from the dependable oil palms. The emphasis on the agricultural sector to provide the impetus to the national economy is because the bill for food and agricultural imports comes to 16 billion Ringgit annually. Some 50% is for raw materials to produce downstream products.

We may not be able to reduce edible food imports much, so we need to increase exports. However, we can substitute some required raw materials with local produce. If a raw material is not readily available, it should be made a priority item, and adequate incentives must be given. An example would be to use by-products from the palm oil industry for animal feed. This is where research and engineering comes in.

The exotic tropical fruits for export are produce we can emphasize. Fruits like star fruit from Raub are now neatly packaged for export and the ones left, if we perchance to see are the rejects. But that's good for foreign exchange earnings. Our Tambun pomelos if promoted well could follow suit, and it will be good for the nation. Our D24s from Raub are making their way to Australia already. Indigenous fruits like the mangosteen, pulasan, dokong, duku langsat, ciku rajah, nangka, talap, etc. and the non-indigenous dragon fruit can do us proud. There are already a small number of fruit plantations in the country and we can do with a whole lot more. However, quality, consistency, guarantees and packaging are some of the demands for perishable agricultural produce. What is needed are packaging facilities, storage and refrigeration, irrigation and drainage, automation, etc.

Meat production is also important. We can more than cater for our own needs except for beef and mutton. A project in Johor has 21 companies involved in the production of cattle and should be running at full steam in a couple of years. Rice estates are now appearing in place of small plots; they are more productive and good incentives are given for Malaysian companies who dare take to the deep seas.

The government can only make it easy for investments and provide incentives, the rest is up to the state governments to open up non-jungle lands (land is a state matter), the big plantations groups (to put aside their best lands for food production) and of course getting FDIs into agriculture (in aquaculture it's quite favorable) are a must if we want to make a mark. We already have controlled environments for the production of temperate vegetables (e.g. aeroponics and hydroponics.) We have controlled environments for the production of the popular Phalaenopsis orchids. We can already grow tulips in a controlled environment. While we can produce many agricultural products, we do not do it on a large scale and that is the problem. We must also produce things that countries where conditions are more favourable, cannot produce or are not of good quality. So we have to identify what is the trump card we hold as far as agricultural produce for export is concerned. We can do all of the above by investing in foreign lands too like what is being done in rice farming, chicken production, oil palm, etc. ■

Letter from Chairman, Standing Committee on Publications

Dear Editor,

Let's face it: we dislike change. Even if we want change, we still get anxious when we think of making the adjustments necessary to leave our "comfort zone". When I answer "Engineer" to the question about my occupation whenever I complete immigration forms, I help reinforce the image some members of society have of us, stereotyped as it is, that "engineers are just engineers." We're very set in our ways even though we build new things nearly all the time.

When I took over as chairman of this committee two years ago, I introduced changes, starting with the way we conducted meetings. I wanted meetings to be short, not more than 30 minutes if I could help it. I wanted our committee to be forward-looking and to desire change. I wanted us to work more closely with Dimension, our out-sourced publisher. Our primary goals: more members reading *Jurutera*, readers getting what they want.

Some readers may not realise that publishing a monthly magazine well takes a lot of hard work, extreme care, and, even love sometimes. It used to cost IEM a lot too. In 2000 and 2001, the costs of printing *Jurutera* and the Journal exceeded advertising revenue by RM60,000. This year, IEM stands to collect about RM50,000 as its share of advertising income, and the publisher pays for the printing costs. So, on average each year, outsourcing the publishing of *Jurutera* and the Journal will make IEM richer by RM110,000, unlike four years ago. I think this was one of the best things IEM has done, starting in 2002.

Certain things did stay still. But this committee worked hard to ensure that the quality of production and magazine content improved. We honestly believed that readers were getting a better bulletin each month.

I think we have to do more. We still need to change mindsets and get more readership and more advertisers.

As I relinquish this post, I wish to thank readers for giving us your support. I thank all committee members for their sacrifice and hard work. Each member had contributed at least one editorial. Ir Mohd. Khir, despite having to drive from Johor Bharu each time, faithfully kept minutes, and I owe a lot to him. I thank the editors, Ir Prof. Megat, Ir Rasid and KH Man for doing their job with zeal and remaining committed to the task, and to have the patience to hear out (and not accept) my ideas all the time. I acknowledge with gratitude the effort put in by Aziah and Nurul, two very cooperative and obliging Secretariat staff. Last, but not least, I thank all who contributed to the publication effort.

I wish the new committee success.

Chee Meng Sang, FIEM

Advancement of Agriculture Engineering in Malaysia

By Ir. Ooi Ho Seng, Chairman, Agricultural and Food Engineering Technical Division

Introduction

The agricultural sector in Malaysia is involved in the production, processing and waste management of crops, livestock and fishery. It has contributed significantly to the Malaysian economy. For the first 30 years after independence, the agricultural sector was the main contributor to the national economy. In 1980 it contributed RM10.2 billion or 23% of the GDP, dropping to 20% in 1989, to 13.6% in 1995 and to 8.2% in 2003. The agricultural sector attained an average growth rate of 3.2 per cent per annum for the period of 1985–1995, with the growth rate dropping from 5% in 1985 to only 2% in 1995. In absolute terms, the total value-added of the agricultural sector increased from RM11.9 billion in 1985 to RM17.1 billion in 1995 and to RM18.2 billion in 2000 (at 1987 prices.)

Changes in the lifestyle of the people, as a result of urbanisation and the higher level of income they receive, have resulted in changes in eating habits, food purchasing and consumption patterns. And with the Malaysian population growing at a rate of 2.5% per annum, the increased demand for food has led to the increase in food imports. Total food imports increased from RM3.5 billion in 1985 to RM7.7 billion in 1995 and to RM13 billion in 2003. With food export worth RM8 billion, our net food import was RM5 billion in 2003.

Over the years, agriculture has been used to finance the development of the country as well as to finance the transformation of the economy towards industrialisation. During the last 10–15 years, the rapid industrialisation in the country has led to a decline in the agricultural sector's relative contribution to national income, export earnings, employment and investments. Industrialisation in the country and the rural-urban migration of youths has created a serious shortage of agricultural workers in the country. The agricultural labour force in 1980 was 1,911,000 or about 39.7% of the national labour force and it dropped to 1,400,000 or about 18% the national labour force in 1995. However, most of the growers and managers in the agriculture and agro-based industry prefer to solve their labour problems by employing cheap imported foreign workers and by relying on traditional manual methods of agricultural production and processing instead of adopting more modern and efficient agricultural engineering technologies.

For Malaysian agriculture to compete effectively in the global environment, it has to change from the current traditional method of farming and cottage-type agro-industry to modern commercial farms and factories. In line with this, the Third National Agricultural Policy (NAP3) has emphasised on the modernisation and commercialisation of the agricultural sector to lower production cost and to increase labour and land productivity. The applications of agricultural engineering technologies constitute the major aspects of this agriculture modernisation.

Agriculture engineering is needed to serve as a catalyst or a pacesetter to stimulate growth in our agriculture and agro-based industry. At the same time, the industry must change in order to be able to make full use of agricultural engineering to respond to the changing demands of agriculture and society.

Agricultural Engineering in World Agriculture

Before the Second World War, agricultural engineering generally played a secondary role in agricultural production. Some machines were developed for agriculture but the development of agricultural engineering was slow. The design of agricultural machines and buildings was based on skills and accumulated experience and there was very little scientific research. After the Second World War, it was necessary to provide for the population's food and other biological needs as fast as possible. Farm machines and equipment were rebuilt, renewed and even created for these purposes. Since then, agricultural engineering has contributed tremendously to world food production. It has provided better design of agricultural machinery and agricultural structures and it has developed ways to conserve soil and water and to improve the processing of agricultural products.

Agricultural engineering has become one of the most effective and powerful tools in agriculture development. This recognition has led to more research and more advancement in agricultural engineering particularly in machinery design, post-harvesting technologies and greenhouses, ergonomics and safety, work organisation, environmental protection and sustainable land development over the last 50 years.

Improvements in storage, processing, and transportation also has increased the marketability of farm products. The use of cold-storage warehouses and refrigerated railroad cars has been supplemented by the introduction of refrigerated motor trucks, by rapid delivery by airplane, and by the quick-freeze preservation process, in which farm produce is frozen and packaged the same day that it is picked. Freeze-drying and irradiation have also reached practical application for many perishable foods.

Airplanes and helicopters have been employed in agriculture for such purposes as seeding, transporting perishable products, fighting forest fires, and in spraying operations for insect and disease control. Radio and television have been used to disseminate vital weather reports and other information.

Interest has been shown in hydroponics and aeroponics, methods of soil-less gardening in which plants are grown using chemical nutrient solutions, to solve some agricultural problems. Meanwhile, agricultural engineering provides the pumping system to circulate the nutrient and the environment control system to give plants an optimum growing environment.

New uses for farm products, by-products, and wastes have been discovered. Standards of quality, size, and packing have been established for various fruits and vegetables to aid in

wholesale marketing. Meanwhile, agricultural engineering provides the equipment and techniques to support and to undertake the standardisation of work.

The increasing demand for agricultural products require continued efforts towards more efficient agricultural production, and an increasing emphasis on the conservation of resources. Despite the big increase in global food production over the last century, there are still many hungry people in the world today. The global population is projected to reach 9.36 billion in 2050 and it is a big challenge to agricultural engineers to help meet the needs of a growing hungry world.

Advancements in Agricultural Engineering

Agricultural engineering is the application of a variety of engineering disciplines in agriculture to produce agricultural products and to manufacture agro-based products. It is dedicated to the application of engineering principles for the advancement of food production, fibre production, and other biological needs.

Field operations such as irrigation, drainage, soil conservation and environment conservation are important in successful farming and they make use of knowledge in agricultural engineering that are integrated with knowledge in biological and other sciences. For example, knowledge in agricultural chemistry is useful in dealing with vital farm problems such as uses of fertiliser, insecticide, fungicide, soil makeup, analysis of agricultural products and nutritional needs of farm animals. Meanwhile, agricultural engineering provides the machinery and equipment to apply the fertiliser, insecticide and fungicide efficiently.

Scientific methods are applied to pest control, limiting the widespread use of insecticides and fungicides and applying more varied and targeted techniques. New understanding of significant biological control measures and the emphasis on integrated pest management have made possible more effective control of certain kinds of insects. Meanwhile agricultural engineering provides the chemical application equipments and the strategies to use them safely.

Plant breeding and genetics contribute immeasurably to farm productivity. Genetics has also placed livestock breeding on a scientific basis. Meanwhile, agricultural engineering provides the machinery for mechanisation to reduce the drudgery of farm work and to cope with the increased farm productivity. More significantly, mechanisation has enormously increased farm efficiency and productivity.

Agricultural engineering covers environmental systems, food production, biological resources or ecological systems, and power and machinery systems. Basically, agricultural engineers are equipped with knowledge and capability in writing, social sciences, and economics, along with mathematics (calculus and statistics), chemistry, physics, and biology. Agricultural engineers are provided with fundamental knowledge of the life sciences and how biological systems interact with their environment. In addition, they are equipped with expertise in thermodynamics, mechanics, instrumentation and controls, electronics and electrical circuits, and engineering design.

Agricultural Engineering has advanced to a stage where it may now be subdivided into the following specialised categories:

Biological (Agricultural) Engineering

One of the most rapidly growing sub-disciplines of agricultural engineering is biological engineering, a discipline that applies engineering practice to problems and opportunities presented by living things and the natural environment. This category of agricultural engineers is involved in a variety of exciting interests that continue to emerge as our understanding of science and nature grows. Areas of interest range from environmental protection and remediation, food and feed production, to medicine and plant-based pharmaceuticals and packaging materials. Biological agricultural engineers may also design medical implants and devices, instrumentation and imaging products while others may develop techniques and strategies for natural pest control and treatment of hazardous wastes, for composting, and for enzyme processing of biomass, food, feed, and wastes.

Natural Resource (Agricultural) Engineering

Our environment is fragile. Events like the El Niño phenomenon remind us that our soil and water are vulnerable to degradation by both natural and man-made forces. These agricultural engineers are equipped with expertise in environmental work to better understand the complex mechanics of these resources, so that they can be used efficiently and without degradation. These engineers determine crop water requirements and design irrigation systems. They are experts in agricultural hydrology principles, such as controlling drainage, and they implement ways to control soil erosion and study the environmental effects of sedimentation on stream quality. Natural resources engineers design, build, operate and maintain water control structures for reservoirs, floodways and channels. They also work on water treatment systems, wetlands protection, and other water issues.

Power Systems & Machinery Design (Agricultural) Engineering

These agricultural engineers focus on designing advanced equipment, making them more efficient and less demanding of our natural resources. They develop equipment for food processing, highly precise crop spraying, agricultural commodity and waste transport, and turf and landscape maintenance. This is in addition to the tractors, tillage equipment, irrigation equipment, and harvest equipment that have done so much to reduce the drudgery of farming. Their work remains challenging as technology advances, production practices change and equipment manufacturers expand globally.

Structures & Environment (Agricultural) Engineering

These agricultural engineers understand the importance of creating and maintaining a healthy environment for growing agricultural commodities and for the labourers who produce them. They also understand that our natural resources must not be diminished, in quality or availability, by agricultural operations. Toward these ends, these agricultural engineers are equipped with expertise in structures and environments to design animal housing, storage structures and greenhouses with

ventilation systems, temperature and humidity controls, and structural strength appropriate for their climate and purpose. They also devise better practices and systems for storing, recovering, reusing and transporting waste products.

Food and Bioprocess (Agricultural) Engineering

Food, fibre and timber are only the beginning of a long list of products that benefit from efficient use of our natural resources. The list includes biomass fuels, biodegradable packaging materials, nutraceuticals, pharmaceutical and other products. These engineers understand microbiological processes and use this expertise to develop useful products, to treat municipal, industrial and agricultural wastes, and to improve food safety. They are experts in pasteurisation, sterilisation, and irradiation, and in the packaging, transportation and storage of perishable products. Food and processing agricultural engineers combine design expertise with manufacturing methods to develop economical and responsible processing solutions for the industry as well as to look for ways to reduce waste by devising alternatives for treatment, disposal and utilisation.

Information & Electrical Technologies (Agricultural) Engineering

The application of information and electrical technologies in agriculture is very versatile. It is applied to virtually all the other sub-disciplines of agricultural engineering, from machinery design to soil testing to food quality and safety control. Geographic information systems, global positioning systems, machine instrumentation and controls, electromagnetics, bio-informatics, bio-robotics, machine vision, sensors and spectroscopy are some of the exciting information and electrical technologies being developed and used today in the agriculture and agro-based industry.

Forest (Agricultural) Engineering

Forest agricultural engineers apply engineering principles to solve natural resource and environment problems in forest production systems and related manufacturing industries. Engineering skills and expertise are needed to address problems related to equipment design and manufacturing, forest access systems design and construction, machine-soil interaction and erosion control, forest operations analysis and improvement, decision modeling, and wood product design and manufacturing. Forest engineers are involved in a full range of activities in natural resource management and forest production systems.

Energy (Agricultural) Engineering

Energy is needed to power the machines, devices, and systems in our homes and workplaces. However, many energy sources are non-renewable and create undesirable by-products. Agricultural engineers are at the forefront of the effort to identify and develop viable energy sources such as biomass, methane and vegetable oil and to make these and other systems cleaner and more efficient. These engineers also develop energy conservation strategies to reduce costs and protect the environment, and they design traditional and alternative energy systems to meet the needs of agricultural operations.

Aquacultural (Agricultural) Engineering

As natural fish supplies are threatened, agricultural engineers are needed to help design farm systems for raising fish and shellfish, as well as ornamental and bait fish. They specialise in water quality, biotechnology, machinery, natural resources, feeding and ventilation systems, and sanitation. They seek ways to reduce pollution from aquacultural discharges, to reduce excess water use, and to improve farm systems. They also work with aquatic animal harvesting, sorting, and processing.

Nursery & Greenhouse (Agricultural) Engineering

Nursery and greenhouse operations, like large-scale production agriculture, have many similar needs such as irrigation, mechanisation, disease and pest control, and nutrient application. However, other engineering needs also present themselves in nursery and greenhouse operations such as equipment for transplanting, control systems for temperature, humidity, and ventilation, and plant biology issues such as hydroponics, tissue culture and seedling propagation methods.

Safety and Health in Agricultural Engineering

Farming is one of the few industries in which families work and live on the premises and are at risk of injuries, illness, and death. Agricultural engineers analyse health and injury data, the use and possible misuse of machines, and compliance of equipment with standards and regulations. They constantly look for ways in which the safety of equipment, materials and agricultural practices can be improved and for ways in which safety and health issues can be communicated to the public.

Agricultural Engineering in Malaysian Agriculture

Current Status

- The level of input of engineering technologies into agriculture (comprising production, processing and waste management of crops, livestock and fishery) is generally still low. Only land preparation is fully mechanised in both plantations and smallholdings. Significant progress has been achieved in the mechanisation of field maintenance and crop maintenance operations in the plantations. Harvesting in plantations is still essentially manual. Post-harvest handling and packinghouse operations of fruits, vegetables and other crops are also manual. In the smallholding sector, rice has achieved a fairly high level of mechanisation in most operations.
- Presently, most of the agricultural machinery used in the country are imported and this amounts to about RM250–300 million annually. The machines are imported either as semi knock down (SKD) or complete built up units (CBU) and are either new or used (the latter to be reconditioned locally.)
- The range of machinery that is locally manufactured or fabricated are broad but the volume of each type is not high. The manufacture of these machines is dependent on imported materials and components. A few of the locally manufactured machinery such as sprayers, tillers and rubber processing machines are being exported.
- Locally manufactured agricultural machines include the rotary tiller,

rotary slasher, rotary oil palm front mulcher, maize seeder, rice stubble slasher, fertilizer spreader, agricultural trailer tanker, oil palm fruit bunch loader, oil palm fruit bunch trailer, oil palm fruit bunch infield transporter, oil palm fruit bunch collector, manual knapsack sprayers, agricultural hand tools, and oil palm and rubber processing machines.

- Much of the agro-based and food processing industry consists mostly of small sized firms. These small firms, which are mostly family concerns, are run in the traditional manner, are often manual in operation and devotes little attention to hygiene or quality control. Their sources of funds are usually severely limited. Typical examples of small operations are manufacturing of coffee, spices, noodle, biscuit, bakeries and fish-based food.
- The few large food-processing plants are equipped with modern machinery and utilise up-to-date processing technology and they keep abreast with the latest innovations in the industry. Firms in this category include canning plants, sugar refineries, and beverage and instant noodle industries.
- Agricultural engineering plays an increasingly pivotal role in supporting the continued growth of the agriculture and agro-based industry under the current full-employment situation where labour is scarce and costly. The national policy to reduce dependence on unskilled foreign labour is encouraging the agriculture and agro-based industry sector to consider adopting capital-intensive and management-intensive mechanisation technologies.

Issues and challenges

- A SWOT (strength, weakness, opportunity and threat) analysis of the local agricultural machinery industry indicates that there is potential for greater inputs of agricultural engineering technologies in the agriculture and agro-based industry. Rigorous coordination and planning is required for this development to happen and to enable agricultural engineering to play its critical supporting role in the agricultural and agro-based industry.
- Many factors contribute to the slow adoption of agricultural engineering technologies in the agricultural sector despite its apparent urgent need for it. An example is the trade-off between the higher costs of mechanisation and the easy availability of relatively cheap foreign labour. Financial incentives and a policy on foreign unskilled labour are required to encourage mechanisation.
- The high cost of mechanisation arise from lack of economies of scale and a higher capital investment required to buy and maintain machines, infrastructure changes to facilitate mechanisation and the need for machine operators and technical managers. Other contributing factors are non-availability of suitable mechanisation technology for certain situations, slow uptake of locally developed agricultural engineering technologies, and the fact that agricultural enterprises generally give lower returns compared to other economic activities.
- Since not all of the country's needs for agricultural machines could be met from imports, there are strong economic, technical and strategic justifications to encourage the local manufacture of certain agricultural machines. Incentives and direction are required to boost this development.
- A few existing taxes act as disincentives to the agricultural machinery industry. These include: (a) Import tax on agricultural machines presently not recognised as such, e.g. infield (off-road) transporters, digger-shovel tractor and excavators; and (b) import tax on machinery parts and components used by local machinery manufacturers and fabricators.
- Taxes on replacement spare parts and materials (lubrication oils, greases, filters, etc.) for routine repair and maintenance of agricultural machinery has made the total operating cost very high and uneconomical.
- The lack of industrial extension and the difficult access to funds for the pilot production and commercialisation of R&D results are the factors that contribute to the slow and difficult process of technology transfer from local R&D centers to the industry.
- Technical manpower relevant to the agriculture machinery industry comprising technicians, mechanics and machine operators are seriously lacking in the country. A programme is required to increase the supply of these workers.
- Mechanised agricultural production requires a higher capital investment than the traditional manual method. However, agricultural enterprises involve higher risks compared to other economic activities and they yield relatively lower returns. Strategies that ensure cost effectiveness and viability of mechanised technologies should be put in place.

National Policies

- In the face of the labour shortage occurring in the agricultural sector, the agricultural machinery industry is a critical support industry to the sector. Befitting this role, it would be given integrated attention in terms of direction and structural development in addition to financial incentives and other support to ensure its accelerated growth.
- The dependence by the agricultural sector on unskilled foreign labour would be reduced. Their employment would be restricted to agricultural operations that currently cannot be mechanised. Incentives would be given for agricultural producers to adopt capital-intensive mechanisation and automation technologies.
- The introduction of high technology in mechanisation and automation of agricultural production would be intensified. R&D programmes and technology transfer work in this area would be strengthened.

Strategic Directions

- A National Committee on Agricultural Mechanisation and Automation will be established to provide strategic direction and coordination on all aspects of agricultural mechanisation (i.e. application of agricultural engineering inputs.) Its members would comprise representatives from the public and private sectors. A technical committee and a permanent secretariat would assist the committee.

- ❑ The "Malaysian Network on Agricultural Mechanisation and Automation" would be established to facilitate technology awareness, information sharing and industry feedback. This government-sponsored network or information hub (iHub) would draw its membership form the general public, government agencies and private sectors with interest in the industry. It would set up an Implementation Task Force, an iHub Internet website, a Mechanisation Information Unit and a newsletter. It would be a programme under the National Committee on Agricultural Mechanisation and Automation.
- ❑ The Implementation Task Force would undertake national baseline technical, economic and socio-economic surveys. It would then undertake the identification and quantification of national mechanisation priorities.
- ❑ Emphasis would be placed on land and crop adaptation for mechanised production. They include the development of strategies and action plans in land consolidation, land leveling, input/output access, irrigation and drainage, cropping layout, adaptive plant breeding, demonstration farms and commercial farming.
- ❑ Strategies on accelerated transfer of global technologies would be implemented. They include the establishment of the Technology Transfer Fund and the development of action plans in technology identification, acquisition, field evaluation, commercialisation and extension.
- ❑ Detailed action plans would be developed to strengthen and streamline R&D on the mechanisation of the farm and factories (food and non-food processing.) The plans would cover Priority R&D, Vision 2020 R&D and joint venture R&D with local and international manufacturers.
- ❑ Private sector involvement in agricultural mechanisation would be promoted by providing financial incentives and creating a favourable business environment for their participation. This include the development of strategies and action plans for farm machinery contractors, farmer owners, operators of machinery, SMI (Small and Medium Scale) development, finance-credit facilities and entrepreneur development packages.
- ❑ Strategies in human resource development would be comprehensive and would cover higher education, vocational training, DOA (Department of Agriculture) training, School Net adult education, Internet extension, and DOA extension.

Role of Agricultural and Food Engineering Technical Division (AFETD)

The Agricultural and Food Engineering Technical Division (AFETD) is one of the 15 Technical Division and Interest Groups of The Institution of Engineers Malaysia (IEM). The formation of AFETD was approved by the IEM Council on 20 July 1998.

The objectives of AFETD is to promote and advance the science and profession of agricultural, biosystems and food engineering and to foster the involvement of its members in national as well as international activities related to agricultural, biosystems and food engineering.

The other objectives of AFETD are:

- To facilitate agricultural engineers, biosystems engineers and food engineers in their pursuit of registration as Professional Engineers;
- To encourage Research and Development in relevant areas appropriate to the needs of the nation; and
- To enhance the role and contribution of agricultural, biosystems and food engineers towards increasing national food and agricultural production within the context of proper environment preservation.

Concluding Remarks

Agricultural engineering has provided technologies for farm mechanisation, irrigation, electrification, structures and food processing. It has contributed significantly to the industrialisation of the Malaysian agriculture and it has brought Malaysian agriculture into the present Information Age.

The use of agricultural engineering inputs in agricultural production and agro-based processing is essential to overcome the various operational constraints such as unfavourable plant growth environment, high handling losses and inefficient work rate. High technology farming, including hybrids for wheat, rice, and other grains, better methods of soil conservation and irrigation, and the use of fertilisers has led to a significant increase in the production of food in this country, particularly rice. Malaysian agriculture should now position and prepare itself to adopt the latest contributions from agricultural engineering which include precision agriculture, animal waste management, nutrient transport and water quality, food safety, crop bio-processing and bio-sensors.

As the Malaysian population increases, more food, energy, and goods are required. Our natural resources are limited and while it is necessary to produce more with less, it is equally important that the higher productivity does not degrade our environment. In the search for new ways to use agricultural products, byproducts and wastes, our agricultural engineers should come up with viable, environmentally sustainable solutions. Our agricultural engineers should ensure the sustainability of the necessities of life. They include safe and plentiful food to eat, pure water to drink, clean fuel and energy sources, and a safe, healthy environment in which to live.

In summary, our agricultural engineers are required and expected to:

- Devise practical, efficient solutions for producing, storing, transporting, processing, and packaging agricultural products.
- Solve problems related to systems, processes, and machines that interact with humans, plants, animals, microorganisms, and biological materials.
- Develop solutions for responsible, alternative uses of agricultural products, byproducts and wastes and of our natural resources – soil, water, air, and energy.
- Keep a constant eye toward improved protection of people, animals, and the environment. ■

An Overview of the Evolution of the Bread Industry in Malaysia

By: Dr Chin Nyuk Ling, Department of Process and Food Engineering, Universiti Putra Malaysia

Introduction

The bread industry in Malaysia has seen many changes in the last decade. It emerged as a small-scale processing industry, then it grew to medium-scale and now, we are witnessing the birth of a new trend called the *boutique* bakery. The bread industry in Malaysia is flourishing very quickly and bread products are gaining much popularity. In fact, bread has been labelled as the most popular substitute of rice, the staple diet of Malaysians. The bakery products industry in Malaysia, where baked goods dominates with a large share of 62%, recorded a value of almost RM 2 billion per annum in 2003 with a strong growth of RM 65 million over the previous year (Anon., 2003). The bread and the bakery products market is forecast to experience a steady growth of about 4% per annum in the coming years, reaching RM 2.9 billion by 2006 (Anon., 2002). There's more to it than just a loaf of bread!

Growth Factors

Generally, the rise of bakery products consumption in Malaysia is in line with the population's growing affluence. However, the increased demand for bread is due to several other factors. The main factor is that bread makes quite a similar diet with rice; both are high in carbohydrate and protein. Bread and rice comprise 83% and 90% carbohydrates and 13% and 8% protein, respectively (Anon., 2004b). This suits the eating pattern of people from a hot and humid region where high caloric food is needed for energy lost as perspiration. Rice is the traditional meal for every family but it is a meal that needs to go with dishes prepared separately. Dish preparation is time consuming and could be a hassle for some modern families. Thus, bread, which provides an equivalent balanced diet, becomes quite handy when a quick meal is favoured. It is not surprising that bread has become the most popular food for breakfast in families. Bread is also beginning to be enjoyed during lunch among the working set when the hot sun in mid afternoon discourages taking a rice or noodle lunch. Breads, spread with butter or jam for breakfast and sandwich lunches are beginning to take over traditional meals prepared with rice or noodle.

The roads in Malaysia have improved tremendously in the last 10 years with new expressways being built, opening of major roads to villages and widening of existing trunk roads. This has enabled a wider distribution of bakery products within the whole country, from cities to rural areas. In the past, bakery product supplies are quite localised as in consumers are confined to products from the local bakeshops in the areas that they live. With a better road system, bread products from bakery factories located in the cities are transported efficiently to convenience stores, standard grocers, supermarkets, mini-markets and petrol station stores. For example, a bread factory in Malaysia, the Stanson Bakeries, has 250 trucks plying the peninsula's North-South expressway 24 hours a day, to reach their outlets overnight, on a daily basis. Their strong distribution network has enabled the company to supply more than 8000 retail outlets throughout the country (Dhesi, 2004). The North-South expressway, opened in 1994 and spanning 890 km connecting the Thai and Singapore borders, has helped to shorten travelling time by half.

The bread industry in Malaysia is vibrant in meeting customers' demand for various types of products. Gardenia Bakeries, for example, produces a variety of tasty bread products such as the Toast'ems (sliced bread filled with fibrous fruit and grains) and convenient savoury snacks such as Gardenia Twiggies, Gardenia Muffins, Squiggles, Fun-in-a-Bun and Fluffy Bun besides its most popular sandwich loaves. A wide range of choices makes bread a popular food, affordable for people of all ages and incomes. The capability of the bread industry to catch up and cope with the consumers' ever changing demands has helped the bread industry to expand. The emphasis now is on health breads. Gardenia Bakeries recently introduced their health bread, the Gardenia Breakthru, which has a low glycaemic index, more protein and fibre and less calories and carbohydrates. Shortly after, their rival Stanson Bakeries (who produces the High 5 range of products) announced their official acquisition of a license for the manufacture and distribution of Roman Meal breads

A bread bakery plant

A wide range of bread products available in a petrol station store

from The Roman Meal Company in the US (best known globally for their nutritional and health breads) in October 2004. Despite the competitiveness in bread products, observations have shown that customers are more inclined to choose products according to their affordability. Some may choose to buy a standard loaf while others might buy the high priced health bread from the same outlets.

Media influence, both externally and internally plays a small role in increasing bread consumption in Malaysia. The western culture has been regarded as worthy to adopt by some in Asian countries, and therefore western lifestyles tend to get picked up. This includes eating and serving bread. Local bread companies in Malaysia also spend a large amount of money in advertising their brands and products.

In-store open-kitchen design concept of a boutique bakery
Insets: A baker at work, seen through the glass panels and attractively crafted breads

Current Players

At present, the Malaysian bread industry is dominated by two national local bakeries, which cater to various regions – namely, the Gardenia and Stanson Bakeries, each with their own popular brands of Gardenia and High 5, respectively. These two companies hold approximately 76% of the retail market (Rydings, 2002). However, they compete between themselves through offering attractive bread products. Gardenia Bakeries began operation in Malaysia in 1986 and started producing American-style sandwich bread, using the traditional sponge and dough method. Within four short years, it became the bread market leader with an astounding 99% brand recall rate and 80% top-of-mind recall (Anon, 2004a). Today, Gardenia's overall production capacity has hit 32,000 loaves per hour (the highest in the region) and the company produces over 20 varieties of loaf bread, buns, rolls and snack cakes in five different factories. Stanson Bakeries and its marketing unit are subsidiary companies of the Stanson Group under the Silver Bird Group Bhd. The Stanson Bakeries manufactures the European variety of breads. The group, which started in 1999, is currently contributing about RM 46 million, close to 90%, of Silver Bird's turnover (Dhesi, 2004).

These two companies, the Gardenia and Stanson Bakeries, are competing to lead the bread market. This has resulted in frequent fluctuation of prices and volumes of bread. Whilst one company charges 20 cents cheaper, the other company offers an extra 20% of bread. Hence, we can say that the bread industrialists are alert all the time. Their current move in conquering more of the market share is to strive towards promoting health breads. Their business competitions and strategies for a larger market are norms in the industry but have certainly offered Malaysians a healthy choice of food variety. The Silver Bird Group built a bread museum called the High 5 BreadTown in their RM 100 million new plant premises. It presents the history of breadmaking, spanning more than 5000 years, from Ancient Egypt, through the Iron Age, the Roman and Viking periods, right through the Industrial Revolution to the present day. It uses colourful murals and interactive displays with sound to give a lively hands-on experience to visitors. It is claimed to be the first of its kind in the world. It even portrays bread in a futuristic setting, in the form of pallets and pills to be taken during a spaceship expedition! It is fascinating with ideas being so well transformed for educational purposes. Gardenia Bakeries, in their move to develop its health bread, has teamed up with a group of a researchers attached to a medical faculty from a local university to formulate bread using special ingredients.

Between these two big giant bakery companies, smaller bakeries still manages to find ways to survive the onslaught. These small bakeries are often family-owned and structured and are usually started as a single shop before extending to more outlets. These family bakeries however, only emphasise on bread products, but also produce higher margin delicacies such as cakes and cookies. These bakeries operate in the city where the flow of people is high and most importantly, where there are more affluent consumers. Among the few local confectionary retail chain shops are the King's Confectionary, which started in 1973 in Kuala Lumpur and now has 49 retail outlets, the Season's Confectionary and Bakery, and the Angel Cake House.

Current Trends

The bread boutique is the newest trend of bakeshops in Malaysia that has evolved through the rigorous application of innovative marketing. These boutiques can be found in shopping malls and are well known for their designer breads where customers find a sense of contemporary ease and an exciting shopping experience. This concept was first introduced in Singapore in July 2000 with the brand

name, Breadtalk. In Malaysia, the first shop, Breadstory, started in September 2002. These boutiques have developed very quickly. Over a span of three years, Breadtalk has opened as many as 23 chain outlets in Singapore while Breadstory has 15 in Malaysia. The unique thing about these boutiques is their store design, which allows the customer to see products being prepared in the most stringent hygienic manner in the kitchen through large glass panels. Their concept of baking and crafting each bread carefully and giving themes reflecting current social and popular trends such as novels, movies, heroes and cartoon characters have delighted their customers. For example, bread products are interestingly named 'Tina Tuna', 'Killing Fills', 'Spiderman', 'Nutty Professor', 'PacMan', 'Humpty Dumpty', etc. These boutique proprietors are working very actively to bring their concept overseas through their franchising programmes. Adwan's (2003) comment on the unknown future of this boutique concept, as a passing fad or an enduring trend not withstanding, Breadtalk has signed master franchise agreements in countries like Indonesia, Kuwait, Malaysia, Philippines and Taiwan by April 2004.

Awareness

The exposure on bread products and its sources and uses has come to a high level in the society. People learn to appreciate bread products and some will not hesitate to spend to get the bread of their choice. Baking used to be a skill learned through apprenticeship but today, there are specialised baking schools that provide short courses, certificates and even diplomas in Malaysia. The Malaysian Institute of Baking (MIB) was approved in January 2003 by the Ministry of Education of Malaysia to conduct courses in baking. Private colleges, such as the Flamingo Institute also provide professional baking courses. These courses are learning opportunities for people from differing backgrounds including people thinking of the bread business, job seekers and also health conscious housewives who wish to prepare fresh bread for their families.

Conclusion

Having studied the current trend of bread eating and the bread industry in Malaysia, there is no indication which mode of bread production operation will gain favouritism. The giant bakeries, the family bakeries and the boutique bakeries, each portrays their own uniqueness, which proves their sustainability. The giant bread factories are able to deliver bread at lower prices with good quality control and production systems that wins the confidence of consumers. The family bakeries are making large margins with high-end products while the bread boutiques with their new and innovative concepts of bread products capture customers' interest. The bread boutiques have also given the bread industry in Malaysia a shot in the arm. Whilst the current bread-eating pattern in Malaysian families is still not far from choosing bread by its price and their palates, nevertheless, the awareness of healthy food is increasing. Most families are beginning to differentiate whole grain bread, mixed grains and white bread, at least! The rising living standard and awareness of consumers in addition to the benefits arising from competition among the bread industrialists are bound to bring a higher level of appreciation of bakery products in time. There's more to it than just a loaf of bread! ■

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Investment Incentives for the Agriculture and Agro-Based Industries

By: Ms. Ooi Chooi Im, Director, Agro-based Industries Division, Malaysian Industrial Development Authority and Ir. Dr Lee Teang Shui, Agricultural and Food Engineering Technical Division

Introduction

The current focus of the nation to develop the agriculture and agro-based industries into an important engine of growth of the national economy is without doubt a far-sighted policy to enhance the position of the Malaysian economy from all angles. Why leave out a renewable resource for potential foreign exchange earnings, especially when it uses god-given resources like the land, water and sunlight, reusable if you consider the cycle of the system as a whole. No single person on this great earth can do without food, however, nobody gives this a second thought. It has always been interesting since the early days, when life was not so fast-paced, to see the land being tilled by vegetables farmers who seem to be able to produce veggies out of land that seemed infertile to the uninitiated. With them landless and toiling under high-tension wires, these folks have tried to do simple agriculture towards contributing in their small way to a much-needed commodity. Now, from the highlands come the flowers, fruits and veggies and from the lowlands come fruits, meat, and palm oil that contributes to our foreign exchange earnings. In any country, by reducing the import bill and conversely by increasing its agricultural produce, it would have contributed to the national economy in terms of financial flows. Recognising the huge import bill (RM16 billion) that the country incurs annually, the government should be given the support to stem the outflow of our hard-earned Ringgit. Towards this end, the government has put in place various facilities and incentives to enhance private sector participation in these sectors. This article discusses the government policies, incentives and opportunities for investment in the agriculture and agro-based industries, all in the hope of attracting foreign direct investments and that big corporations would see the need to go big on agriculture and food production. Recognising the risks involved with the investments and longer gestation periods to reap the fruits of the investments, policies are set up to account for these factors.

Some Malaysian Agricultural Products

Background

There are tremendous ideal prospects and immense opportunities to be reaped from the food industry in Malaysia. Malaysia is a lush tropical land full of natural resources that adds flavour and variety to the research, cultivation and processing of foods. Malaysia is poised to become one of the leading Asian countries in food production and processing, and she is positioning herself to lead in the halal food certification sector. The present annual export worth of more than RM5 billion for processed food accounts for two-thirds of the total food exports of RM8 billion. To give a picture of what's going on in the land, here are some interesting facts:

- While the country is a net exporter of poultry meat (60% of the meat industry), she is however still a net importer of meat products, particularly beef and mutton. Except for production of pasteurised milk, the dairy industry is dependent on imports. Poultry meat production is expected to go up to 1.13 million tonnes in 2010, up from 0.88 million tonnes in 2003.
- Exports exceed RM1.5 billion per annum of which frozen prawns accounts for RM600 million. 85% of fisheries are from marine catch while 15% are from aquaculture. From 1.31 million tonnes in 2003, it is expected to reach 1.65 million tonnes in 2010.
- Although the cereal products sector is dependent on imported raw materials, the net export is RM250 million per annum.
- Pepper products earns some RM120 million (fifth largest producer.)
- Net import of RM50 million of processed fruits and vegetables. Major activities are the downstream processing of fruits such as canning of pineapples, guava, passion fruit, jackfruit and banana, and juices. In 2003 fruit production comes to 1.51 million tonnes and expected to grow to 3.8 million tonnes in 2010.
- RM 1.17 billion per annum of exports of cocoa products (sixth largest producer.)
- Total export value of edible palm oil-based products is RM22 billion per annum (50% of the world's palm oil output, 65% of palm oil of the world's exports.)
- There are about 400 hectares under flower cultivation and of these 70% of the production is for export.

Aeroponics Vegetable Farm

- Vegetable production is forecasted to increase from 813,000 tonnes to 1.9 million tonnes by 2010.

The fruit and vegetables processing industry have tremendous potential for import substitution and export opportunities and investors are encouraged to undertake the commercial cultivation of fruits, vegetable and flowers. Also, further development in the production of value-added palm oil-based specialty products to cater to the health conscious (health supplements) and vegetarian consumers is another avenue for growth. Quality and safety certification are top priorities for the food processing sector and thus, the Hazard Analysis and Critical Control Point (HACCP) System Certification is administered by the Ministry of Health to provide certification and surveillance audits. Apart from adhering to the regulatory Food Act (1983) and Food Regulations (1985), food manufacturers with quality assurance in production are awarded the internationally recognised MS ISO 9001:2000 Certification of Quality Systems by SIRIM QAS International Sdn. Bhd.

Malaysian Industrial Development Authority

The Malaysian Industrial Development Authority, MIDA, is the government's principal agency responsible for co-ordinating and promoting development in the industrial, agricultural and services sector in the country. It is like a one-stop center for a host of information, advisory services and assistance. Its principal role is to assist investors by providing information on the opportunities for investment and facilitating the development of joint venture investments. Evaluation of manufacturing licenses, tax incentives, posts for expatriates and duty exemptions on raw materials, machineries, equipment and components are part and parcel of MIDA's role. Those seeking information or assistance can let the fingers do the walking at *www.mida.gov.my* or pay a visit to MIDA's Business Information Center at Plaza Sentral in Kuala Lumpur. With its 10 nationwide offices and the many offices in major countries overseas, MIDA is poised for any query on doing business in Malaysia. The 9-booklet series, *Guide For Malaysian Manufacturers*, published in May 2004, aids local investors on all they want to know. The range of materials covered ranges from Getting Started, Approval and Licensing, to the all important Incentives for Investments, Taxation, Government Grants, Financing, Credit Facilities, Infrastructure Facilities, Employment Policies, Legislations, Employment Policies, Manpower Development and Training Facilities. It also covers where research and development can be carried out to improve processes and products.

Incentives For The Agricultural Sector and Food Production

According to the definition given in the Promotion of Investments Act 1986, a company involved in agriculture includes that of agro-based cooperative societies and associations and sole proprietorships and partnerships engaged in agriculture. This is different from that for manufacturing where according to the Manufacturing License Industrial Coordination Act (ICA) 1975, all manufacturing companies with shareholders' fund of RM2.5 million or more, or engaging 75 or more employees are required to apply for a manufacturing license. The liberalisation of equity policy rules that all new projects in manufacturing, including expansion and diversification, will be exempted from both the equity and export conditions. However the specific equity policy for aquaculture activities require at least 30% Malaysian equity and in deep-sea fishing ventures, 100% Malaysia equity. The incentives for investments are:

Main Incentives

The Promotion of Investments Act 1986 provides for two main incentives, the Pioneer Status (PS) and the Investment Tax Allowance (ITA).

(a) Pioneer Status
Companies producing promoted products or are engaged in promoted activities (Table 1) are eligible for Pioneer Status, one that enjoys a partial income tax exemption on 70% of statutory income for 5 years resulting in an effective tax rate of 8.4%, commencing from its Production Day (defined as the day of first sale of the agriculture produce.) This goes up to 100% if investors are willing to operate in Kelantan, Terengganu, Pahang, District of Mersing in Johore, Sabah and Sarawak.

(b) Investment Tax Allowance
As an alternative, companies granted ITA are eligible for an allowance of 60% on its qualifying capital expenditure (factory, plant, machinery/equipment) incurred within 5 years from the date of the first qualifying capital expenditure incurred. ITA can be utilised to offset against 70% of the statutory income. Any unutilised allowance can be carried forward until exhausted. The remaining 30% of statutory income is taxable at the prevailing company tax rate. Again, the 100% value hold true for the specific areas.

To increase the benefits to agricultural projects, the government has broadened the definition of qualifying capital expenditure to include expenditure incurred for (i) clearing and preparation of land, (ii) planting of crops, (iii) provision of plant and machinery used in Malaysia for the purpose of crop cultivation, animal farming, aquaculture, inland fishing or deep-sea fishing, and other agricultural or pastoral pursuits, and (iv) construction of access roads including bridges, construction or purchase of buildings (including those provided for the welfare of people or as living accommodation,) and structural improvements of land or other structures which are used for crop cultivation, animal farming, aquaculture, inland fishing and other agricultural or pastoral pursuits. Such roads, bridges, buildings, structural improvements on land and other structures should be on land forming part of the land used for the purpose of such crop cultivation, animal farming, aquaculture, inland fishing and other agricultural or pastoral pursuits

In view of the time lag between start-up and processing of the produce, integrated agricultural projects qualify for ITA for an additional five years for expenditure incurred for processing or manufacturing operations.

(c) Incentives for Food Production
To encourage new projects, a company that invests in a subsidiary company engaged in food production, together with the subsidiary company, qualifies for either of the following incentive packages (Table 2). The eligible food products include kenaf, vegetables, fruits, herbs, spices, aquaculture, cattle, goats, sheep, deep-sea fishing, etc.

Table 1: Promoted Activities and Products Qualifying for PS and ITA

List of Promoted Activities and Products which are Eligible for Consideration of Pioneer Status and Investment Tax Allowance under the Promotion of Investments Act 1986

AGRICULTURAL PRODUCTION

Cultivation of tea
Cultivation of fruits
Cultivation of vegetables, tubers or roots
Cultivation of rice or maize
Cultivation of herbs or spices
Cultivation of essential oil crops
Production of planting materials
Cultivation of crops for animal feed
Floriculture
Apiculture
Sericulture

Livestock farming (excluding rearing of chickens, ducks or pigs)
Production of breeder stock
Spawning, breeding and culturing of aquatic products
Off-shore fishing
Cultivation of medicinal plants
Cultivation of cocoa
Cultivation of coconut
Cultivation of sago palm
Rearing of chickens and ducks

PROCESSING OF AGRICULTURAL PRODUCE

Chocolate and chocolate confectionery
Cocoa and cocoa products
Fruits
Vegetables, tubers or roots
Essential oils
Livestock products
Agricultural waste or agricultural by-products
Aquatic products
Aquaculture feed

Plant extracts for pharmaceutical, perfumery, cosmetic or food industries
High fructose syrup
Coconut products except copra or crude coconut oil
Starch products
Cocoa paste, cocoa butter and cocoa powder

FORESTRY AND FORESTRY PRODUCTS

Cultivation of timber, bamboo or cane, Cane products, Bamboo products

MANUFACTURE OF RUBBER PRODUCTS

Earthmover tyres, agricultural tyres, industrial tyres, commercial vehicle tyres, motorcycle tyres, aircraft tyres or solid tyres
Precured tread liners
Retreading of aircraft tyres
Latex products: surgical gloves, safety/special function gloves, condoms, catheters, rubber (elastomeric) specialty coatings, rubberised fabrics, rubber floorings, rubber moulds, modified natural rubber, reclaimed rubber, latex products: carpet underlay, swimming caps, balloons, finger cots, toys, latex thread

Dry rubber products:
Beltings, hoses, pipes and tubings, rubber profiles, inflatable rubber products, industrial and office equipment rollers, seals, gaskets, washers, packings and rings, anti-vibration, damping and sound insulation products, rubber linings

MANUFACTURE OF PALM AND PALM KERNEL OIL PRODUCTS AND THEIR DERIVATIVES

Oleochemicals or oleochemical derivatives or preparations
Margarine, vanaspati, shortening or other manufactured fat products
Cocoa buffer replacers, cocoa butter substitutes, cocoa butter equivalent, palm or special olein
Crude palm kernel oil or palm kernel meal
Refining of palm oil or palm kernel oil

Table 2: Incentive Packages

Incentive Package	Details of Incentives
A	A company which takes up a 100% equity in a subsidiary company engaged in food production receives a tax deduction equivalent to the amount of investment made in that subsidiary. The subsidiary company enjoys full income tax exemption on its statutory income for 10 years commencing from the first year the company enjoys profits, in which, (i) losses incurred before and during the exemption period can be brought forward after the exemption period of 10 years, and (ii) dividends paid from the exempt income are exempted in the hands of the shareholders.
B	A company which takes up 100% equity in a subsidiary company engaged in food production will be given group relief for the losses incurred by the subsidiary company before it records any profit. The subsidiary company enjoys full income tax exemption on its statutory income for 10 years. This commences from the first year the company enjoys profits, in which (i) losses incurred during the tax exemption period can be brought forward after the exemption period of 10 years; and (ii) dividends paid from the exempt income are exempted in the hands of the shareholders.

An existing company that reinvests in the production of the above food products also qualifies for the same incentives for a period of five years. The food production project for both new and existing companies should commence within a year from the date the incentive is approved. Applications should be submitted to the Ministry of Agriculture by 31 December 2005. A locally-owned manufacturing company with Malaysian equity of at least 60% that reinvests in promoted food processing activities is eligible for another round of the Pioneer Status or Investment Tax Allowance (ITA) incentives.

More Incentives For The Agricultural Sector

Companies engaged for at least 12 months in the production of essential food such as rice, maize, vegetables, tubers, livestock, aquatic products, and any other activities approved by the Minister of Finance can enjoy the Reinvestment Allowance (RA). The qualifying capital expenditure includes expenditure incurred, as mentioned above. The RA is in the form of an allowance of 60% of the qualifying capital expenditure incurred within a period of 15 years beginning from the year the first reinvestment is made. The allowance can be offset against 70% of the statutory income in the year of assessment. Unutilised allowances can be carried forward to the following years until fully utilised. Companies that undertake reinvestment projects in the promoted areas mentioned previously can offset the allowance fully against their statutory income for that year of assessment.

Reinvestment Incentives for Resource-Based Industries are offered to companies that are at least 51% Malaysian-owned and are in the rubber, oil palm and wood-based industries producing products that have export potential. Companies in these industries reinvesting for expansion purposes are eligible for another round of Pioneer Status or Investment Tax Allowance. To promote modernisation and the usage of environment-friendly practices in the agricultural sector, companies or farmers in the chicken and duck business who reinvest for the purpose of shifting from the opened house system to the closed house system will be eligible for RA for a period of 15 consecutive years commencing from the first year the reinvestment is made. This incentive is given on condition that the minimum rearing capacity of the closed house system is (i) 20,000 broiler chickens or ducks per cycle or (ii) 50,000 layer chickens or ducks per cycle. This incentive is effective from the year of assessment 2003 and all projects are to be verified by the Ministry of Agriculture.

Upon the expiry of the Reinvestment Allowance (RA), companies that reinvest in promoted agricultural activities and food products are eligible to apply for the Accelerated Capital Allowance (ACA). These activities include the cultivation of rice, maize, vegetables, tubers, livestock, aquatic products and any other activities approved by the Minister of Finance. The ACA on the capital expenditure is to be utilised within three years, i.e. an initial allowance of 40% in the first year and an annual allowance of 20%. Claims should be submitted to the Inland Revenue Board, accompanied by a letter from MIDA certifying that the companies are undertaking promoted agricultural activities or producing promoted food products.

A person or a company carrying on an agricultural activity can also claim for capital allowances and special industrial building allowances under the Income Tax Act 1967 for certain capital expenditure. Capital expenditure that qualifies include expenditure incurred on activities previously mentioned. A company continues to get the allowance for as long as it incurs the expenditure, regardless of whether it already enjoys Pioneer Status or ITA.

In what is called an Accelerated Agriculture Allowance for the planting of rubberwood trees for the furniture industry, a non-rubber plantation company that plants at least 10% of its plantation with rubberwood trees is eligible for the Accelerated Agriculture Allowance, whereby the write-off period on the capital expenditure incurred for land preparation, planting and maintenance of rubberwood cultivation is accelerated from two years to one year. This incentive is for project applications received by the Ministry of Primary Industries from 21 September 2002. Applications should be submitted to the Ministry of Primary Industries

Schedule 4A of the Income Tax Act 1967 provides for a 100% allowance on capital expenditure for Approved Agricultural Projects as approved by the Minister of Finance. This covers qualifying capital expenditure incurred within a specific time frame for a farm that cultivates and utilises a specified minimum acreage as stipulated by the Minister of Finance.

Approved agricultural projects are those for the cultivation of vegetables, fruits (papaya, banana, passion fruit, star fruit, guava and mangosteen), tubers, roots, herbs, spices, crops for animal feed and aeroponic and hydroponic grown products; ornamental fish culture; fish and prawn rearing (pond culture, tank culture, marine cage culture, and off-

shore marine cage culture); cockles, oysters, mussels, and seaweed culture; shrimp, prawn and fish hatchery; and certain species of forest plantations. The incentive enables a person carrying on such a project to elect to deduct the qualifying capital expenditure incurred in respect of that project from his aggregate income, including income from other sources. Where there is insufficient aggregate income, the unabsorbed expenditure can be carried forward to subsequent years of assessment. Where he so elects, he will not be entitled to any capital allowance or agricultural allowance on the same capital expenditure (as before). This incentive is not available to companies that have been granted incentives under the Promotion of Investments Act 1986 and whose tax relief periods have not started or have not expired. To increase export earnings, incentives are given to companies which exports fresh and dried fruits, fresh and dried flowers, ornamental plants and ornamental fish enjoying a tax exemption of its statutory income equivalent to 10% of the value of its increased exports. Companies providing cold room and refrigerated truck facilities and related services such as the collection and treatment of locally produced perishable food products qualify for Pioneer Status or Investment Tax Allowance. To enhance the competitiveness of Malaysian companies in the global market for "halal" products, expenses incurred in obtaining "halal" and quality certification and accreditation, both local and international certifications are allowed as income tax deductions. Companies producing high quality halal food for export and which use modern and state of the art machinery and equipment are eligible for ITA of 100% qualifying capital expenditure within a period of 5 years and can be offset against 100% of statutory income.

Other Incentives

There are also incentives given for High Technology Companies, where the PS status is given with income tax exemption on 100% statutory income for 5 years or ITA of 60% on qualifying capital expenditure for 5 years from the date the first qualifying capital expenditure is incurred. The allowance can be utilised to offset against 100% of its statutory income for each year of assessment. However, the high technology company must fulfill the criteria that the percentage of local R&D expenditure to gross sales should be at least 1% on an annual basis. Companies are given three years from the date of operation or commencement of business to comply, and at least 7% of the total company's workforce should be scientific and technical staff with diplomas or degrees with a minimum of 5 years' experience. The list of products is shown in Table 1. Food production using emerging technologies and advanced farming systems, and the development, testing and manufacturing of food products using emerging technologies and advanced manufacturing systems are considered as high technology.

Apart from the above, incentives are also given for companies in R&D. Contract R&D companies that provide services to other companies other than its own related company stands to be eligible for PS and ITA status. R&D companies that provide services both for its related company and other companies are eligible for ITA qualification. However, the criteria include research being undertaken in accordance to the needs of the country; at least 70% of the income of the company be derived from R&D activities; at least 50% of its workforce and at least 5% must be qualified personnel in R&D functions, "for food manufacturing companies and for agricultural-based companies, respectively. Companies with in-house R&D qualify for ITA of 50% on qualifying capital expenditure (related to R&D activities) incurred within 10 years. The allowance can be offset against 70% of statutory income. Effective 21 May 2003, R&D companies stand to gain for eligibility of a second round of PS status for another 5 years or ITA for a further 10 years.

To give added impetus to agricultural development, incentives are also given for commercialisation of public R&D products. Effective 11 September 2004, a company that invests in its subsidiary company involved in the commercialisation of resource-based R&D findings will be given tax deductions equivalent to the amount of investment made to the subsidiary. The subsidiary that undertakes this activity are to be given 100% tax exemption on statutory income for 10 years. The criteria to qualify include being at least a 70% Malaysian company and should own at least 7% equity of the company doing the commercialisation effort. This effort has to be implemented within a year from the date of approval of the incentive.

Other incentives include double deduction on revenue expenditure incurred on approved research, and double deduction on costs incurred for the use of facilities and services of approved institutions or R&D companies or contract R&D companies. Approved R&D expenditure incurred during the PS period will be allowed to accumulate and be brought forward and given another deduction after the PS period. Also permitted are double deduction on cash contributions made to approved research institutions and an Industrial Building Allowance for buildings for R&D purposes. There are a host of other incentives including for products for export, value of increased exports, promotion of Malaysian brand names, tax exemptions for outsourcing manufacturing activities, development of websites to promote sales, freight charges (East Malaysia to Peninsula Malaysia,) acquiring a foreign company, training incentives, incentives for being environmentally friendly, and incentives for raw materials, each with their own criteria.

Conclusion

This article is written with the purpose of informing readers about the many advantages of investing in agriculture production and food processing granted by the government, in the hope that the nation would gain from a net agricultural product exporting vantage point. With the neat package of advantages offered, companies should really be making a beeline to see the fruits of their labour. There may be other aspects that need to be considered though, one of which is the acquisition of land for the activities desired and in this matter; the state governments should be the ones to approach, since land is a state jurisdiction. Suffice to mention that in order to be considered a force to be reckoned with, only powerful conglomerates or the bigger corporations who are willing to go big to produce with economies of scale, quality, guarantees, packaging, promotion, and healthy products, can make it happen.

Acknowledgements

This article is written based on a talk given by Ms. Ooi Chooi Im, Director, Agro-based Industries Division, Malaysian Industrial Development Authority (MIDA), on 19 February 2005, organised by the Agricultural and Food Engineering Technical Division (AFETD) of The Institution of Engineers Malaysia (IEM). The authors would like to express their sincere thanks and appreciation to MIDA for the use of her literature in the course of writing this article.

WEC 2004 Shanghai: Engineers Shape The Sustainable Future – After Thoughts

By: Ir. Yam Seng Lam, B.E. (Adelaide), P.Eng., MIEM

The Second World Engineers' Convention held in the first week of November 2004 has a very appropriate and apt theme in "Engineers Shape The Sustainable Future." It was set against a backdrop of a world long obsessed with growth when it is not busy at war. In the host city Shanghai, which epitomizes the excesses of China's teeming cities, there looms the dark shadow of her two decades of unrelenting growth and development. To be fair, the part of Shanghai we visitors frequented was rather pleasant and traffic congestion appears tolerable. The same cannot be said of her air and water quality and the living conditions of the people in the streets.

Dr William Wulf, President of the National Academy of Engineers, USA, in his opening message invoked an American folk belief of cooking a frog with slow fire; had it been boiling water in the first contact, the frog would have skipped out of the pot quickly, but if the water temperature were to be raised gradually, the frog would experience a false complacency and it would face the inevitable fate of being cooked eventually. He saw the parallel between human beings living in a worsening environment and the frog being put through a slow boil.

Sustainability will eventually be achieved through nature's own way of seeking ecological equilibrium or balance but if we do not conscientiously intervene to correct excesses in some areas, the eventual equilibrium level achieved may not be entirely benign to human habitation with the eventuality that the well-being and even the very existence of mankind may not even figure in the new equilibrium.

This appears to be the ultimate fate awaiting mankind as we get used to the deceivingly slow process of environmental degradation and the accompanying ecological imbalance. Take the jungle for instance; it suffers from the direct blow of over-logging and the pressure of human of cultivation. Its many precious plant species and fauna are being exploited to the point or brink of extinction. The jungle, its plant life and the fauna that thrive in it are in a very delicate ecological balance. Many plant species and fauna are fundamental to the healthy propagation and growth of the jungle, which in turn provides home and protection to these inhabitants of the jungle. Our direct encroachment of the jungle coupled with over-exploitation of its other resources has the net effect of setting off a series of ecological imbalances on an accelerated pace. When nature has to readjust itself on a grand scale, it is normally accompanied by outbreak of what we term as unnatural events; be they extreme weather changes, or the spread of pests, diseases or stubborn viruses. We always find physical or chemical means of overcoming these changes, we thought. If these fail, accommodating the new equilibrium would be the order of the day. Exhaust fumes pollutes the environment and to overcome poor air quality on the road, we have to drive in enclosed air-conditioned cars, but at the expense of burning more fuel, which compounds pollution. We have grown to accept such self-deceiving acts in the belief that we have been smart and are able to make the adjustment to fit into an ever-changing ecological equilibrium. The truth is we have been lucky but only as lucky as the frog, as in the final analysis nothing short of early perception of danger and jumping off the pot would save the frog. That much we can learn from the American folk belief of Dr Wulf.

In the same convention, there were some discussions on innovative technologies as a key tool for a sustainable future. However, it is debatable if such technology-driven advantage can sustain development indefinitely, as the real contribution of technology is in cutting down raw material wastage and increasing efficiency in production and thereby prolonging the production and demand cycle. On the supply side, exploitation of resources has a ceiling. Many resources are depleting while those that can regenerate require a critical mass to keep them sustainable. The demand side appears to have a free run, being supported by growing populations, wasteful lifestyles and vested commercial interests.

In tracing human progress on Planet Earth, we note that technology has an extremely slow takeoff since the first humans discovered the use of crude stone implements and fire. It took the scattered colonies of the early humans close to one million years to journey the so-called Stone Age before bronze was introduced about 3,500 years ago. Since this quantum jump from stone to metal, the pace was accelerated. Explosives in the 14th century and then electricity introduced in the 19th century let loose the power of science. Advance and growth in the last century has been nothing short of spectacular. Unfortunately the advance is driven by consumption and built on resource exploitation. In recent decades, fuelled by advances in electronics and IT, the desire to consume has reached an unprecedented scale and the raid on resources is frenzied.

Factories spring up to produce and manufacture goods to meet the demand of our insatiable consumption habit. The direct impact of manufacturing-related activities on environmental degradation is devastating. Direct pollution of the environment by harmful gas emissions, waste water discharge and hazardous industrial dumping cause untold damages to both air and ground water, the very basic elements sustaining life forms on Earth. The oceans are not spared either. Waters around the world's busy sea lanes are polluted. The pollution in our coastal waters provides a glimpse of the plight of the oceans of the world. The Eighth Malaysia Plan reported that of 273 water samples taken from coastal water of all states, 94% were polluted by oil and grease, 73% by suspended solids and 30% by E. coli. That was before the

year 2000. Indirectly, disappearing species and fauna, a direct result of our mindless raid of nature's treasure trove, adds on to the disequilibrium. All these have a way of getting back at us through new ecological equilibrium that may unleash unimaginable terror forces of nature.

Technology riding on the success of mass production efficiency has enriched our lives with comforts and luxuries. The price to pay is resource plundering and environmental degradation. Environmental consciousness as well as economic consideration in recent decades has set governments and businesses to drive technology in a more rational way to enhance the efficient utilization of raw material and energy in production processes and thereby reducing waste and energy in furtherance of the cause for sustainable development. This is the area engineers and let us be fair, scientists in various fields too, have long been involved in and some of the main success scored are as follows:

- Raw material utilization is getting more efficient through miniaturization of components and better component design efficiency.
- Substitution of hazardous components with environmentally friendly materials and substitution of non-renewable materials by renewable resources.
- Adoption of recyclable components or materials in product design.
- Better production efficiency, which is more energy efficient and minimizes raw material wastage.

Japanese electronics is a good example of component miniaturization. But in total, the above processes are best exemplified by the motor industry and in particular the German car makers seem to be showing the way. As early as 1988, BMW had started coding the plastic body panels of one of its models for the purpose of easy recycling. Car makers are also avoiding difficult to recycle and hazardous material like PVC, mercury, lead and cadmium in car components. Researchers are also developing tougher pure material like polypropylene to replace the less recyclable glass fibre reinforced composites. The above are on-going processes and there is still vast scopes to explore in the varied fields of engineering. What comes to mind readily in the context of Malaysian construction industry is the under-utilization of pre-cast technology. Prefab and standardizing of components are two areas where the industry is trying to minimize waste but, for various reasons, have not gained the acceptance it deserves. The CIDB Industrialised Building System (IBS) initiative in recent years is a refreshing step in the right direction.

The above drives home the point that basically engineers are contributing their efforts more at the downstream design or production end to meet the demand. These efforts help in satisfying the demand at a lesser cost to the environment but may still be inadequate against the onslaught of demand propped by a growing population with an insatiable appetite to consume. In the short term, the population is set to grow and so will demand. We harbour hope that the world's population will eventually reach a manageable level, in the belief that improved life quality, coupled with the human survival instinct would help to keep the number down. Assuming that the population figure will eventually sort itself out, the greatest threat to sustainable development would appear to be the demand created by an insatiable human appetite to consume. If there were effective input by engineers at upstream or conceptualization or planning level to help moderate the demand for products or services, then this would be the most cost and resource-effective contribution by engineers.

Intervention at this level to moderate demand is not all about technology and engineering skill only. More often than not, the main decision makers are not engineers. How effective can this be then? There is no definite answer; for example commuters can be induced to take buses or the Light Rail Transit (LRT) instead of cars if such public amenities are well-planned and efficient. Good planning and efficiency can only result from realistic ridership projections and optimum route and machinery selection by engineers and town planners at the conceptualization or planning level. Again its impact on the car population may not be great but it does reduce daily car trips substantially. In Singapore, in conjunction with an excellent public transport system, tax disincentive and other measures are applied to curb car ownership quite successfully. But not many countries would want to introduce such an unpopular tax regime. This reaffirms that the success or failure of the system is not entirely engineering or centered on engineers; there are also the town planners, other bureaucrats and political agenda or vision to contend with. Such are the difficulties and complexities of attempting to moderate demand with upstream engineering input. Intimidating as the task may appear, we know an efficient system and its success would ultimately depend on decisions derived from facts and science-based articulation. Hence a lot of hope and responsibilities would still rest on the shoulders of engineers as senior department heads and consultants to ensure that science and quality engineering data would figure in the decision making process.

This is a less explored area but engineering efforts at this level require great skill and to measure up to the task and responsibilities we need well-informed engineers with passion and conscience for the environment. Such attributes can best be cultivated in the education system. Many schools have regular environment programmes like collecting recyclables and tree planting. But more is required at tertiary level and for the purpose intended here, engineering schools especially have to create environmental awareness in their students by impressing upon them the delicate equilibrium of the ecosystem, the alarming state of its degradation and man's role within the system. This would provide the correct ambience to nurture and sustain a pool of like-minded and well-informed engineers with common passion and conscience for the environment. With such attributes, engineers will be able to share their thoughts in promoting a structured linkup between conscience and scientific or engineering efforts. The first little step may be modest but over the long term there will be respectable incremental improvement to the engineering efforts. The first step could provide us with a better and more scientific definition for environmental conscience and the responsibilities it entails. From this we can reasonably expect the evolution of scientific linkups in the form of scientific tools, financial models and even interfacing methodology with others for articulating the case of engineering intervention of projects at conceptualization stage to moderate demand.

We are not commencing from zero base. On the application side, the engineering fraternity already has the

tools such as value engineering, growth and cash-flow projections and due diligence procedures. Perhaps these often-overused tools can be given fresh terms of reference or mandates to provide the methodology and framework for engineering efforts aimed at moderating demand.

The example of transport systems demonstrates that the excellent efforts of engineers and planners in projecting ridership demand and mapping out an optimum transport network at the conceptualization stage can effectively influence commuters' choice and result in a substantial reduction of daily car trips. There are other areas where similar intervention may work beneficially. All over the world there are the superfluous and overbuilt facilities that could be trimmed but are nevertheless built. Yet there are still projects, which insist on providing facilities based on an unrealistic growth projection over an unnecessarily long period. The waste in the costly upkeep of oversized facilities that are under utilized over a long period is sinful, not to mention that rapid technology advance and social-economic shift may make the original planning and design irrelevant before full utilization. The thought sends cold shudders right down to our empty pockets.

So far our discussion on engineering intervention at the conceptualization stage to help moderate demand is focused on a narrow field of public projects. There is fair doubt as to its effectiveness and relevance in commercial production of consumer goods and services. Here engineers in the business sector appear to be in a dilemma, as intervention by whatever means to reduce demand would go counter to vested commercial interest. Often in such businesses, engineers are excluded from the inner decision-making circle and are deprived of a chance in articulating the engineering perspectives. On this we can take heart at what one Indian academician at the WEC 2004 suggested: "Engineers who conscientiously modify treatment plants for greater efficiency and search for alternative fuels are shouldering responsibilities on one side of the coin, the other side of the coin where engineers are mostly sidelined, requires us to educate ourselves and in turn others." That is another perspective of engineers' struggle to contribute at the two levels: the design/production level and the conceptualization/planning level. While the statement seems to accept the limit that what engineers can do is mainly at the conceptualization level (as engineers are sidelined on the other side of the coin,) the suggestion nevertheless advocates educating ourselves and in turn others. This probably is where the answer lies. To reach out for a better future, this is also the spirit engineers should adopt when confronted by frustration.

The encouraging sign is that globally big businesses are more ready to embrace the role of good corporate citizens. This would provide the right business environment to make engineers more relevant on the other side of the coin, but first we must share a passion for the environment and educate ourselves on the same topic before we can educate others. ■

Comments on the Report on "Soil Nailing & Guniting"

By: Ir. Dr Gue See Sew and Sdr. Gue Chang Shin

We refer to the comprehensive report by Ir. Yee on the interesting talk on "Soil Nailing & Guniting" presented by Ir. Neoh, which was published in the IEM Bulletin (October 2004). In the report he has highlighted three (3) internal and four (4) external failure modes that must be checked to ensure safety. Figure 1 of the report shows a layer of reinforcement at 30mm from the soil face; this short lever arm is generally unlikely to satisfy the bending resistance for the facing structural design at the mid span between the nails particularly for high cut slopes, in which the lateral pressure on the gunite facing could be high.

Soil nail facing provides a lateral confinement to the soil between the nails, in which the soil nail facing plays a major role to resist the earth pressure. It is important to note that the facing needs to satisfy the structural design requirements in bending and shear.

As mentioned in the "Manual For Design & Construction Monitoring Of Soil Nail Walls" by the U.S. Department of Transportation, Federal Highway Administration (FHWA, 1998), the facing structural design requires provision of adequate bending moment capacity to resist the earth pressures applied to the facing span between adjacent nail heads, and provision of adequately sized bearing plates to provide adequate punching shear capacity and must be able to transmit load from the gunite facing to the nails.

It is therefore important to make sure the design and detailing of soil nail and gunite facing meets the structural design requirements. Figure A shows the typical detailing of soil nail gunite facing. ■

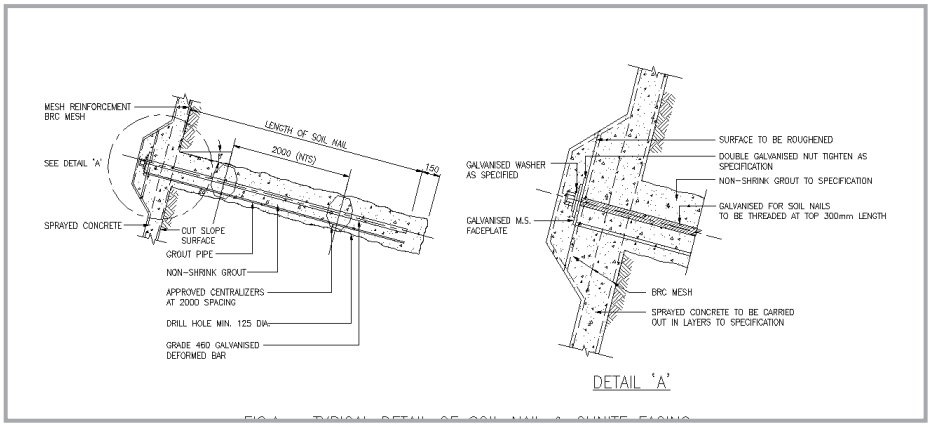

Figure A: Typical Detail of Soil Nail and Gunite Facing

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Solly, You Talking to Me?

By: Sdri. Elaine Koh

Now, it is indeed unusual that I single out any particular person or phrase to write on, on grounds that it is rude to ridicule someone for their poor command of language. But an e-mail which G&S received recently has stayed with me and is indeed reflective of the shocking command of English amongst our engineering students.

The e-mail of contention is from a representative of a student body from a prominent local university. He being the coordinator for the student body, 'demanded' that we forward him a logo for inclusion into their brochure. This person is already a final year student in the engineering faculty and would graduate next year.

It gets to me, this language thing. It gnaws at me that a lot of students in the local universities think that having a worse-than-average English vocabulary doesn't really matter. Why? And the fact that he wrote that e-mail to many persons meant that he probably didn't know that there was something very wrong with his language.

Reading this you would probably think I'm a snob. Am I? Is it too much to ask that a person write an e-mail of perfectly constructed sentences? Nothing bombastic, nothing superfluous, just simple text-book sentences. Maybe I'm lucky. I come from a background where books were with me even before I could read. At home, books overflowed the shelves and there were times my mum has had to chuck that odd book or two.

But then, I also have friends whose first language is their native tongue. My very best friend to whom I've had to patiently explain what a nipple is comes from a background where no one speaks English. And really, I respect her for making such an effort. She now switches back and forth between Mandarin and English effortlessly and ashamedly, I regret teaching her some words any mother would pale at.

You know how it is, there will be a rash of theories from educationists and politicians, expounding their views on the standard of English (or the shocking lack of it) in our country. And then, after everyone has had their say, nothing really gets done. Students still plod along with their shuddering English and think it's all hoity-doity.

But it's not! It's no more just them looking for a job in this country where everyone also goes 'I demand for a logo.' The world had gotten so small, it's practically borderless. The competition has just gotten so much tighter. That piece of paper to say that you're a top A student just doesn't cut it anymore. If you've attended our first talk in the series of "Engineering the Engineer" recently, you'll know exactly what I'm talking about.

No system is going to give you a better command of English. Of course it will help – a bit. But it's really more of attitude. It's about taking opportunities to speak it, to read it and to make mistakes. So what if they laugh or write about you in their column. At least you're learning. It's about coming out of your comfort zone and being challenged. Constantly. But after a while, it gets easier and easier and before you know it, you'll not 'demand' someone for a logo, you'll politely request for a logo. In a nutshell, it's all about being your own steward. ■

For more info on our hip and happening young engineers, visit ***http://www.iem.org.my/external/g&s/*** *or mail us at* ***iemgs@yahoo.com***

The World NEEDS Engineers.....

- Whose truth cannot be bought,
- Whose word is their bond,
- Who put character and honesty above wealth,
- Who do not hesitate to take chances,
- Who will not lose their identity in a crowd,
- Who will be as honest in small things as in great things,
- Who will make no compromise with wrong,
- Whose ambitions are not confined to their own selfish desires,
- Who will not say they do it "because everybody else does it,"
- Who are true to their friends through good report and evil report, in adversity as well as in prosperity,
- Who do not believe that shrewdness and cunning are the best qualities for winning success,
- Who are not ashamed to stand for the truth when it is unpopular, and
- Who have integrity and wisdom in addition to knowledge.

Please help me to be this kind of engineer.
Bob Bea

Grateful acknowledgement is made to Professor Robert Bea for permission to print this inspiring piece. Thanks to Ir. Parminder Singh who pointed it out to the Secretariat.

The 11th Young Engineers of the ASEAN Federation of Engineering Organizations Conference (YEAFEO)

Reported by: Sdr. Suresh Yegambaram & Sdr. Yau Chau Fong

Date : 16-20 December 2004
Place : Yangon, Myanmar
Malaysian YEAFEO Delegates : Sdr. Suresh Yegambaram, Sdr. Yau Chau Fong, Sdri. Kee Wai Fun, Sdri. Trudy Ganendra & Sdr. Ngeow Yen Wan

Mingalabar……(hello in Burmese)

It was one of the MOST unforgettable and HAPPENING delegations we have participated in. Five days and four nights with Young Engineers from Myanmar, Singapore, Indonesia, Cambodia, Japan (observer), Brunei, Hong Kong (observer), Vietnam, Philippines and Thailand, was just not enough. We were truly, madly and deeply sad to leave Yangon (the capital of Myanmar) and the superb hospitality shown by the Young Engineers (YE) of Myanmar.

16 December 2004 (Thursday)

We started our journey from KLIA and safely landed at the Yangon International Airport, Myanmar. From the look of the airport, it was as if we were in Malaysia in the early 70's. We were informed earlier that someone carrying a CAFEO signboard from the Myanmar Engineering Society will be receiving us. But what we experienced was way beyond our expectations. A pool of Young Engineers from Myanmar, including a few pretty young ladies wearing their national dress, surrounded us with joy and gave us a very pleasant welcome.

Upon reaching the prestigious Sedona Hotel, the venue for CAFEO/YEAFEO, we were again greeted by the passionate Young Engineers (YE) of Myanmar. In fact, all the registration counters were handled by YE volunteers. Their commitment throughout the event was absolutely impressive.

After registration, we were off to a simple Myanmar traditional dinner with the YE committees led by their two leaders, namely Mr. Ye Myat Thoo and Ms. Mya Seng Aye. Their local food was really yummy and Myanmar cuisine was something like a combination of our Malay and Indian food. Following the dinner, we were taken to the Chinatown to have a view of their night market and we had a chance to try some of their local fruits.

The welcoming by the Young Engineers of Myanmar Engineering Society at the airport

17 December 2004 (Friday)

The day started at about 8am for a city tour in Yangon. All the delegates were cramped into two hired coaches by the organizer. At first, we were surprised by the smooth flow of traffic to our destinations. Later we found out that all the delegates were treated exactly like how we treat NAM or OIC delegates in Malaysia, with police escorts and road blocks to all our destinations. That really gave us an impression on how important this event was to their country.

Our first destination was Sule Pagoda and the Historical Monument. Next we visited National Races Village, a cultural village which is similar to our Mini Malaysia in Malacca. The tour continued after lunch and this time we were brought to Shwethalyaung, one of the world's most beautiful reclining Buddhas. Our next stop was shopping at Scott Market, which is something like our Petaling Street, where a variety of local products could be found.

The day's dinner was held at the majestic Karewei Palace. For us, the dinner was great not just because of the food but it was the starting point of new bonds of friendship. We met the rest of the young delegates who had just arrived from their respective countries. During the night, most of us were too busy exchanging business cards and mingling with each other until we did not even have much time to eat our food.

18 December 2004 (Saturday)

It's time to get back to business. This is the start of the official day for CAFEO and YEAFEO. The opening ceremony was officiated by the Prime Minister of Myanmar and was covered live by the media, touted as one of the biggest events of the year in the country.

After the end of the ceremony, the YEAFEO delegates kicked off with our very own conference program of the day. It started with country reports presented by all the chairmen of the respective institutions. Our G&S chairman, Sdr. Suresh Yegambaram gave an impressive presentation by presenting all the activities done by G&S during the past one year and the upcoming activities as well. The activities and achievements of G&S amazed all the other YEAFEO delegates and they congratulated us by saying "IEM G&S certainly has the most active young engineers section among ASEAN countries." That remark certainly gave us extra motivation to move forward.

After lunch, all the delegates proceeded to the next important event in the agenda, the 11th YEAFEO Council Board Meeting. During the meeting the following issues were discussed:

(i) *Strategic plans to enhance communication between YEAFEO members*

Keeping up communication among YEAFEO members and frequent

The photo session at Kerawei Palace

update of the website have been a serious problem all these years. To solve that, Malaysia was selected as the coordinator to follow up with countries for updates and to ensure active participation from all to enhance communication. Meanwhile, Thailand agreed to continue their duty as the web master for the YEAFEO web page. All delegates agreed to send updates to the website on a monthly basis.

(ii) *Formation of permanent secretariat for YEAFEO Currently, the host country will be the secretary for YEAFEO by a rotational basis every year. This caused some loss of information and there was no proper point of contact for YEAFEO. Therefore, Malaysia proposed to have a permanent secretariat to handle and maintain YEAFEO affairs in a much more organized manner. The secretariat should act as a point of contact and an information center for YEAFEO. Malaysia, the appointed coordinator was requested to produce a paper indicating the pros and cons of the proposed set up.*

(iii) *Resource exchange programs between countries*

Malaysia suggested that resource exchange for education programs in terms of speakers for courses can be done among countries. Other than that, it was also suggested that delegations to member countries should be organized to create more chances to learn from each other. All the delegates agreed to support such resource exchange programs.

After the meeting, all the delegates exchanged gifts and took the opportunity to invite each other to their respective countries. Singapore invited all the YEAFEO members to join the IEM/IES meet in Singapore this May. Meanwhile the Malaysian delegates invited all the YEAFEO members to participate in the IEM G&S's technical delegation to Japan in April 2005.

The official function for YEAFEO ended after a dinner, but it wasn't the end of the day. A bunch of almost 30 delegates conquered the streets of Chinatown; eating, tasting and chatting all along the way.

19 December 2004 (Sunday)

Although most of us slept very late the night before, the excitement and enthusiasm made us wake up early to start our journey again. This time YE of Myanmar chartered a bus with a police escort for our YEAFEO delegations' tour. That was cool!

Our first destination was the famous ShweDagon pagoda, the most notable building in Yangon. It is a

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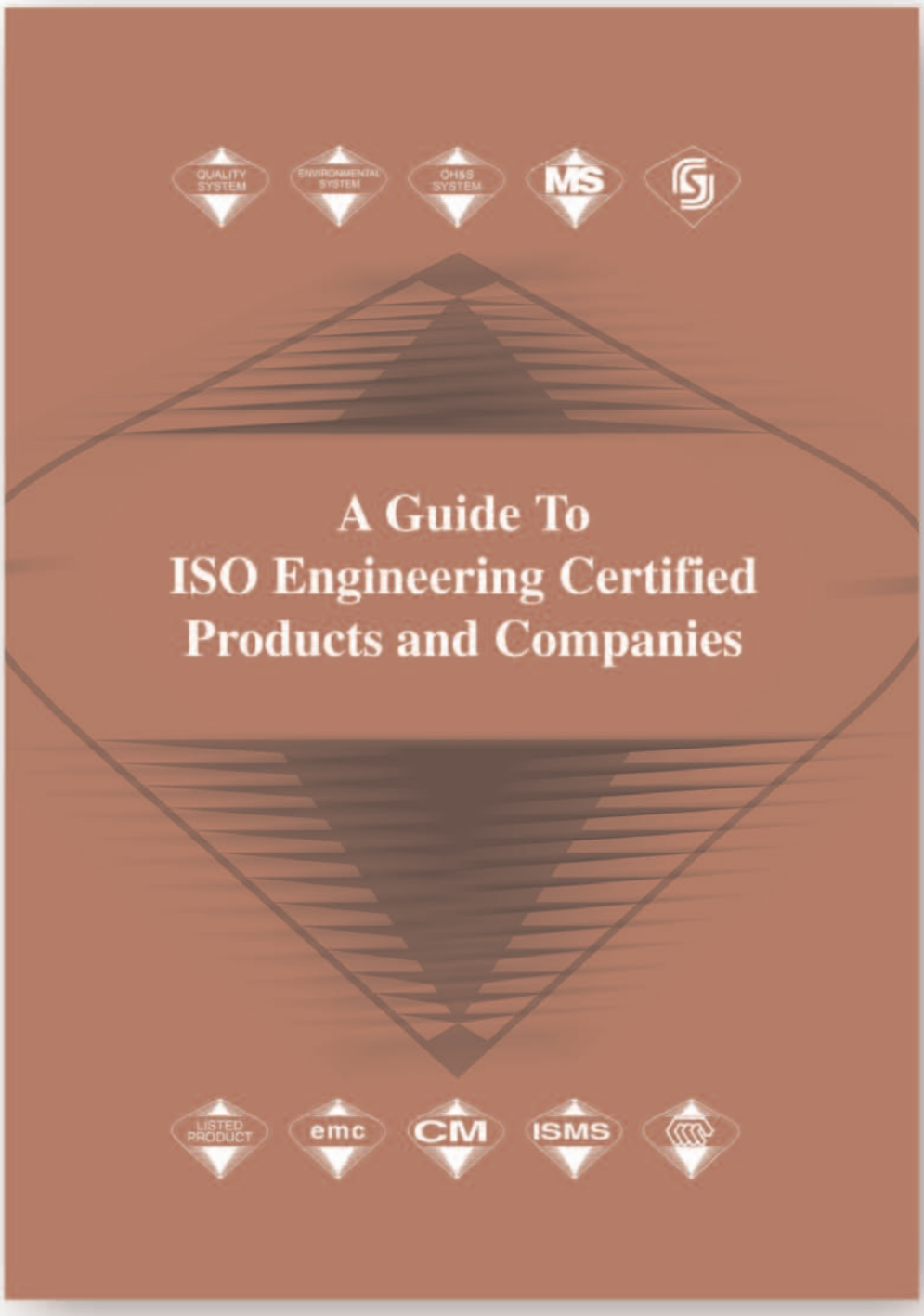

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Hanging out with YEAFEO delegates

great cone-shaped Buddhist monument that crowns a hill about one mile north of the Cantonment. The pagoda itself is a solid brick stupa (Buddhist reliquary) that is completely covered with gold. It rises 326 feet (99m) on a hill 168 feet (51m) above the city.

Then, it was another visit to the National Races Village as most of the delegates were unable to visit the place on the first day. Although the Malaysian delegates had been there before, the experience was totally different when visiting with all the other delegates. It was joy and fun. From the village we stopped at one of their lakes in the city to take some pictures before returning to the hotel.

All great things must come to an end. The closing ceremony took place in the evening. During the ceremony, every country performed their country song and our Malaysian delegates, led by Sdri. Trudy and Sdri. Kee Wai Fun, did a remix version of "Rasa Sayang" to entertain the crowd.

20 December 2004 (Monday)

It was the last day and time to say "TA TA" (goodbye in Burmese) to Myanmar, a country and the people that we would never forget.

The golden land of Myanmar has brought us new friends. The hospitality shown especially by the Young Engineers of Myanmar Engineering Society has definitely sparkled and they deserved full credit for their organization of YEAFEO. Till we meet again in next YEAFEO meeting in Vientienne, Laos, in December 2005.

Chey Su Ti Bar Ti……Young Engineers of Myanmar Engineering Society

(Thank you YE of Myanmar Engineering Society)

We would like to express our gratitude and appreciation to IEM for giving the opportunity to G&S members to participate in the event. This in turn has given the G&S members invaluable experience and exposure at the international stage.

More information and photos of the event could be obtained by surfing to our G&S website and the YEAFEO official website at ***www.yeafeo.org***

To G&S members who are interested to participate and to be part of the upcoming YEAFEO delegation, feel free to drop us an e-mail at ***iemgs@yahoo.com***