

FEATURES

NOTICE OF 42ND ANNUAL GENERAL MEETING 2014/2015

AGM NOTICE

Please be informed that 42nd Annual General Meeting of the Balai Ikhtisas Malaysia is scheduled as follows:

Day/Date : 29th (Wednesday) July 2015
Time : 6.00p.m.
Venue : Safir Room, Hotel Istana, Jalan Raja Chulan, Kuala Lumpur

Programme:

- 5.30 pm - 6.00 pm - Registration/ Refreshment
- 6.00 pm - 8.00 pm - Annual General Meeting
- 8.00 pm - Hari Raya Aidilfitri Open House Celebration

The EXCO and Board of Management would like to invite all to join us for the Hari Raya Aidilfitri Open House Celebration which will be held immediately after the Annual General Meeting at 8.00 pm.



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ANNUAL DINNER 2015, 10th June 2015

Balai Ikhtisas Malaysia has successfully organized its Annual Dinner on Wednesday, 10 June 2015 at Hotel Istana, Kuala Lumpur.

The BIM Annual Dinner 2015 was attended by the professionals of Member-Institutions representing surveyors, engineers, architects, planners, pharmacists, social workers, foresters, agronomists, veterinarians, scientists and researchers involved with rubber, plastics and materials, dentists and doctors of medicine, planters, and experts in logistics and transport.



YB Puan Hajah Nancy bt Haji Shukri, Minister in the Prime Minister's Department giving her speech as the first lady guest of honour



From (L-R): Tan Sri Dato' (Dr) Abdul Aziz bin Abdul Rahman, Dato' Dr. Mohd Noordin bin Keling, YB Senator Tan Sri Dato' Abdul Rahim Abdul Rahman, YB Puan Hajah Nancy binti Hj Shukri, Prof Dr Mohd Khanif Yusop, Tan Sri Dato' Ir. Gan Thian Leong and Dato' Dr Vincent Ng In Hooi

For the first time BIM dinner that was officiated by a lady Guest of Honour, the Honourable YB Puan Hajah Nancy binti Haji Shukri, Minister in the Prime Minister's Department.

The highlights of the Annual Dinner were the presentation of the prestigious **BIM Professional Excellence Award 2015** under the different groups namely:

- Engineering, Construction & Property: Tan Sri Dato' Ir. Gan Thian Leong (IEM)
- Pure and Applied Science: Dato' Dr. Mohd Noordin bin Keling (VAM)
- Accounting, Business, Commercial and Legal: Tan Sri Dato' (Dr) Abdul Aziz bin Abdul Rahman (CILTM)

BIM Lifetime Achievement Award for the year 2015 was presented to YB Senator Tan Sri Dato' Abdul Rahim Abdul Rahman (RISM).

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President Prof Dr Mohd Khanif Yusop speaks



Master of Ceremonies, Assoc. Prof. Dr Nur Azura Adam



Members of Veterinary Association of Malaysia (VAM) give support for Dato' Dr. Mohd Noordin bin Keling as one of the award recipients



Birthday celebration for BIM Trustee, Dato' Dr. Mohd Noordin bin Keling



Prize presentation for the winners of Inter Professional Bowling Game

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Souvenir to YB Puan Hajah Nancy bt Haji Shukri



Prof Khanif in song with YB Puan Hajah Nancy bt Haji Shukri



BIM Executive Committee Members, Past Presidents with Guest of Honour,
YB Puan Hajah Nancy bt Haji Shukri

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ABOUT MEMBERS



PAM NEW COUNCIL MEMBER LIST 2015-2016

We are pleased to announce that the following were elected into PAM Council for 2015 - 2016 at the 49th Annual General Meeting of Pertubuhan Akitek Malaysia held on 25 April 2015.



Ar Mohd Zulhemlee An

**PAM President
2015/2016**

President	Ar. Mohd Zulhemlee An
Deputy President	Ar. Lillian Tay Wai Fun
Vice President	Ar. Ang Chee Cheong
Honorary Secretary	Ar. Sarizal Yusman Yusoff
Honorary Treasurer	Ar. Thirilogachandran a/l Shanmugasundaram
Immediate Past President	Ar. Chan Seong Aun
Council Members	Ar. Sarly Adre bin Sarkum
	Ar. Erdayu Os'hara Omar
	Ar. Alvin Lim Hai Seah
	Ar. Mustapha Kamal Zulkarnain
	Ar. Steven Thang Boon Ann
	Ar. Alice Leong Pek Lian
	Ar. Zamri Ismail
	Dato' Ar. Kevin Woo Thin Fook
	Ar. Adrianta bin Aziz
	Ar. Norzaini bin Mufti @ Ahmat
	Dato' Ar. Maurice Wee Beng Teck
	Ar. Ahmad Ridha bin Abd Razak
	Ar. Zulkhairi bin Md Zain
	Ar. Goh Ching Keng (Northern Chapter Chairman)
	Ar. Hj Muhamad Zawawi Zainuddin (Southern Chapter Chairman)
	Ar. Jebb Liew Kim Kiong (Sabah Chapter Chairman)
	Ar. Mike Boon Chee Khian (Sarawak Chapter Chairman)

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RISM COUNCIL MEMBERS SESSION 2015-2016

The Annual General Meeting of Royal Institution of Surveyors Malaysia (RISM) was held on 13 June 2015. The newly elected Office Bearers for the term 2015-2016 are as follows:



**Dato' Sr Sri Kandan
s/o Kanagainthiram**

**RISM President
2015/2016**

President :	YBhg. Dato' Sr K. Sri Kandan
Immediate Past President :	YBhg. Dato' Sr Hasan Jamil
Deputy President :	YBhg. Dato' Sr Lau Wai Seang
Hon. Secretary General :	Sr Ang Fuey Lin
Hon. Treasurer General :	Sr Gar Ti Wei
Vice President (GLS) :	YBhg. Dato' Sr Mohd Noor Isa
Vice President (QS) :	Sr Wan Ainon Zuraiha Wan Abdul Khalid
Vice President (PMVS) :	YM Prof. Sr Dr. Tunku Fauzi Dato' Tunku Abd Malek
Vice President (BS) :	Sr Hj. Mohd Amin Mohd Din
Sarawak Branch (Chair) :	Sr Kenneth Wong Cheng Ai
Sabah Branch (Chair) :	Sr Samuel Chong Choung Henn
Johor Branch (Chair) :	Sr Ezam Ariffin
Northern Branch (Chair) :	Sr Fook Tone Huat
East Coast Branch (Chair) :	Sr Wan Zainuddin Hj. Wan Yusoff
Council Members :	Sr Lim Meng Heok
	Assoc. Prof. Sr Zaiton Yaacob
	Prof. Sr Dr. Ting Kien Hwa
	Sr Ishak Ismail
	Sr Dainna Baharuddin
	Assoc. Prof. Sr Dr. Hj Mohammad Fadhil Mohammad
	Sr Danny Yeo Soon Kee
	Sr Adzman Shah Mohd Ariffin
	Sr Dr. Teng Chee Hua
	Sr Dr. Noordin Ahmad
	Prof. Sr Dr. Md Najib Ibrahim
	Sr Hj Mohd Zahry Shaikh Abdul Rahman
	Prof. Sr. Dr Hjh Wan Maimun Wan Abdullah
Chair of Professional Bodies	
Land Surveyors Board Malaysia :	YBhg. Datuk Sr Ahmad Fauzi Nordin
Board of Quantity Surveyors Malaysia :	YBhg. Dato' Sr Hj Abdull Manaf Hj Hashim
Board of Valuers, Appraisers and Estate Agents Malaysia :	Sr Hj. Faizan Abdul Rahman

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CURRENT ISSUES

DRIVING THE AGRICULTURAL AND FOOD ENGINEERING SECTORS

JURUTERA, November 2014



Prof. Dato' Dr Mohd. Fauzi Hj. Ramlan is the 7th Vice Chancellor of Universiti Putra Malaysia (UPM) He has a Diploma in Agriculture from Universiti Pertanian Malaysia (UPM), a Bachelor of Science in Agronomy from Iowa State University, USA, a Master of Science from Louisiana State University, USA and a PhD (Biology) from the University of York, United Kingdom.

He started lecturing at Universiti Putra Malaysia in April 1986, where he has served as a Professor in the field of agriculture. He was appointed the Director of the Student Affairs and Development Division of the Higher Education Department of the Ministry of Higher Education on 1st Oct 2006. From there, he returned to his alma mater as Deputy Vice Chancellor (Student Affairs and Alumni) in May 2010.

Prof Dato' Dr Mohd. Fauzi was appointed as the 7th Vice Chancellor of UPM on the 1st January 2013.

Universiti Putra Malaysia (UPM) is known for producing most of the agricultural and food engineers in the country. UPM Vice Chancellor, Prof. Dato' Dr Mohd. Fauzi Hj. Ramlan says the close ties between the university and the industry are what ensures its graduates are well prepared to work and are able to contribute to the industry as soon as they graduate.

He also says there are lots of challenges that both types of engineers face as Malaysia becomes increasingly urbanised in its quest to become a developed country. He tells us more at **JURUTERA**:

Q: As the pioneer university with programmes on agricultural engineering and food engineering, what are the university's roles and contributions to the food and agriculture industries. How do you see UPM being a source of reference for others in the region and globally?

Prof. Dato' Dr Mohd. Fauzi: I see our approach to achieving this through the use of the 3Rs which we have adopted at the university. First of all, we aspire to be Relevant. By being relevant, we will bring agricultural engineering to the next level.

Secondly, we aspire to gain Respect. In this case, if we are relevant, then people will respect our existence.

Finally, it is our ambition to be a university that is Referred To. If we are relevant and respected, then we will be referred to as a university of stature. UPM has long been recognised, especially in the field of agricultural engineering. When we started our engineering faculty, the major component was agricultural engineering.

UPM started as School of Agriculture in Serdang in 1931 and we offered two programmes: A three-year diploma programme and a one-year certificate course in Agriculture. In 1947, it was declared as the College of Agriculture Malaya and in 1971, Universiti Pertanian Malaysia (UPM) came about when the College of Agriculture in Serdang merged with the Faculty of Agriculture, University of Malaya.

“Today, Universiti Putra Malaysia is well known worldwide as an established agricultural university.”

In 1997, the name Pertanian was changed to Putra as a strategic gesture to reflect the status of UPM as a centre of higher education capable of providing various fields of studies.

Today, UPM is well known worldwide as an established agricultural university. Core education, training and research at UPM place emphasis on agricultural and biological sciences as well as engineering.

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As such, UPM has developed the expertise and facilities as well as an environment conducive for education and research to support the achievement of the objectives of the two undergraduate engineering programmes i.e. Bachelor of Engineering (Biological and Agricultural) and Bachelor of Engineering (Process and Food) to enhance further development of agricultural production and food sector.

As the pioneer for agricultural engineering and food engineering programmes, we have trained and produced many engineering professionals for the industry. For the agricultural engineering programme, 35 batches have graduated since its first intake in year 1975. As for the food engineering programme, 15 batches of students have graduated since its inception in 1996.

UPM also plays the role of a Centre of Innovation and Expert Reference for the agricultural and food engineering fields. Universities from Iran, Bangladesh, Iraq, Nigeria, Sudan, Pakistan, Yemen and Oman have sent their academic staff for our postgraduate programmes for academic staff training.

To name a few, University Faisalabad in Pakistan has referred to our food engineering programme and Institute Technology Brunei referred to our agricultural engineering programme in the development of their respective programmes. At international level of student mobilisation, we have staff and students coming from Kazakhstan, Turkey, Sudan, Oman, Bangladesh, and India.

Local universities which UPM works closely with include Universiti Teknologi Malaysia, Universiti Malaysia Perlis, Universiti Malaysia Terengganu, Universiti Kuala Lumpur MiCET, Universiti Tun Hussein Onn, etc. where our staff members are involved as external examiners, programme assessors or post-graduate supervisors. UPM also has very close research collaborations with Malaysian Palm Oil Board (MPOB) and Institut Penyelidikan dan Kemajuan Pertanian Malaysia (MARDI) to name a few.

Our agricultural and food engineers in UPM are also journal editors or on the editorial board of reputable international journal publications. Many are also involved in international learned societies.

Q: What is it about these two mentioned programmes in UPM that is appealing to others?

Prof. Dato' Dr Mohd. Fauzi: In UPM, 83% of our teaching staff are doctorates. That is the top in the academic world. Once you reach 80%, then you are in the same league as the big boys.

Secondly, UPM is appealing for the facilities that we have, especially our links with the industry. We have the recognition and the infrastructure.

We are the only university in the country producing agricultural engineers. Our graduates find work in a diverse range of employment. In the case of oil palm refineries

and mills, the graduates are employed in the whole chain of agriculture activities from upstream to downstream.

Many of our students have gone on to achieve great success in the industry. Graduates of both the programmes are doing well and many are holding important positions, such as Dato' Dr Ahmad Kamarulnajib Che Ibrahim (Deputy Director-General, Department of Environment), Dato' Azman Mahmud (CEO, MIDA) and Encik Anas Ahmad Nasarudin (CEO, MARDITech Corporation). Some are successful entrepreneurs, for example Ir. Izhar Mahmood (EPA [M] Sdn. Bhd. a subsidiary of Kulim Malaysia Bhd). Alumni are back contributing like Ir. Kumar Subramaniam (SGT Consult Sdn. Bhd), Mr. Justin Tay (Mewah Dairies Sdn. Bhd.) and Encik Sharmi Zahari (Dewina Food Industries).

These are where our graduates are working today. They populate the field, not only in Tractors Malaysia and Felda, but at all tiers of the industry.

“Our graduate employability is 86 per cent. This means that six months after graduation, 86 per cent of our graduates would have found jobs.”

With the successes that we've had so far, our graduates find it easy to find work. Our graduate employability is 86 per cent. This means that six months after graduation, 86 per cent of our graduates would have found jobs. It is the fifth highest graduate employability in the country.

The strength, experience and links that we have with oil palm refineries and oil palm mills attract international students to come to UPM to study.

As a side note, both programmes also fulfil international and national standards and are accredited by Engineering Accreditation Council Malaysia, an entrusted body of the Board of Engineers Malaysia. In 2009, the Board of Engineers Malaysia was accepted as the 13th signatory country of the Washington Accord. This indicates that the standard of the programmes offered for Agricultural Engineering and Food Engineering in UPM is equivalent to the engineering degrees of signatory countries of the Washington Accord.

We send our staff members to reputable universities for training and 83% of them are PhD holders, mostly are from highly ranked universities such as Iowa State University, Oxford University, Imperial College London, UNESCO-IHE, Kyoto University, etc.

Our programmes are bench-marked by external assessors from well-known international universities. In fact, we are looking into international ranking and rating of our departments for the agricultural engineering and food programmes. This will help to attract a higher enrolment of international students which, in the long run, will promote Malaysia's image and help increase exports to the countries where these students come from.

Q: How has agricultural engineering education evolved over almost 40 years in Malaysia?

Prof. Dato' Dr Mohd. Fauzi: The conventional agricultural engineering studies comprise of four sub-areas i.e. farm power and machinery, soil and water engineering, agricultural process engineering, farm structures and environment, and emphasise more on engineering inputs for field production of food crops.

The agricultural process engineering sub-area which traditionally dwells on post-harvest technology, has been adopted and expanded in developing to encompass agricultural/biomaterial processing and food engineering as a means of transforming agricultural production beyond the normal or conventional production of raw agricultural materials by value addition through processing into consumer products.

“The objectives of farm mechanisation are to increase the productivity per agricultural worker and to change the character of farm work, making it less arduous and thus, more attractive.”

This is logical and necessary because of the demand for high quality and value agricultural produce for direct utilisation and consumption as well as to provide abundant supply for processing into value-added quality food and functional/fabricated food products, thus expanding the sources of revenues for the agricultural and food sector.

The need to meet the requirements of food security issues, technological and engineering aspects and automation in food production for downstream processing have all contributed towards this evolution.

The faculty of engineering has moved forward from 1975 to where it is now. We fulfil not only industrial needs but we also work with other local universities such as Universiti Malaysia Perlis and Universiti Tun Hussein Onn Malaysia. We assisted them in the development of their PhD programmes. We have become mentors. In 1979, there were only 30-40 graduates but since then, we have produced some 1,600 agricultural engineers. In fact, most agricultural engineers in Malaysia are graduates from UPM. Only a handful is from overseas.



Q: For 60 years, oil palm has been a major economy crop and we have worked on technologies for palm oil processing. Do we have any strategic crop that offers competitiveness in the future?

Prof. Dato' Dr Mohd. Fauzi: As of today, we have not been able to replace oil palm. People who invest in palm oil are asking for a return of five ringgit for every ringgit of investment. This is, at present, the most profitable crop. Oil palm is very well suited to our climate. At the university, when we look at oil palm, we look at the whole chain, from planting to processing of the oil. Upstream production is all about efficiency. The challenge now resides in the downstream.

We are now looking at using oil palm for bioethanol. We are looking at how to diversify the use of oil palm products. We are not just looking at changing the crop. Let's exploit the full potential of oil palm first. We have not yet finished with exploring the use of oil palm and its waste products. The downstream processes include palm oil as biofuel, oil palm kernel for its milk, palm kernel cake as poultry feed, aspects of green technology, more consistent and higher germination rates, oil extraction rates and etc. There is still plenty of room for improvement.

“In terms of innovation, it is the task of agricultural engineering to try to address food issues in the big cities, using what we call urban agriculture.”

In Malaysia, we are comfortable with plantation crops. It used to be coffee, then rubber and now oil palm. We tried to move to cocoa but it didn't work. Economy-wise, there's huge potential in oil palm.

Yes, we also have kenaf (jute-like plant from the hibiscus family) and tobacco but there are still so many things and huge potentials to be explored where oil palm is concerned. There have been efforts made by Pihak Berkuasa Kemajuan Pekebun Kecil Perusahaan Getah (RISDA) and other agencies like rearing cattle in oil palm plantations so that the cow dung can be used to fertilise the soil. These are among some of the combinations we have tried, but we have not yet reached its real potential.

Oil palm has been a blessing for our country.

As for potential crops that can be identified, perhaps these can be biofuel or energy crops such as the jatophra, herbs (*serai, misai kucing, kacang fatimah, mas cotek, tongkat ali*), vegetables and fruit which have high antioxidants

such as mangosteen, roselle, chilly, pineapple, papaya and coconut.

While identifying potential crops which can act as a primary product, we will continue to work on exploiting the complete utilisation of the oil palm (tree and fruit). In the context of UPM, the research and development in agricultural and food covers a wide range of crops, from cereals crops like rice to industrial crops like oil palm, rubber and cocoa.

In fact, agricultural engineering solutions begin with land development for agriculture, including design and construction of drainage and irrigation infrastructures with soil erosion and water control and storage facilities. Technologies like GIS, remote sensing, environmental sensors, farm machineries and decision support systems have been introduced to the agricultural and plantation sectors to facilitate easier operations.

Q:

Malaysia aims to be a high income nation by 2020. As a popular institute of higher learning, how can UPM contribute towards making this a reality, especially through agricultural and food engineering perspectives? How do you see UPM's contribution towards developing the agricultural sector as one of the leading engines of growth?

Prof. Dato' Dr Mohd. Fauzi: One of our tasks at the university is innovation. Our country is fast changing. The Prime Minister recently mentioned that we now have eight million households. Of these, four million are urban.

We have one million people who make up the urban poor. In terms of innovation, it is the task of agricultural engineering to try to address food issues in the big cities, using what we call urban agriculture. In order to produce food for people living in urban high rise buildings, the engineering must be state-of-the-art. Think multi-tier vertical farming. This type of farming will be seen in areas where there is a lot of high rise buildings and no land for farming. In the big cities all land has been used for housing.

UPM has a tagline: Agriculture, Inovation, Life or in Malay, "Pertanian, Inovasi, Kehidupan".

Agriculture engineering has to develop structures at low cost to provide at least vegetables to feed people in urban areas. We will develop community gardens. It involves innovation and the use of structures.

The Honourable PM launched this initiative in UiTM two years ago. It is already in the market.

Now it is up to the Housing Ministry to buy into it.

If we talk about vertical agriculture, Singapore is already doing this. In many buildings in the republic, there is a biosphere for food. These are community gardens. That area of the residential flat is meant for growing food.

Eventually we should have community gardens of our own. For example, my apartment is producing salad. Your apartment produces onion and Azmi's apartment produces tomato. We can then do barter trade with each other. This is the concept of a community garden.

In the current situation, this also guarantees food. Imagine what would happen if say, for some reason or other, a lorry from Cameron Highlands is unable to deliver vegetables to the Selayang market. Some areas will be affected. Food security is the availability of food at any time.

“The smart farming concept was introduced and developed by agricultural engineers.”

Another initiative being done currently is improving the traditional ways of farming. Farm mechanisation is considered the critical factor of the industrialisation process. The objectives of farm mechanisation are to increase the productivity per agricultural worker and to change the character of farm work, making it less arduous and thus, more attractive.

The agricultural and food engineering departments are working towards creating a favourable situation where it will require only a very small percentage of the population to be involved in food production for entire country.

The high income sector from agriculture is also evolving with the development and improvement of technologies and support. For example, with the intensive, mechanised and hygienic close confinement poultry system, 200,000 chickens can be produced with one worker instead of 20 chickens with 3 people.

The smart farming concept was introduced and developed by agricultural engineers. For example, to increase the income of rice farmers,



a project in Tanjung Karang, conducted by the SMART Farming Technology Research Center at the Department of Biological and Agricultural Engineering, introduced a new technique called "variable rate" technology which reduced the cost of production and increased rice yield by precise management of water and fertiliser in the paddy field.

Today, about 30 farmers in Tanjung Karang are enrolled in the Smart Farming Community Center's rice precision farming programme. Since the project began nine years ago, the area's rice production has increased from 4 tonnes per hectare (the national average) to more than 6 tonnes per hectare.

Agricultural engineers in UPM are also developing machines for other rice farming techniques such as SRI which has resulted in higher yields while reducing the use of water, fertiliser and other chemicals as well as minimising the emission of greenhouse gases from the paddy fields.

The remote sensing and GIS technology introduced by Geospatial Information System Research Centre, which was also initiated at the Department of Biological and Agricultural Engineering, has helped palm oil companies such as MPOB and Sime Darby to increase productivity through more efficient plantation monitoring and management.

In food processing, the invention of food machineries has helped to automate and mechanised many traditional food processes and brought the SME to greater heights in terms of productivity and income. We have a variety of kuih-making machines that have been prototyped and commercialised.

In a nutshell, we have played roles in the development of new systems for agricultural production and the enhancement of rural and suburban SMEs, actively engaging in consumer food production utilising local agricultural materials as well as locally designed techniques or processes and equipment or technologies.

Q: How can engineering contribute to the aspects of halal food production?

Prof. Dato' Dr Mohd. Fauzi: Both departments of the agricultural and food engineering are working closely with Halal Institute in UPM to produce technology to improve halal food production.

“UPM plays a dominant role in the agriculture and food sectors.”

For example, a group of engineers has developed a sensing system using electrical-based properties spectroscopy technique for lard detection to be used in food industries. A model based on FTIR spectra selection combined with multivariate analysis to detect potential presence of lard in ink-printed packaging of foodstuff was also developed recently.

However, we are not just looking at lard. There is a broader spectrum to this field. We have techniques to determine whether an animal is slaughtered properly or not and how the animal died. This test will examine the blood to determine whether the amino acid levels are high. If an animal is under stress the level of amino acids in the blood will be higher. This is already recognised in Kazakhstan.

Q: What is your vision and mission for the agricultural engineering and food engineering education and research at UPM?

Prof. Dato' Dr Mohd. Fauzi: Universiti Putra Malaysia was developed as an agriculture university and agriculture is still the backbone of UPM. Both agricultural engineering and food engineering disciplines are closely linked and UPM plays a dominant role in the agriculture and food sectors. We will be at the forefront in bringing new technologies to the

“We hope to be a reference centre for agricultural and food developments in the country.”

agriculture and food industries and increasing agricultural productivity through improved and mechanised agricultural systems. UPM also looks into the training of professionals for processing value added food products with wider markets and the generation of more agriculture and food related businesses and enterprises. We hope to be a reference centre for agricultural and food developments in the country with a showcase centre of cutting edge researches and technologies. ■

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ENGINEERING GROUP READY TO HELP

The Star, 23 June 2015

THE Institution of Engineers, Malaysia (IEM) is concerned about the recent earthquake and relatively strong ensuing aftershocks at the Ranau/Kundasang area from June 5 to June 18.

A number of post-earthquake hazards need to be considered by the authorities when undertaking emergency operations.

After that the authorities need to initiate post-hazard assessments on the integrity of affected buildings, infrastructure and safety of the affected lands before permitting their continued use. The four more significant potential hazards are:

1) **Landslides:** The overburdened earth covers on the steep mountain slopes are prone to instability, particularly upon exposure to wet weather and can manifest as landslides. They are especially vulnerable given their weakened state after the earthquake.

2) **Rockfall:** Rockslides and rockfalls from the loosened rock mass and barely stable boulder piles down the steep mountain sides are inevitable.

In the natural setting of the steep slopes, the long run-out of rockslides presents great risks to people and properties along the travel paths of the hazards.

3) **Debris-laden streamflow:** Considering the very steep terrain, debris dams tend to be created by earth and rockslide depositions in the valley floors, blocking off running waterways. These debris dams can breach and burst abruptly, with terrifying consequences, releasing torrents of mud, boulders and uprooted large trees together with the flood waters to smash through anything obstructing them.

They also have the power to gouge into the sidewalls of valleys to induce further landslides and release more debris into the stream channel.

4) **Damages related to ground liquefaction:** Coastal and waterlogged riverine areas may suffer ground liquefaction, where the ground behaves like liquid (quicksand, for example) when shaken by an earthquake, and related damage leading to excessive settlement of roadways and severe lateral spreading of the ground.

All the above hazards have proven to be capable of destroying buildings, bridges, homes and farmlands and disrupting essential infrastructures such as power lines, gas lines, road links, telecommunications, potable water supply, healthcare and public order.

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It would be incumbent upon the authorities to promptly evacuate people from the identified hazard zones to avoid casualties. The evacuees need to be relocated to safety in temporary shelters with food and basic needs until the hazards are identified and addressed, and essential services restored to their communities.

The post-hazard assessments on the structural integrity of the affected buildings, infrastructure and the safety of the affected land for subsequent usage need to be undertaken by qualified professionals in order to ensure public safety.

IEM with its large number of available members possessing the necessary professional qualifications and expertise is ready to assist the authorities in assessing the affected areas for safe emergency operations and subsequent reconstruction works.

DATUK IR LIM CHOW HOCK

President,

The Institution of Engineers, Malaysia

BIM MEMBER INSTITUTIONS

- Malaysian Pharmaceutical Society (MPS)
- Royal Institution of Surveyors Malaysia (RISM)
- The Institution of Engineers Malaysia (IEM)
- Pertubuhan Akitteknik Malaysia (PAM)
- Malaysian Medical Association (MMA)
- Malaysian Dental Association (MDA)
- Malaysian Institute of Planners (MIP)
- Veterinary Association Malaysia (VAM)
- Malaysian Institute of Interior Designers (MIID)
- Malaysian Society of Soil Science (MSSS)
- Malaysian Association of Social Workers (MASW)
- The Plastics & Rubber Institute of Malaysia (PRIM)
- Agricultural Institute of Malaysia (AIM)
- Institut Rimbawan Malaysia (IRIM)
- The Chartered Institute of Building Malaysia (CIOBM)
- Institute of Landscape Architects Malaysia (ILAM)
- Institute of Internal Auditors Malaysia (IIAM)
- Institut Bahan Malaysia (ICMM)
- The Chartered Institute of Logistics And Transport Malaysia (CILTM)
- International Institution of Plantation Management (IIPM)

CORPORATE AFFILIATE

- Malaysian Association of Productivity (MAP)
- Malaysian Institute of Human Resource Management