

## Half Day Seminar on “Failure in Structures – Learning from the Structural Failures and Mistakes of Structural Engineers”

By : Ir. Ong Sang Woh

One hundred and twenty participants attended the half-day seminar on “Failures in Structures – Learning from the Structural Failures and Mistakes of Structural Engineers” by Mr. Leon Grill on 15 January 2005 at Bangunan Ingenieur, IEM. Mr. Leon Grill is at present, an independent consultant and has 48 years of experience in structural design, detailing, structural failures and diagnosis of the causes, problems of Codes of Practice and strengthening/repair of the existing structures. He has also been practicing as Chief Proof Checking Engineer in Europe, South America, Australia as well as in Singapore and Malaysia.

The seminar was presented in two parts – i.e. “Failures of Reinforced Concrete Structures”, and “Pathology of Steel Structures”. Mr. Leon highlighted the reasons for structural failures, lessons learnt from these failures and the importance of reducing the unacceptably high number and frequency of failures. The use of competent Forensic Engineering reports and the compilation of reported failures into a data bank were reported. These are useful reference materials for cross-checking by the engineering profession in crucial investigative matters.

The lecture on “Failures of Reinforced Concrete Structures” commenced with a given report on the statistics of structural failures from various countries and the root causes of these failures. It was reported that between 43% to 59% of all these structural failures are caused specifically by design shortcomings only – some of which are incorrect choice of general design concept, poor detailing or details being left to the contractor, improper choice of materials and errors in design calculations. Other causes of structural failures (besides design defects) are attributed to poor construction by builders, use of defective construction materials, and misuse and/or improper maintenance

of structures. Mr. Leon highlighted that the cost of wrong detailing or lack of detailing has increased dramatically as compared to the other causes of design failures. He also mentioned that the heavy reliance on the use of computer-aided design in the recent past has resulted in detailing being (sometimes) dangerously neglected.

A typical case history, which described the structural failure of a reinforced concrete cantilever roof of a sports stadium, was discussed. The speaker highlighted the presence of cracks at the top surface of the component, which may have contributed to the collapse of the cantilever structure. These cracks occurred, not at the face of the columns as expected, but close to the centre-line of the supporting columns – in total contradiction of the studied theory or as described in Codes of Practice. Consequently, laboratory tests were carried out and the experimental results obtained have confirmed that the type of structural failure found (as in the case of the RC cantilever roof of the sports stadium) is neither exceptional nor unique.

From thereon, the subject of design of corbels and the use of Codes of Practice was discussed. The speaker reported that laboratory tests conducted indicated that the general safety factor recommended by Codes of Practice was not always satisfactory. (Note: The speaker recommended a factor of safety of at least 2.5 for live load in the design of corbels). In addition, it was stressed that the proper detailing for the corbels is just as critical.

The second part of the seminar deals on the topic entitled, “Pathology of Steel Structures”. It was mentioned that the most repeated causes of structural steel failures are human in nature, i.e. ignorance, negligence and lack of foresight. The general known means of prevention are as follows:-

- Quality assurance through quality control at all stages during design and construction.

- Strict control of the quality of the materials to be used.
- Proof checking at all the stages of engineering design (specifications, conceptual, calculation, and detailing).
- Site control of assembly and provision of stability during erection.

Statistics and photographs showing collapse of steel structures and causes of reported failure were presented. Three categories of the causes of failures were identified as follow:-

- (a) Those which occurs during erection.
- (b) Those that are due to instability caused by buckling of members or thin plates.
- (c) Those resulting from faulty assemblies.

In conclusion, the speaker introduced two practical recommendations to improve on the practice of engineering. They are:-

- (a) To introduce short courses on structural failures in the universities.
- (b) To have an independent peer review or proof checking at all stages of engineering design.

In addition, the speaker emphasized that the checking of design should not be limited to assuring that all parts of the design are in full agreement with the provisions in Codes of Practice, but must also be based on sound and reliable engineering judgment. The speaker also gave a list of useful references on related subjects on structural failures.

During the discussion session, major issues pertaining to the use of Codes in design was debated and the speaker ended the session stating that engineers should always consider the Codes as a Guide and not use it as a Manual. ■

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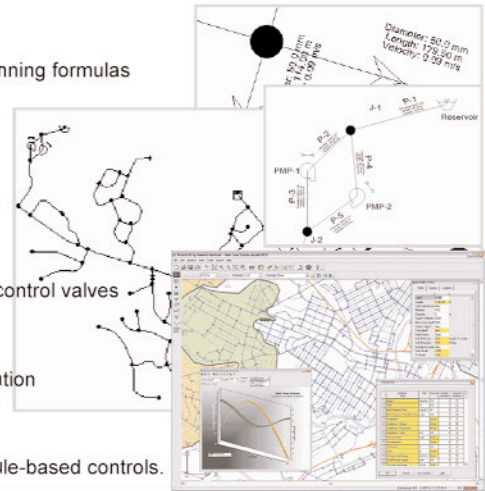


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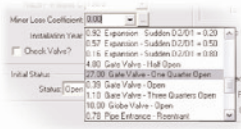
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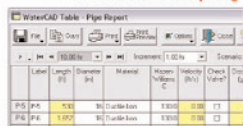
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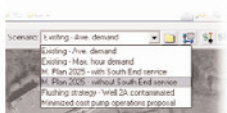
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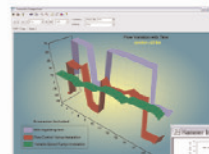
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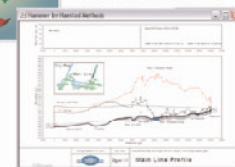
Multi scenario, time variable graphs



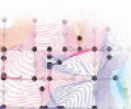
Customizable reporting

Label	Length	Diameter	Material	Hydro. Valves	Check	Pressure	Losses	Losses	Losses
P1	100	150	Cast Iron	0	0	0	0	0	0
P2	200	150	Cast Iron	0	0	0	0	0	0
P3	150	150	Cast Iron	0	0	0	0	0	0
P4	100	150	Cast Iron	0	0	0	0	0	0
P5	50	150	Cast Iron	0	0	0	0	0	0

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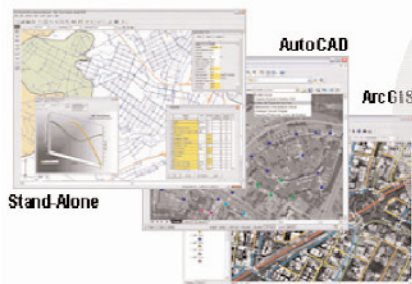


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## Report on the Regional Forum on Sustainable Energy – 11 April 2005

Reported by : Ir. Mah Soo

The Institute for Environment and Development (LESTARI) of Universiti Kebangsaan Malaysia (UKM) recently held a regional forum on the 11 April 2005. The forum focused on sustainable energy, with the headline “Meeting the Challenges for Sustainability in Energy Development and Utilisation”. The event was officiated by YB Dato’ Sri Dr. Lim Keng Yaik, Minister of Energy, Water and Communications, Malaysia.

The main keynote speech was presented by Y. Bhg. Tan Sri Datuk Amar Leo Moggie, Chairman of Tenaga Nasional Berhad (TNB) and it was entitled “Sustainable Development in the Power Sector in Malaysia”.

In his speech, Y. Bhg. Tan Sri Datuk Amar Leo Moggie highlighted two critical issues faced by our energy consortium; that of sustainable energy development and sustainable growth of energy companies in the power sector.

“Last year’s tsunami and the subsequent earthquakes have forced the global community, more than ever before, to come to terms with the true wrath and force of nature and the importance of striking a balance between development and the environment.

For long, changes in energy development have been driven by resource availability, prices and developments in technology. Today, consistent with the goal of sustainable development, the transition to a sustainable energy system is also increasingly marked by the importance we give to the environment and social concerns through actions related to energy.”

The speaker goes on to state that “At times, however, we in Malaysia have been guilty of taking our beautiful, clean and pristine green environment for granted. As the recent spate of news on environmental violations goes to prove, more and more, pressures for development have resulted in the collision of priorities between the needs and interests of what is seen as “development” and those of nature and



the environment.” and he cited the increase of public interest in the environment and that environmental impact assessment is a necessary part of projects and steps has to be taken to minimise and mitigate the effects on the environment and the surrounding areas.

### SUSTAINABILITY IN ENERGY DEVELOPMENT

Y. Bhg. Tan Sri Datuk Amar Leo Moggie emphasised “Energy is always an important issue in today’s world, not only because of its implications for economic growth and development but also because we are concerned with our declining natural resources. For too long, we have been too reliant on fossil fuels for our energy resources that we lost sight, albeit temporarily, of the need for resources to be sustained for generations to come.

Every sector in the economy has its fair share of sustainable development issues. A sustainable energy future, according to the UNDP, is an important linkage for sustainable development and brings considerable benefits in social, environmental, economic and security terms.”

The speaker talked about the evolution towards the four fuel strategy to the recent inclusion of renewable

energy as the fifth fuel. Examples of some of the developments in the renewable energy sector in Malaysia and that around the world were discussed with examples of wind, solar and biomass projects that were conducted in Malaysia. He cited that the slow progress in this sector is due to the cost differential between the cost of generation of electricity from the other different fuels.

### Hydro Potential

The speaker introduced hydropower as a green energy, which is perhaps the only conventional large energy system that is renewable and sustainable. He cited that a lot of this potential resource is underdeveloped because of its location. In Malaysia, specifically in Sarawak, the Rajang river basin including Bakun, Muruni, Baleh and Pelagus, which boasts of a huge hydropower potential, reportedly at approximately 20,000 MW.

In the context of ASEAN, three countries share the Mekong river basin, which is known to have huge hydropower potential.

Within this scenario, hydropower should attract renewed interests and its potential deserves another re-look for long-term diversification of the country’s generation capacity.

### SUSTAINABLE GROWTH OF COMPANIES

The speaker then touched on sustainability of companies in the power sector. He gave some comparative data as follows:

"A look at some comparative figures on return on capital employed of different utilities versus their corresponding electricity growth rates show that in 2003-2004, TNB's return on capital employed was 3.6% compared to 12.5% for EGAT in Thailand, 5% for KEPCO in Korea, 8.5% for Singapore Power and 14.9% for China Light and Power.

The corresponding growth in electricity demand was 8% p.a. for Malaysia, 9.2% for Thailand, 5.7% for S. Korea, 2.4% for Singapore and 4.3% for Hong Kong. As can be noted, even though the demand growth for S. Korea, Singapore and Hong Kong were lower than Malaysia, the returns to these utilities were all higher than TNB's.

Utilities can only provide the quality of service modern consumers expect if they earn a fair returns to allow for continuous investment in capacity building and upgrading of existing networks."

Finally, the speaker concluded after having covered a wide area of issues relating to sustainable energy development, from traditional fuels to renewable energy and to the relevance of sustainable company growth. He then warned that the time for renewable energy has arrived as oil, coal and natural gas prices in the long term would continue to escalate, while renewable energy costs should come down, and there will be a time when all the prices would converge and all forms of energy would compete on a level playing field.

He also highlighted the challenges faced by a utility as a commercial entity with a going concern in the issue of sustainability. He then cited TNB as an example "which has for long strived to cope with trying to sustain and meet electricity demand growth, despite the declining rates of return from the 8% required by World Bank before privatisation, to less than 4% today.

Many nations, we we know, have been experimenting with the competitive model in the hope of letting market forces determine the price of electricity and to weed out the weak and inefficient industry players. Despite the early enthusiasm that accompanied such a model in the late 80's and early 90's, success of the model has been evasive so far and has created instability in the supply system even for countries where demand growth has stabilised."

The speaker concluded on the note that TNB has a central role in the power sector and that "when TNB sneezes, the electricity industry in the country would catch a cold" and that it is essential to ensure the continued sustainability of the national utility (TNB) as a prerequisite to sustainable development in the power sector." ■

*Y. Bhg. Datuk Amar Leo Moggie was recently conferred the title of 'Tan Sri' by the Yang di-Pertuan Agong Tuanku Syed Sirajuddin Syed Putra Jamalullail.*

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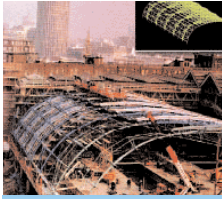
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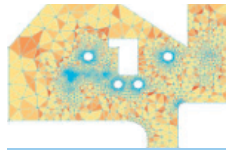


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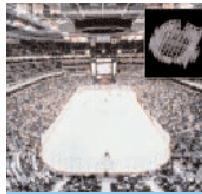
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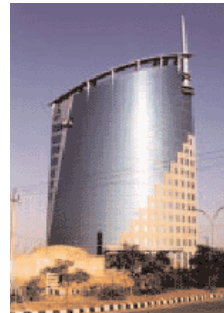
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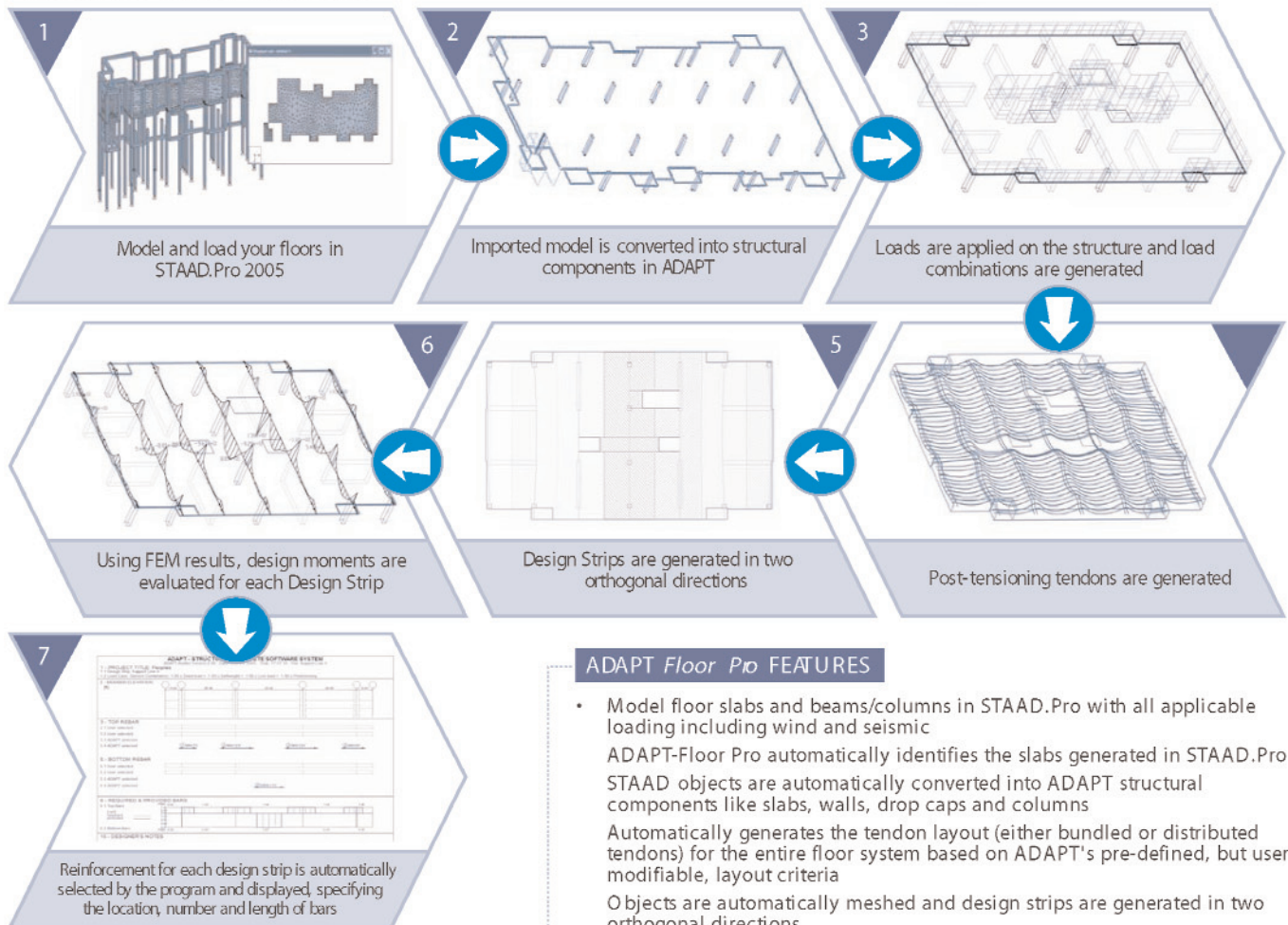
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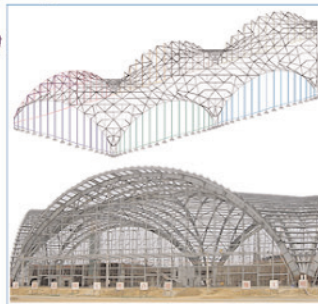
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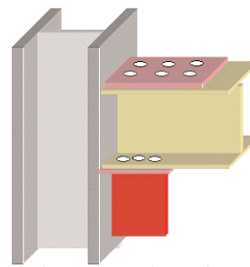
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- Torsion design per Pub. T-117
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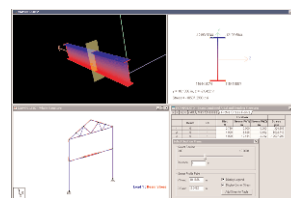
## Concrete Design



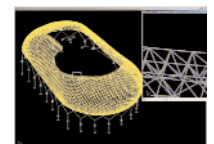
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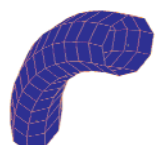
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# “Failure Modes of Concrete Structures”

Reported by: Ir. Ong Sang Woh

## Introduction

On 5 August 2004, the Civil & Structural Engineering Technical Division of The Institution of Engineers, Malaysia in conjunction with IStructE, Malaysia Division organised an interesting talk entitled “Failure Modes of Concrete Structures”. The renowned speaker is Professor Leslie A. Clark, Head of Civil Engineering Department at the University of Birmingham and the Past President of IStructE, UK. The talk was attended by 171 participants.

The talk covered the use of structural design codes in general, and briefly addressed issues of strength, stiffness and durability of structural elements, and checking of the ultimate and serviceability limit states of individual members. Structural design is thus highly codified and applying past knowledge gained from practical experience and research. Hence, the practice of codified design encourages lack of consideration of real structure's behaviour. Moreover, other aspects not covered by code of practice are also ignored.

However, in reality, when structural failures occur in practice they often involve whole structures, and not individual elements. Structural failures are also often of a very sudden non-ductile nature. These aspects of structural behaviour and failure modes are not well covered in the design codes, hence there is an immediate need to consider rational ways of designing to provide adequate robustness, ductility and redundancy in concrete structures.

## Types of Failure

Four major factors for structural failures are discussed and it was stated that failures could be due to a combination of the following four factors:

- Design code deficiencies
- Design errors
- Construction deficiencies
- Deterioration

The common features of structural failures are:

- Sudden and brittle
- Involve significant parts, if not all, of the structure

Typical examples of structural failures and failure mechanism were discussed and highlighted by the speaker. These examples are:

- Hotel New World, Singapore
- Royal Plaza Hotel, Thailand
- Wilkins Air Force Base, USA

- Ronan Point Flats, UK
- Ynys - y - Gwas Bridge, UK
- Pipers Row Car Park, UK
- World Trade Center, USA

As a result of the brittle nature of structural failures, consideration have to be given to the relationship between robustness and ductility of concrete structures. Robustness is defined as

**“The damage suffered by a structure as the result of an unforeseen event, which should not be disproportionate to the cause.”**

Unfortunately, robustness is a term, which could not be quantified. Hence, there is a need to consider it separately.

## Design for Robustness

The structure has to be capable of withstanding two different and independent sets of actions.

- It should be able to support a defined ultimate load
- It should be able to absorb, without collapse, a defined energy input. Hence, the required ductility can be determined.

The three elements in ductility as discussed are:

- Concrete – which has limited ductility especially in design for high strength. As such, concrete failure may be restrained by reducing the failure strain in concrete.
- Reinforcement – which is the main element for ductility.
- Detailing – which also includes anchorage of structural elements.

Although there is no specific ductility requirements in BS81 10 and BS5400, the aspects of ductility have been envisaged and will be covered in Eurocodes EN1992-1-1 for Buildings and EN1992-2 for Bridges. Also the reinforcement production (in terms of performance characteristics, threshold limits, test methods and attestation of conformity) will be covered by EN 10080 (which is due for publication by 2005).

The Normative Annex C of EN 1992 specifies the ductility requirements of Classes A, B and C structures. The following design conditions are covered by the design applications of the classes of structures.

### Class A

- moment redistribution < 20%
- no plastic analysis

### Class B

- moment redistribution < 30%
- plastic analysis

### Class C

- seismic condition

Slides of failed structures with high and low ductility reinforcement and fractured reinforcement were shown. Also the effect of corrosion deterioration of the reinforcement was discussed using the following graphs:

- Total force versus micro strains for reinforcement bars
- Effect of corrosion of reinforcement properties
- Effect of corrosion on bar ductility
- Effect of corrosion on beam ductility

In summary, the talk on failure modes of concrete structures covered the following points, which should be noted for design considerations:

- The collapse of structures tend to be sudden, non-ductile and non-localised.
- Design codes do not cover ductility and robustness adequately.
- There is a need for a rational design method.
- Concerns persist in design code requirements for shear resistance.
- Significant effect of corrosion on reinforcement bars may occur due to poor detailing or even inappropriate design.

Finally, a lively question and answer session followed on immediately after the talk was concluded. The queries raised cover a wide range of topics, such as,

- the definition of “ductility” of structures,
- the need for research into types of deterioration in structures,
- bonded construction and grouting of tendons,
- current trends adopted for shear design worldwide,
- the use of computers by young engineers and the need for a clear understanding on behaviour of structures, and
- awareness by engineers, of up-to-date knowledge in structural design and not “hiding” behind the design codes.

The talk officially ended at 7.30 p.m., and the speaker was given a rousing claps of appreciation. A token of appreciation was presented to the speaker by the organisers, the IEM Civil & Structural Engineering Technical Division. ■



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Pile jacking in progress

## 23rd IEM/IES Meet 2005

By: Sdri. Kang Sze Hui

IEM/IES meet is an annual event organised on rotational basis by The Graduate and Student Section of IEM (IEM G&S) and Young Members Committee of IES (IES YMC). The objectives of this meet are to promote more communication, interaction, and cooperation and information exchange between the young engineers of the two institutions. This year, for the 23rd meet, IES YMC was the host. The event was held from 21 to 23 May 2005. Ten members from IEM and seventh members from IES participated in this year's meet.

The IEM delegates led by Sdr. Suresh Yegambaram (IEM G&S Chairperson) and Sdr. Yau Chau Fong (IEM G&S Vice Chairperson) departed from Puduraya in the wee hours of the morning. After a few hours of sleep in the bus, we finally arrived at our destination, Singapore..... The Merlion City.....

Our first day started by having breakfast with some of the IES YMC delegates at the Beach Road Hawker Centre. After the get together breakfast, we checked in to 'The New 7th Storey Hotel.' Next, we headed to SMU (Singapore Management University) construction site for site visit. We were warmly welcomed and guided by Mr. CK Phang, one of the civil engineers in charge at that site. Safety helmets were distributed as a safety measure along with the site plans and structural layout of the site for site illustration. We were given a thorough explanation on the various design considerations and concepts in constructing the building and structures. We then visited different sections of the university.

After a pleasant lunch and mingling with each other, we were off for the next visit to the 'NEWater Plant'. We boarded a bus together with the rest of the IES delegates. During the journey on the bus, we took the golden opportunity to have a short ice breaking session with one another. Upon reaching the plant, we were shown a documentary about the 'NEWater Plant'. Basically the progress of the visit reminds me of the tour I had at the KLCC Petronas Twin Tower Visit. After the brief documentary show, the visitors were given some time to have fun with some hands-on and interactive

games in order to understand more about the 'NEWater'. A further documentary was also shown. Later, we were led by a tour guide for the briefing of the different stages in water processing before the water is safe for drinking. Finally, we were each given a bottle of 'NEWater' as a souvenir. We had a few photo sessions before moving on to the next activity that is none other than the much awaited IEM/IES Challenge Trophy activities.

The sports activities were held at East Coast Park. Two games were supposed to be played in determining which team will win the IEM/IES Challenge Trophy, namely the Frisbee Challenge and the Captain Ball. After some tense moments, IEM G&S has to surrender the trophy they won two years ago to the much fitter IES YMC in a tough game with a score of 8-5. The IEM G&S was initially leading the in points but as the game went on, the IEM G&S tired out and gave the game away. Unfortunately it started to rain heavily after the first game during the Frisbee Challenge and we decided to end the challenge and awarded the trophy to IES YMC in a true sporting spirit. After that, we continued to have some ice breaking games before dinner time. As the day grew, we could see the changes of East Coast Park. It was getting merrier and more gala, offering a variety of delightful Singapore's local food. Beautiful and colorful lights added to the festive



Singapore Management University Site Visit

atmosphere. Among the famous local food available were satay bahun, chicken rice, stingray fish and BBQ chicken.

Sightseeing was the highlight for the second day. We were brought to the Chinatown for the heritage view and to buy some souvenirs. After having our brunch at a famous "dim sum" restaurant (The Yum Cha Dim Sum) at Chinatown, we split into few groups and headed for some light shopping. Along the road, we noticed that there were some street performers preparing to do some performances later in the evening. Time flew... and before we could wait for the performance to start, we were asked to gather for our next activity. The next itinerary was at Kallang Water Sports Centre. Well, Kallang is famous for its dragon boat races. The event was led by the muscular built IES YMC committees, Kok Leng and Hsien Hung. We have a short warm up before we went through the dragon boat's introductory training. The weather on that evening was just

beautiful for us to do such activity. We had a good rowing and enjoy splashing ourselves during the boat race. After a tiring day of walking and splashing around, we were treated to a sumptuous dinner at Rendezvous Hotel by IES.



The Dragon Boat Training at Kallang River

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Group Photo at NEWater Plant

The dinner was great and most of us took the opportunity to exchange information and interact with each other. The official dinner ends with exchange of souvenirs between the two institutions

After the dinner, the committees from both IEM G&S and IES YMC proceeded with a short discussion session chaired by the Engr. Chew Chee Yong, the Chairperson of IES YMC.

The summary of the discussion were as follows:

- 1) The next IEM/IES Meet would be held in Malaysia, tentatively in May 2006.
- 2) Both IEM G&S and IES YMC agreed to have more cooperation amongst the student members and representatives of both institutions.
- 3) To look into sharing of knowledge and information on each other's activities held.

- 4) To play a more proactive and prominent role in the upcoming YEAFEO (Young Engineers of ASEAN Federation of Engineers Organisation) in Laos.
- 5) To conduct combined visits to other ASEAN countries in the near future.

After that we had a brisk walk to the famous Esplanade, Boat Quay and Clarke Quay. Those places are well-known for picturesque night view along the Singapore river and a definite 'happening' place for the younger generation, especially during the night. Boat Quay and Clarke Quay are famous for their pubs and cafés too. As we walked along the quays, we could hear a wide repertoire of songs ranging from oldies hits to the latest hits coming from the pubs. The landscape of Esplanade was really a sight at night time. It was

brightly lit by light from the famous "Durian Building", which was dubbed by the locals because the shape of the building is like a durian.

On the last day of our Meet, we were given freedom to choose the places that we wanted to visit. Finally, after a lengthy discussion, we decided to split ourselves into two groups. A group visited the Singapore Zoo and another went off to Orchard Road to do some shopping. I chose the Singapore Zoo! Singapore Zoo is a well known spot for tourist attraction, famous for its animal shows. We were all so keyed up during the animals' shows. We gathered for dinner at the First Thai Restaurant. The dinner was good especially the Tom Yam Soup and the dessert. Next, we had some night view at Bugis Junction and some chit chat before bading farewell to IES YMC delegates. We thanked the IES YMC for their hospitality. We came back exhausted but each of us had a store of memories, which will not be easily forgotten. ■

\*\* The IEM G&S would like to thank the IES YMC (especially Chew Chee Yong, Hsien Hung, Kok Leng and their Committees) for successfully organising the 23rd IEM/IES Meet 2005 and their hospitality. We will meet again in the next edition of the IEM/IES Meet 2006 in Malaysia. For those who would like to receive more updates on the upcoming IEM/IES Meet 2006 and the IEM G&S activities, feel free to drop us an e-mail at [iemgs@yahoo.com](mailto:iemgs@yahoo.com).



Group Photo at Chinatown MRT Station



The start of the IEM/IES Challenge – The Frisbees Challenge



Group Photo at Singapore Zoo

Dear Chief Editor,

I just finished reading (not front to back though) the March 2005 issue of JURUTERA and am impressed by the mix of articles, not to mention the format of blending colors. I particularly enjoyed the witty remarks sprinkled by Ir. Dr Wong Koon Yuen throughout his article reporting on his foray into the metropolis that is Shanghai. Alas we are also reminded that some human habits do die hard despite the imposing façade of modern development. I'm referring of course, to the spitting culture.

I also find his need to qualify his Chinese friend "who has done very well in China" as not an engineer quaint, his telling it as it is notwithstanding. Maybe it is this kind of subtle and not so subtle attempts at equating engineers to NOT RICH guys that is causing the recent slump in the number of engineering graduates as lamented in the US (*Malaysia?*). Or are we (or rather am I) giving too much credit to these innuendos?

I'm also happy for Sauber Petronas for having a modern (sorry, ultra-modern) wind tunnel facility, which must be the envy of many a university bent on solving engineering problems from atmospheric turbulence to building safety in extreme wind events. And FLUENT, the state-of-the-art CFD, will surely come in handy in studying various engineering problems associated with fluid motion, be it air, water, or any other liquid media. Maybe some form of arrangement can be made for local universities to partake of this wondrous facility to address more "down-to-earth" but chronic engineering issues. Wishful thinking? You tell me.

The many reports on IEM activities perhaps answer the call to capturing IEM's living memory as rightly advanced in the editorial of Sdr. K.H. Man to some extent. Obviously much more need to be done and now is the time as good as any to start a serious effort in that respect.

Last but not the least, the musing of Sdri. Elaine Koh can be an inspiration to other engineering graduates to enter the fold of IEM, be it through constant bugging as was the "last straw" for her, but only at the start, or adding the human element to the engineer in community projects, which sustains her attachment thereafter. I must commend her for "taking a step back and reflecting where I am going next" at such a relatively young age (I'm guessing that from her photo and her appellation, Sdri.). Most of us at the half-century mark are only beginning to exercise that part of the faculty in our brains.

And the Shaiky's View is a befitting epilogue to the monthly issue of JURUTERA, as always.

All in all it has been a delightful pleasure reading the online version of JURUTERA (*just imagine if it were a printed copy on glossy papers ... it will surely make my day. I,m hinting here...).* ■

Sincerely,

**Ir. Dr Lee Say Chong**  
Ph.D. MIEM  
(via email from US,  
April 30, 2005)

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## Al-Fatiha

## Allahyarham Prof. Madya Ir. Dr Mohamad Nizar Hassan Dalam Kenangan

By: Ir. Assoc. Prof. Siti Hawa binti Hamzah

Allahyarham Prof. Madya Ir. Dr Mohamad Nizar dilahirkan pada 23 Oktober 1956 di Langgar, Alor Setar, Kedah. Allahyarham telah mendapat pendidikan di Sekolah Datuk Abdul Razak Seremban, Negeri Sembilan sebelum melanjutkan pelajaran ke peringkat diploma dalam kursus Kimia Perindustrian di ITM (kini UiTM) pada tahun 1978 dan seterusnya melanjutkan pelajaran di West Virginia University USA dan berjaya memperolehi B.Sc. (Chemical Engineering) pada tahun 1984. Pada tahun 1987 Allahyarham memperolehi M.Sc. (Chemical Engineering) di Florida Institute Of Technology USA dan PhD (Chemical Process Technology) di USM P. Pinang pada tahun 2000.

Allahyarham telah memulakan kariernya sebagai penolong pensyarah di UiTM Perlis pada 1980-1984. Pada tahun 1985-1993 beliau telah dilantik sebagai pensyarah. Allahyarham telah diberikan kepercayaan oleh pihak Universiti dan telah dilantik sebagai Ketua, Bahagian Penyelidikan dan

Perundingan UiTM Kampung Arau, Perlis. Pada 1993 beliau telah di naik pangkat ke jawatan pensyarah kanan seterusnya ke Profesor Madya. Allahyarham juga telah dilantik sebagai Ketua Jabatan Kejuruteraan Kimia pada November 2001 hingga April 2003.

Sepanjang kariernya sebagai pensyarah di UiTM Allahyarham telah menyumbangkan sebanyak 10 jurnal serta kertas kerja dan 10 penyelidikan samada perseorangan atau berkumpulan. Pada tahun 1993 Allahyarham telah dianugerahkan *Researcher Of The Year* dari UiTM dan finalist, Petronas Inventors Award.

Pada bulan Mac, 1998 Allahyarham telah dilantik sebagai ahli perunding bagi *Wastewater Treatment System Audit* bagi AMOCO Chemical (M) Sdn. Bhd, Gebeng Industri Park, Kuantan, Pahang. Allahyarham juga bergiat aktif sebagai ahli dalam *The Institution of Engineers, Malaysia, Institution of Chemical Engineers, Malaysia* dan Institut Tenaga Malaysia. Allahyarham adalah Ahli Korporat Institusi Jurutera Malaysia (IEM) dan beliau telah

memperolehi kelayakan Jurutera Profesional daripada Lembaga Jurutera Malaysia (BEM) pada 16 November, 2004.

Di kalangan rakan-rakan, Allahyarham merupakan seorang yang periang, peramah, pemurah dan seorang yang rajin berusaha.

Pada tanggal 20 Mac 2005 bersamaan 9 Safar 1426, Prof. Madya Ir. Dr. Mohamad Nizar Hassan telah kembali ke rahmahtullah. Semoga rohnya dicucuri rahmat dan ditempatkan bersama-sama dengan orang yang saleh.



***"IT IS MY OBLIGATION TO ACQUIRE AND TRANSMIT KNOWLEDGE FOR THE SAKE OF ALLAH" INSYAALLAH***



Di atas adalah "teaching philosophy" daripada Allahyarham Prof. Madya Ir. Dr. Mohamad Nizar Hassan.

## ERRATA

(In Previous Bulletin)

## MAY 2005 ISSUE

On page 34 of the May 2005 issue of JURUTERA, in the article "**2-Cycle Moment Distribution For The Analysis of Continuous Beams And Multi-Storey Framed Structures**",

In Fig. 1 and Fig. 2, it should be  $D.L = 1.0G$  instead of  $1.4G$ . Under "**Minimum Moment At Span**", the 6th line should read:

*"It can be obtained by allowing total loads on the adjacent spans and dead load only on span BC".*

Under "**Determination of Column Moments**", the 5th line "*far lends*" should read "*far ends*" instead and 9th line should read "*live load*" instead of "*line load*".

The second last paragraph on "*The sign of column moments should be opposite to the beam unbalanced moments at the joint*" should be replaced by "*No signs are given for the column moments; the rotation for column moment follows that of the beam unbalanced moment at the joint and bending moment diagram should be drawn on the tension face*".

## JUNE 2005 ISSUE

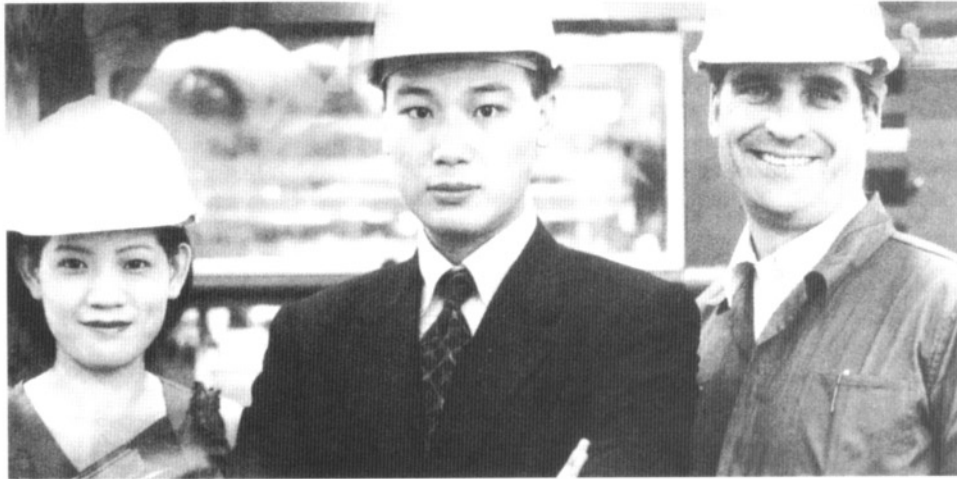
On page 16 of the June 2005 issue of JURUTERA, in the article "**SI & Geotechnical Engineering Design**" by Ir. Neoh Cheng Aik, we apologise to our readers and the author for the erroneous 1/2 page void.

On page 18 of the same issue, in the article "A Glimpse of Engineering Geology", Mr. Tan Boon Kong was incorrectly credited as Ir. Tan Boon Kong. The correct designation is Assoc. Prof. Tan Boon Kong.

We regret any inconvenience caused

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## How to be an Excellent Student

By: Sdri Eunice Lim (MMU Cyberjaya)

In this modern age, many students are trying their best to excel in their studies to keep up with the ever demanding world which only the fittest will survive. Some students even attend special courses which promise students the fast and easy way to excel in studies. These courses provide multiple comprehensive plans to ensure the success of their 'students' in education. Thus, many researches have carried out in formulating plans to help students achieving their dreams. Here are some ways that might prove handy to students who wants to get good grades.

The first thing a student must know is that studying 24 hours a day, 7 days a week, is not a good approach. We should instead follow the saying 'study smart, not hard.' Study smart is a program written by a student to help others improve their grades and reduce their study time. Firstly, a student must be confident in everything they do. Self confidence is the key to success. This may get them to be interested in the course taken even though it's dull or difficult. Another important point is to have a good organisation of your study materials. When writing your own notes for references, the notes have to be well

organised and simple to understand. Mind mapping is a proven method to help students remember fast. Mind mapping is to write notes using colorful pens and pictures to make them interesting and easy to understand. This form of studying method has been applied by many successful students in replacement of the boring black and white words.

Next, students should have an advanced examination preparation. Advanced examination preparation means that students should be well prepared before the examinations. Try your best to revise the subjects taught in class at the very same day. Constant study leads to success, a proverb that is proven to be true. Before the examinations, students should attempt a lot of questions taken from several sources. Apply all the concepts given by lecturers to solve the problems given. Any doubts should be rectified by consulting the respective lecturer as soon as possible. These practices are helpful and students retain more knowledge from it than from just plain reading. After all the preparation and hard work, students will have more confidence when sitting for the examinations. This is an important aspect to do well.

Students should also have a systematic study plan. A systematic study plan focuses on two principal elements; excellence in teaching and learning, and excellence in research and creative activity. Both teachers and students must establish a two way communication in order to have a better understanding of the subjects. Excellence in research and creativity refers to the way students help themselves in remembering important points on certain subjects. Group studies among friends may be helpful too. This would make studying more interesting as interaction is present. Students should have a timetable to ensure that they do not miss any subjects that they should be revising. A good and systematic plan is healthy for students as they provide a good balance of study and play. Therefore, they would not have to squeeze their brain every single minute, with no time for leisure.

In conclusion, to be an excellent student, one has to be hardworking and well-disciplined. As a student, we should know how to spend our time wisely. An ambitious person and someone who has self confidence in themselves is an excellent student! ■

### Shaiky's View



"FOR GOD'S SAKE ....THESE REPORTS, THESE MANUALS, THESE GUIDELINES, THEY ARE ALL HIGHLY TECHNICAL...WHY DO THEY ALSO HAVE TO MAKE SENSE !!!!!"