

IVAT Newsletter

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IVAT

is the abbreviated name for the Institute of High Voltage and High Current, or in Malay, Institut Voltan dan Arus Tinggi – a Centre of Excellence of Universiti Teknologi Malaysia.

INSIDE THIS ISSUE

Page 2

IVAT Director's remark

Page 3

IVAT's collaboration

Page 4

IVAT's awards

Page 5

IVAT Strategic Planning Workshop

Page 6

Team Building dan Hari Kelurga IVAT

Page 7

Pertandingan boling IVAT

Page 8

IVAT welcomes visitors

Page 9

Lightning incident in MRSM Alor Gajah

Page 10

IVAT's training services

Page 11

IVAT's calibration services

Page 12

IVAT's testing services

IVAT organises International Short Course



Photo taken during the opening ceremony of the international short course organised by IVAT. Sitting: third from left are Assoc. Prof. Dr. Zulkurnain Abd. Malek, Prof. Dr. Zainal Salam, Engr. Dr. Mohammed Sani Haruna, Prof. Dr. Christian O. Nwajagu and Assoc. Prof. Dr. Zolkafie Buntat.

JOHOR BAHRU, 25 January 2014 – IVAT, for the second time, organised a short course involving overseas participants, namely, several engineers from the National Agency for Science and Engineering Infrastructure (NASENI), Nigeria.

NASENI is an agency established under the Federal Ministry of Science and Technology of Nigeria. The agency is responsible for the development and implementation of national policies in science and engineering infrastructure. It was established in 1992

by the Federal Government of Nigeria via the recommendations of the White Paper Committee in the 1991 Report of a 150-member National Committee on Engineering Infrastructure comprising scientists, engineers, administrators, federal and state civil servants, economists, lawyers, bankers and industrialists. The mission of NASENI is to establish and nurture appropriate and dynamic science and engineering infrastructure for achieving home-based-

(continued on page 2...)

VC visits IVAT

JOHOR BAHRU, 4 March 2014 – IVAT had the honour of being visited by the Universiti Teknologi Malaysia (UTM) Vice Chancellor (VC), Prof. Ir. Dr. Wahid Omar and his entourage. Accompanying the VC, were the UTM Deputy VC (Research and Innovation), Prof. Ir. Dr. Mohd. Azraai Kassim, the UTM Director of Works, Prof. Dr. Abd. Latif Saleh, UTM Senior Deputy Registrars, Mr. Azham Ramli and Mr. Muhamad Afandi Hamzah, and several others from the Office of the Vice Chancellor. The Director of IVAT, Assoc. Prof. Dr. Zulkurnain Abdul Malek had the honour to tour the



IVAT Director presenting during the UTM VC's visit to IVAT.

entourage around IVAT's high voltage laboratory to see the latest research activities and innovations, and gave a presentation on IVAT's achievement. More details on IVAT's achievement can be found on page 2 (IVAT Director's remark).

IVAT Director's remark

by Assoc. Prof. Dr. Zulkurnain Abdul Malek, the Director of the Institute of High Voltage and High Current, Universiti Teknologi Malaysia.

First of all, on behalf of IVAT, I would like to thank the Universiti Teknologi Malaysia (UTM) Vice Chancellor (VC), Prof. Ir. Dr. Wahid Omar, the UTM Deputy VC (Research and Innovation), Prof. Ir. Dr. Mohd. Azraai Kassim and their entourage for their recent visit to IVAT as well as fruitful exchanges and feedbacks.

IVAT's 2013 achievement can be highlighted by the HiCoE (Higher Institutions' Centre of Excellence) audit carried out recently. IVAT scored (100/127) 79% and ranked second after IPASA (Institute of Environmental and Water Resource Management) among the 28 UTM Research and Innovation CoE (Centres of Excellence). Nevertheless, to be eligible for HiCoE application, IVAT needs to maintain excellent performance over a 5-year period. In view of this, IVAT has laid out several initiatives, including the enhancement of the quantity and quality of researchers, the quantity and quality of research, the quantity and quality of postgraduates, innova-

tion, networking and linkages, and income generation via testing, calibration and short courses.

In 2014, lots of activities have been planned, including the launching and chairmanship of two important entities, namely the Malaysian High Voltage Network and the IEEE-DEIS (Institute of Electrical and Electronics Engineers - Dielectrics and Electrical Insulation Society) Malaysian Chapter. IVAT also plans to launch a new International Journal of High Voltage Engineering. Other important events in 2014 are the Compliance Assessment of MS IEC 17025 Accreditation of Testing Service and the Annual High Voltage Symposium. IVAT's three important groups – IVAT's Management Group (IMG), IVAT's Academic Group (IAG), and IVAT's Support Group (ISG) – meet regularly throughout the year.

IVAT aims to get the National HiCoE status by 2015. By 2020, IVAT also aspires to be

a Nanodielectrics and Lightning Characterisation Centre of Excellence. It is also a national ambition that IVAT becomes the first institution to have a High Power Laboratory which then enables IVAT to become a full member of the prestigious Short Circuit Testing Liaison (STL).

IVAT's dedicated staff will continue to work harder to achieve all the planned initiatives and the KAI (Key Amal Indicator) promised. With 14 academic staff, 8 support staff, 40 postgraduate students, excellent support from the University Management, and a lot of hard work, IVAT believes it can deliver all its planned KAIs as well as be on the right track to achieving a HiCoE status by 2015.

Lastly, I would like to congratulate IVAT Newsletter Editorial Team for this inaugural edition of the newsletter with ISSN. Well done and keep up the good work!



UTM VC (third from right) touring around IVAT's high voltage laboratory. Accompanying him were the UTM Deputy VC (Research and Innovation), the UTM Director of Works, UTM Senior Deputy Registrars and several others from the Office of the Vice Chancellor and IVAT.

(... continued from page 1)

initiated and home-prompted industrialisation through the development of relevant processes, capital goods and equipment necessary for job creation, national economic well-being and progress. Their vision is to create an enabling environment for knowledge-driven local mass-production of standard parts, goods and services required for the nation's technological advancement.

A total of 4 participants enrolled in the course entitled High Voltage Technology, held for 3 months from 26 January to 17 April 2014. The opening ceremony for the course was held on 25 January 2014, which was inau-

gurated by the Dean of the Energy Research Alliance, Universiti Teknologi Malaysia (UTM), Prof. Dr. Zainal Salam, attended by the Executive Vice Chairman and Chief Executive of NASENI, Engr. Dr. Mohammed Sani Haruna, the Director of IVAT, Assoc. Prof. Dr. Zulkurnain Abdul Malek, a delegate from NASENI and IVAT staff.

NASENI's willingness to join IVAT's short course came after seeing the facilities and expertise in IVAT. Through the short course, the participants were hoped to gain the appropriate experience and knowledge, thus becoming the future mentors for NASENI to provide similar high voltage systems in Nigeria.

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Editor & Designer:

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NASENI's participation in the short course is an international recognition of IVAT's expertise in IVAT.

Invited Lecture by Prof. Satoshi Matsumoto



in Japan, including advanced underground substation design, power generation status in Japan after the Fukushima disaster and advanced partial discharge signal processing techniques. Discussion on the possible collaboration between IVAT and SIT, especially in high voltage researches, was also held after the lecture session.

Earlier before the event, Prof. Satoshi attended the 8th South-East Asian Technical Universities Consortium (SEATUC) Symposium at M-Suites Hotel, Johor Bahru. The symposium was organised by UTM from 3-5 March 2014.

Left:
Prof. Satoshi delivering his lecture.

Below:
Prof. Satoshi (fourth from left) with his student and IVAT staff.

JOHOR BAHRU, 5 March 2014 – IVAT organised an invited lecture delivered by one of the prominent Japanese high voltage professors, Prof. Satoshi Matsumoto. Prof. Satoshi is currently working at Shibaura Institute of Technology (SIT), Tokyo, and he previously worked with the high voltage technology group of Toshiba Corporation for almost 20 years. The invited lecture was given to staff and students undertaking the high voltage subject at the Faculty of Electrical Engineering, Universiti Teknologi Malaysia (UTM).

Prof. Satoshi's lecture covered a comprehensive introduction to the recent high voltage technology



IVAT strengthens collaboration with Universitas Sriwijaya



Dinner at Grand Zuri Hotel, Palembang. Round the table from left: Dr. Muhammad Abu Bakar Sidik, Prof. Dr. Ir. Zainuddin Nawawi, Dr. Agung Mataram, Prof. Ir. Dr. Wazir Mustafa, Prof. Dr. Hussein Ahmad and Dr. Muhammad Irfan Jambak.

PALEMBANG, 13 March 2014 – In an effort to be recognised as a prominent centre of excellence in the ASEAN (Association of Southeast Asian Nations) region, IVAT has been reaching out to universities and institutes across ASEAN with the hope of establishing research collaborations. The High Voltage and Electrical Measurement laboratory, Department of Electrical Engineering, Universitas Sriwijaya (UNSRI), Indonesia has been one of IVAT's peer collaborators for around 10 years.

In order to strengthen mutual collaborations between IVAT, Universiti Teknologi Malaysia (UTM) and the Laboratory of High Voltage and Electrical Measurement, UNSRI, three UTM staffs, namely Prof. Ir. Dr. Mohd. Wazir Mustafa, Prof. Dr. Hussein Ahmad, and Dr. Muhammad Abu Bakar Sidik were invited to visit UNSRI on 10-13 March 2014. During the visit, several strategic programmes were agreed. These include the establishment of Centre of Electrical Energy and Safety System (CEEES) at UNSRI, joint research between CEEES and IVAT, joint effort in securing international research collaboration grant provided by Indonesian's government and UNSRI, Memorandum of Agreement (MOA) on Master by research programme to be established in UNSRI, joint supervision for Ph.D. and Master by research programme, and collaboration in organising international and regional training programmes.

Visits to/from Universal Cable

JOHOR BAHRU, 7 March 2014 – A team of 2 lecturers, 2 technicians from IVAT and 4 Nigerian engineers (who are on a 3-months IVAT-organised short course) visited Universal Cable plant at Plentong, Johor Bahru. The visit was organized as a working trip for the 4 Nigerian engineers. The visit started at 12.30 pm, welcomed by the Universal Cables' Quality Assurance Manager, Mr. Lokman Hashim. During the 4-hour visit, the visitors were exposed to the processes of weaving aluminium or copper conductors into stranded cables, sleeving, insulation by extrusion and testing of finished product (drums of high voltage cable). All these processes were done in a 400-metre long work-floor, with the extrusion machine placed on the 3rd storey of the factory building. The visit was concluded with a brief introductory and vote of thanks speeches from both parties.



IVAT delegate visiting Universal Cable plant.



Universal Cable executive members visiting IVAT.

JOHOR BAHRU, 13 March 2014 – As a part of technology exchange initiative between IVAT and Universal Cable, a team of executive members from Universal Cable (M) Sdn. Bhd. visited IVAT laboratory after the visit of IVAT to their plant a week ago. Headed by the Universal Cable's Technical Director, Mr. Inche, their managers and design and manufacturing engineers arrived at IVAT at 9.15 am. The visitors were tour guided around the laboratory while being explained on IVAT's core activities. A video presentation was shown to the visitors, and a special question and answer session on lightning phenomena was also conducted. Possible collaboration between IVAT and Universal Cable was also discussed during the visit. The visit ended at 12:30 pm, after a gratuitive speech by Mr. Inche,

IVAT's Awards

IVAT won several awards in the second half of 2013. At international level, Assoc. Prof. Dr. Zulkurnain Abdul Malek won a gold medal and a bronze medal for his products "Metal Oxide Surge Arrester Monitor" and "Low Cost Portable Tesla Coils", respectively at the SIF (Seoul International Invention Fair) 2013 held in Korea. At the national level, the INATEX (Industrial and Art Technology Exhibition) 2013 saw Assoc. Prof. Dr. Zulkurnain Abdul Malek,

Assoc. Prof. Dr. M. Afendi M. Piah and Dr. Nor Asiah Muhamad win gold, silver and bronze medals, respectively. In addition, Dr. Nor Asiah Muhamad was also awarded a silver medal at the PECIPTA (Persidangan dan Expo Ciptaan Institusi Pengajian Tinggi Antarabangsa) 2013 for her product "Transformer Hybrid-DGA Interpretation Software". Earlier in May 2013, Dr. Muhammad Abu Bakar Sidik won a silver medal at the ITEX (International Invention, Innovation and Technology Exhibition) 2013 for his product "Rotating Electric Field Mill Sensor Network".



Dr. Nor Asiah (middle) won a university award at the INATEX 2013.



Dr. Muhammad Abu Bakar (right) won an international award at the ITEX 2013.



Assoc. Prof. Dr. Zulkurnain (second from right) won an international award at the SIF 2013, Korea.

IVAT staff awarded Ph.D.

Three IVAT staffs have recently been awarded the degree of Doctor of Philosophy (Ph.D.) in the areas relevant to high voltage engineering.

Dr. Zulkarnain Ahmad Noorden completed his Ph.D. in Regional Environment Systems at Shibaura Institute of Technology, Japan in September 2013 with his thesis entitled "New Carbon Material Derived from Mineral Oil with Sulfuric Acid Treatment and its Electrical Properties for Supercapacitors". Previously, he received his B.Eng. (First Class Honours) in Electrical Engineering and M.Eng. in Electrical Power Engineering from Universiti Teknologi Malaysia (UTM) in 2008 and 2010, respectively. His research fields include energy storage technology (supercapacitor), power equipment diagnosis and high voltage generation. He is a member of the IEEE, IEEE PES, IEEJ and IEEE DEIS.

Meanwhile, Dr. Lau Kwan Yiew completed his Ph.D. in Electronics and Electrical Engineering at the University of Southampton, United Kingdom in October 2013 with his thesis entitled "Structure and Electrical Properties of Silica-based Polyethylene Nanocomposites". He previously completed his B.Eng. degree in Electrical Engineering with First Class Honours from UTM in 2007. After working as an Electronics Development Engineer at Dyson Malaysia, he joined the Faculty of Electrical Engineering (FKE), UTM as a Tutor in 2008. He then completed his M.Eng. degree in Electrical Power Engineering at the same university in 2010. His research interests include high voltage engineering,



From left: Dr. Lau, Dr. Zulkarnain and Dr. Mohd Hafizi.

dielectric materials and renewable energy systems. He is a graduate engineer of the BEM and a member of the IEEE, IEEE DEIS and IET.

Dr. Mohd Hafizi Ahmad, on the other hand, completed his Ph.D. in Electrical Engineering at UTM in November 2013 with his thesis entitled "Electrical Tree Growth Characterisation of Polymeric-based Insulating Materials". He formerly received his B.Eng. with First Class Honours from UTM in 2009. His research fields include high voltage insulation, mathematical modelling, partial discharge, water treeing and electrical treeing phenomenon in polymeric-based, and microcomposites and nanocomposites insulating materials. He is a member of the IEEE and IEEE DEIS.

Dr. Zulkarnain, Dr. Lau and Dr. Mohd Hafizi are now appointed as senior lecturers at FKE, UTM. Congratulations to all of them!

IVAT Strategic Planning Workshop

JOHOR BAHRU, 28 March 2014 – IVAT organised a workshop entitled "IVAT Strategic Planning for FY2014-2016" at Le Grandeur Palm Resort, Senai. The purpose of the workshop was to strengthen IVAT's achievements via its Key Amal Indicator (KAI). The KAIs are in line with Universiti Teknologi Malaysia's (UTM) aspiration to maintaining research university status based on the new requirements (MyRA II) set by the Department of Higher Education, Ministry of Education, Malaysia.

The workshop helped IVAT staffs, especially researchers, to understand and plan for the need for the institute not only to remain relevant to UTM, but also to be sustainable in the society as a whole. Particular emphasis was put fourth on the importance of IVAT researchers to increase their academic publications and revenues from consultancy services. Acknowledging his wide experience in consultancy activities, IVAT invited Prof. Ir. Dr. Salman Leong, the Director of the Institute of Noise and Vibration (IKG) – one of the top achieving Centres of Excellence (CoEs) in UTM – to share his knowledge.

At the end of the workshop, a dinner was held to appreciate the contributions of IVAT staffs in 2013 (IVAT is now ranked 4th

among 38 CoEs in UTM). Below is the list of awarded staffs according to their categories:

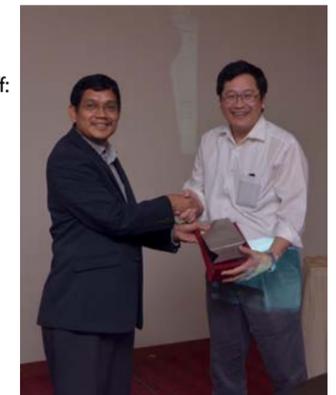
- Highest number of publications:
Assoc. Prof. Dr. Zulkurnain Abdul Malek and Dr. Nor Asiah Muhamad
- Highest cumulative impact factor:
Dr. Nouruddeen Bashir Umar
- Highest amount of received grant:
Assoc. Prof. Dr. Mohamed Afendi Mohamed Piah
- Special award:
Dr. Zuraimy Adzis
- Accreditation of calibration:
Dr. Noor Azlinda Ahmad
- Accreditation of testing:
Dr. Zuraimy Adzis
- Excellent non-academic staff:
Ms. Norhidayu Bakrin



IVAT staffs having discussion during the workshop.



IVAT staff enjoying dinner.



IVAT Director presenting a gift to Prof. Ir. Dr. Salman Leong (right).

Team Building dan Hari Keluarga IVAT

JOHOR BAHRU, 29 Mac 2014 – Alhamdulillah, syukur ke hadrat ilahi. Seperti tahun-tahun yang sebelumnya, IVAT telah berjaya menganjurkan program Team building dan Hari Keluarga IVAT pada tahun ini. Program Team building dan Hari Keluarga IVAT 2014 tersebut juga merupakan program IVAT yang pertama bagi tahun 2014. Tujuan program tersebut diadakan adalah untuk memupuk semangat setia kawan di kalangan ahli program. Semua staf IVAT dan ahli keluarga dikehendaki turut serta dalam program tersebut.

Program Team building dan Hari Keluarga IVAT 2014 tersebut diadakan di Le Grandeur Palm Resort Senai, Johor. Program tersebut dimulakan dengan acara Team Building dan diikuti oleh acara Hari Keluarga. Program tersebut berlangsung dari pukul 8.00 pagi sehingga 1.00 petang.

Bagi acara Team Building, hanya staf IVAT sahaja yang terlibat, dan ianya dibahagikan kepada tiga kumpulan, iaitu Team U, Team T dan Team M. Juara keseluruhan bagi acara Team Building tersebut dimenangi oleh Team T, diikuti oleh Team U dan Team M.

Bagi acara 'fun match', staf IVAT bergabung dengan ahli keluarga masing-masing mengikut kumpulan U, T dan M. Acara tersebut telah dimenangi oleh kumpulan U, diikuti kumpulan T dan kumpulan M.

Gambar-gambar Team Building dan Hari Keluarga IVAT.



Team U



Team T



Team M



Pertandingan boling anjuran Kelab Kebajikan Staf IVAT

JOHOR BAHRU, 25 Januari 2014 – Satu pertandingan boling anjuran Kelab Kebajikan Staf IVAT (KKSJ) telah diadakan di Angsana Bowl, Plaza Angsana Johor Bahru. Seramai 20 orang staf dan pasangan staf IVAT menyertai pertandingan boling siri 1/2014 tersebut. Pertandingan tersebut dibahagikan kepada dua kategori, iaitu kategori lelaki (individu) dan kategori wanita (individu). Pertandingan boling tersebut bermula pada jam 11.00 pagi dan berakhir pada jam 1.30 tengahari. Bak kata pepatah Inggeris, "sekeping gambar bernilai seribu perkataan (a picture is worth a thousand words)". Dilampirkan aksi-aksi menarik pertandingan boling tersebut untuk dinikmati bersama.



Pengarah IVAT, P.M. Dr. Zulkurnain Abdul Malek merasmikan pertandingan boling dengan membuat balingan pertama.



Semua peserta bersemangat memulakan pertandingan dengan membuat balingan.



Aksi-aksi menarik ketika pertandingan.



Semua peserta pertandingan berkumpul mendengar ucapan penutup yang disampaikan oleh Pengarah IVAT.



Piala yang dipertandingkan bagi kategori lelaki dan wanita (individu) serta piala pusingan bagi siri 1/2014.



Majlis penyampaian hadiah bagi johan kategori wanita (individu).



Majlis penyampaian hadiah bagi johan kategori lelaki (individu).

IVAT welcomes visitors

IVAT is committed to entertain visits by delegates from not only its own university, but also as far as overseas. The main aim for IVAT organising visits is to share their research, services and consultancy experience to as many people as they could, especially in areas relevant to high voltage engineering.

For interested students from schools or higher learning institutions, the focus of visit would be on IVAT's role in building the nation through their technical support to electrical energy industries to achieve reliable and efficient operations. This is inculcated through their fascinating demonstration on high voltage air discharges (either impulsive or sustainable low current arcs).

For representatives from private companies, IVAT showcases their services and consultancy capabilities, as well as their research achievements, in attempts to increase the return of investments to the university. As for executives of ministerial bodies and government parastatals, IVAT extends their knowledge and experience to open possible collaborations on research works.

A routine visit to IVAT would include a 20-minute video presentation on IVAT, electrical discharges and electrical safety. It would be followed by a 10-minute briefing by an IVAT academician, and then a question-and-answer session on any topic relevant to the visit.

Since 1999, IVAT has had students from over 100 local schools and higher learning institutions visiting their laboratory. Overseas visitors, on the other hand, were from countries such as Germany, Turkey, Japan, Taiwan, South Korea, Australia, Nigeria, Zimbabwe and Indonesia. They include academicians from higher learning institutions and engineers from lightning protection companies.

Some of the most prominent Malaysian public officers that have visited IVAT include the Vice Chancellors of Universiti Teknologi Malaysia as well as the former Education Minister of Malaysia, Tan Sri Dato' Seri Musa Mohamad, who visited IVAT in February 2001. Other visitors include:

Schools:

- Sekolah Menengah Kebangsaan (SMK) Tun Ismail
- SMK Seri Pinang, Kulai
- SMK Majidi Baru, Johor Bahru
- SMK Taman Pelangi Indah, Johor Bahru
- SMK Zainab (1) Kota Bharu

- SMK Dato Bentara Luar, Batu Pahat
- SMK Tinggi Klang
- SMK Lenga, Muar
- Sekolah Menengah Teknik (SMT) Sungai Buluh, Selangor
- SMT Jasin, Melaka
- SMT Chenor, Pahang
- SMT Selangor
- Sekolah Menengah (SM) Bukit Besar, Kulai
- SM Teknik Perdagangan, Johor Bahru
- Sekolah Kebangsaan (SK) Mohd Khir Johari, Johor Bahru
- Tunas Pendidikan Pencegahan Dadah

Government Bodies:

- Universiti Teknologi Malaysia (UTM) Vice Chancellors
- Malaysian Ministry of Education
- Malaysian Nuclear Agency
- Malaysian Investment Development Authority
- Ministry of Finance and Pemandu (Performance Management Delivery Unit)
- Malaysian Ministry of Higher Education
- SIRIM (Standards and Industrial Research Institute of Malaysia)
- MAMPU (Malaysian Administrative Modernisation and Management Planning Unit)

Universities:

- Universiti Tenaga Nasional
- Centre of Lightning Protection, Universiti Putra Malaysia
- Institutions of Engineers Malaysia
- Cardiff University, United Kingdom
- Faculty of Mechanical Engineering, Universiti Teknologi Mara
- Politeknik Sultan Mizan Zainal Abidin, Dungun
- Institute of Information Technology, Istanbul
- Cellpack, Germany
- Universiti Malaysia Perlis
- University of Siegen, Germany
- Universitas Raja Ali Haji, Riau Islands Province
- Harare Institute of Technology, Zimbabwe
- Universiti Malaysia Sabah
- Universitas Trisakti, Indonesia



Photos taken during various visits.

- Kolej Universiti Kejuruteraan dan Teknologi Malaysia, Pahang
- Shahjalal University of Science & Technology, Bangladesh
- Kolej Universiti Teknokal Kebangsaan Malaysia
- Toyama University, Japan
- Pejabat Pelajaran Daerah Klang
- Sekolah Agama Menengah Tinggi Tengku Ampuan Jemaah S.I.I, Shah Alam
- Meiji University, Japan
- Malaysian Metropolitan University
- University of New South Wales, New Zealand
- Govt. Swedish Pakistani College of Technology Gujrat (SPIT), Pakistan
- Government College of Technology, Faisalabad, Pakistan
- Shandong University, Jinan, China

Private Companies:

- Universal Cable (M) Sdn. Bhd.
- Ed Global Corporation Sdn. Bhd.
- Central Cable Berhad, Melaka
- Furse, Singapore
- IBM, Germany
- NASENI (National Agency for Science and Engineering Infrastructure), Nigeria



IVAT to learn from AMTEC

JOHOR BAHRU, 11 March 2014 – The management and academic staff of IVAT paid a visit to a sister Center of Excellence (CoE) of Universiti Teknologi Malaysia (UTM), the Advanced Membrane Technology Research Centre (AMTEC). The visit was headed by IVAT Director, Assoc. Prof. Dr. Zulkurnain Abdul Malek. At AMTEC, IVAT was welcomed by its Director, Prof. Dr. Ahmad Fauzi Ismail along with few other management members and academic staff. The sole purpose of the visit was for IVAT to take a cue from the success story of AMTEC. AMTEC is one of UTM's most successful CoE. Over the years, it has excelled in research and development (R & D), has strong linkages with the industry with millions of ringgits of consultancy projects and research grants. In addition, it has several R & D collaborations with several North American, European and Japanese research institutions and organizations. During the visit, Prof. Dr. Ahmad Fauzi toured the visitors around AMTEC's facilities and also made a 1-hour presentation. His presentation covered AMTEC's success



Prof. Dr. Ahmad Fauzi (left) touring IVAT staff around AMTEC's facilities.

story and strategies in the aspect of industrial collaborations, projects and consultancies, R & D, publications, national and international grants. Prof. Dr. Ahmad Fauzi summed up the success of AMTEC and attributed it to quality research and publications, intense national and international networking as well as conducting projects that cater the needs of the industry. At the

end of the visit, Assoc. Prof. Dr. Zulkurnain thanked Prof. Dr. Ahmad Fauzi for finding time out of his busy schedule to present AMTEC's strategies to success. He pointed out that IVAT has learnt a lot from the visit and by the grace of God will implement similar strategies so as to success in achieving its goals and targets as a CoE.

Lightning Incident in MRSM Alor Gajah

ALOR GAJAH, 25 April 2014 – Lightning is one of the greatest phenomena in nature. It has a lot of benefit to the organism on earth. However, due to its catastrophic effects, lightning can be a source of disaster and misery for human being. Recently on 1 April 2014, an incident occurred at Maktab Rendah Sains MARA (MRSM) Alor Gajah, in which a Form-I student was suspected to have undergone heart failure due to lightning shock, leading to his the unfortunate death two-days after he was admitted to hospital.



LIG members discussing with MRSM officers.

Receiving the news via newspapers, IVAT's Lightning and Instrument Group (LIG), one of the three research groups in IVAT, sought to investigate the lightning incident. In order to obtain first hand and credible information pertaining to the incident, all the LIG members, namely Assoc. Prof. Dr. Zulkurnain Abd Malek, Dr. Zuraimy Adzis, Dr. Noor Azlinda Ahmad, Dr. Muhammad Abu Bakar Sidik and Dr. Zulkurnain Ahmad Noorden visited MRSM Alor Gajah on 25 April 2014.

Upon arrival, the LIG members were warmly welcomed by the head of MRSM Alor Gajah, Mrs. Wan Ainazah Ariffin and staffs, Mr. Mohd. Bukhari Hamid, Mr. Ikhwan Khalil and Mr. Abu Bakar Wahab. Preliminary investigations show that MRSM Alor Gajah is, in general, located at high altitude and surrounded by hilly land, and the place of incident is, in specific, an open field with no lightning protection system installed. It was

not raining at the time of incident and the sky was clear, but there were thunderclouds in distant positions. Meanwhile, the hospital report revealed no sign of light-



LIG members investigating the place of incident.

ning which might have struck the victim. Nevertheless, together with the Lightning Protection and Tracking System (LPATS) data obtained from Tenaga Nasional Berhad Research (TNBR) on lightning location and characteristics, all relevant information will be collected and studied by the LIG members. More detailed work to follow soon.

Electrical Insulation

by Dr. Nor Asiah Muhamad, Institute of High Voltage and High Current, Universiti Teknologi Malaysia

An insulator, also known as a dielectric, can be defined as a material within which the internal electric charge does not flow freely under the influence of an electric field. Therefore, an insulator does not conduct electric current. Basically an insulator can be in the form of solid, liquid and gas.

Solid insulators are used not only in low voltage electrical appliances, but also in high voltage electrical equipment such as cables, surge arresters and bushing. Examples of solid materials normally used in electrical insulators are Kraft-paper, epoxy resin, glass, clay, polymer and pressboard. In these, Kraft-paper and pressboard are commonly used in high voltage transformers while epoxy resin is usually found in low voltage transformers such as those found in radios, televisions, motors and distribution transformers. Polymers, on the other hand, are widely used in high voltage cables. Meanwhile, clay and glass are commonly used in transmission networks.

Liquid insulators are also commonly used for insulation purposes in high voltage equipment. Examples of liquid insulation include mineral oil, ester oil and synthetic ester oil. As their names imply, they appear in the form of liquid. They can be found in

many high voltage apparatus such as power transformers, tap-changers and cables.

Meanwhile, gas has been popular for insulation purposes since a long time ago. The most common insulating gas is air due to it being ubiquity and low cost. Other types of gas commonly used as insulators are nitrogen (N_2), sulfur hexafluoride (SF_6), perfluorocarbons (C_3F_8) and chlorofluorocarbons (CFC). This type of insulator is widely used in transformers, circuit breakers and switchgears. Some of these gases, such as the SF_6 , have very good dielectric properties and very high breakdown

strength. However, it should be noted that most of these gases are highly toxic when reacted with other chemicals.

Insulators are needed not only to separate one conductor from the other, but also to protect people working on electrical equipment. For this reason, any designed insulators must undergo appropriate electrical safety testing to ensure that they can withstand the desired level of stress. Examples of electrical safety testing include dielectric voltage withstand test, resistance test, earth bond test and leakage current test.



Solid insulators: paper and pressboard insulation.

IVAT provides Training and Consultancy Services

IVAT regularly organises training workshops/seminars/short courses for students, engineers, technical managers, technical supervisors, technicians, personnel and researchers involved in electrical power industry. Some popular modules include:

- Electrical Safety Seminar
- Fundamentals of High Voltage Technology
- Three-day Short Course on High Voltage Testing Techniques and Safety
- Two-day Short Course on Grounding Systems
- Short Course on Lightning Protection for High and Low Voltage Systems
- Short Course on Partial Discharge Phenomena

IVAT also offers consultancy services for the following research areas:

- Lightning protection systems for buildings
- Protection systems for electrical power networks
- Grounding systems installations
- High voltage products development
- Low voltage and telecommunication surge protective devices



Dr. Muhammad Abu Bakar Sidik (left) and his trainees measuring electric field under overhead transmission lines (not shown in the photo).

Coming soon:

“Three-day Short Course on High Voltage Testing Techniques and Safety”
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For more information, contact:

Institute of High Voltage and High Current (IVAT)
Block P06
Universiti Teknologi Malaysia
81310 Johor Bahru, Johor
Malaysia

Tel: +60 7 553 5615 (Ms. Norhidayu), Fax: +60 7 557 8150, E-mail: ivat@fke.utm.my
Website: ivat.utm.my

Testing Services by IVAT

As a testing laboratory, IVAT wishes to be able to cater for the needs of electrical energy sectors.

Facilities

Our facilities define our services. Our facilities determine our capabilities and limits to our services.

The Laboratory

is about 5-storey high (25 metres), with a floor area of around 400 metre square (20 metres by 20 metres). The largest access to the laboratory is a 5-metre wide and a 10-metre high automatic vertically folded door. Within the floor area, a 20-tonne crane is available to move things around.

Testing Equipment

We are equipped mainly with a 280 kV AC/DC HV generation and measurement set (for withstand test and equipped with a wet testing modular), a 2 MV impulse generation and a partial discharge measurement system (equipped with oil filled termination for cables).

Accreditation

is also an advantage for us in ensuring a quality system that covers both the technical and managerial aspects of running a testing laboratory. We are in pursuit to be accredited to all available electrical tests and are at the moment seeking more product specific tests to cater for the need for a third party evaluation.

IVAT's laboratory.

Special Tests

will be considered upon request and technical reviews will be done prior to quotations. Requests for research purposes will be considered with possible cost exemption upon an agreement/understanding between the laboratory and potential universities.

Please do not hesitate to forward all your enquiries to ivat@fke.utm.my



2 MV impulse generator.



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Power frequency withstand wet test.



250 kV HVAC test set.



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Published by:

**Institute of High Voltage and High Current
(IVAT)**

Block P06

Universiti Teknologi Malaysia
81310 Johor Bahru, Johor
Malaysia

Phone: +60 7 553 5615

Fax: +60 7 557 8150

E-mail: ivat@fke.utm.my

Website: ivat.utm.my

The Institute of High Voltage and High Current, or in Malay, Institut Voltan dan Arus Tinggi (IVAT), was established in Universiti Teknologi Malaysia in 1991. It was initially an educational laboratory which provides facilities for carrying out experiments, research and consultancy services in high voltage engineering, as early as the 1970s.

The establishment of IVAT stems out from the needs of the country for a centre which carries out research and development, test and calibration works in high voltage areas, so that efficient technologies and power system apparatus can be effectively employed for the transmission and distribution to the consumer of electrical energy.

In 1992, the institute became the first institution in the country to be accredited to handle high voltage test and calibration works according to ISO/IEC Guide 25. In 2004, IVAT was accredited with the ISO/IEC 17025 in the field of high voltage electrical calibration. In certification, IVAT has also successfully migrated to MS ISO/IEC 17025 since July 2007 till date. Recently in 2013, IVAT was accredited with the on-site calibration and the scope of calibration had been extended up to 140 kV AC (alternating current), 180 kV DC (direct current) and 140 kV impulse.