

INTERNATIONAL UNIMAS STEM ENC N 12TH ENGINEERING CONFERENCE 2019

28TH - 29TH AUGUST 2019 | RIVERSIDE MAJESTIC HOTEL, KUCHING SARAWAK, MALAYSIA

**‘REVOLUTIONIZED INNOVATIVE
ENGINEERING AND TECHNOLOGY
TOWARDS SUSTAINABLE DEVELOPMENT’**

THE OFFICIAL PROGRAMME



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VICE CHANCELLOR'S MESSAGE

Assalamualaikum W.B.T. and greetings to all,

It is my great pleasure to welcome all of you delegates and participants to the 2019 International UNIMAS STEM 12th Engineering Conference (EnCon).



The Faculty of Engineering UNIMAS has been successfully hosting this annual EnCon conference since 2007. This year, once again, under strategic partnership with Institute of Electrical and Electronics Engineers (IEEE) Malaysia Section and Sarawak Subsection, The Institution of Engineers, Malaysia (IEM and Sarawak Multimedia Authority (SMA) provides platform for professionals in the field of science, technology and engineering to build networking and collaborations is organized. This year, EnCon2019, with the theme "Revolutionized Innovative Engineering and Technology towards Sustainable Development" is seen timely as we strive for solutions to enhance the knowledge in the field of science, technology and engineering through presentation and sharing of innovative ideas towards the 4th Industrial Revolution. Our distinguished keynote speakers have been invited to share their knowledge and views on various topics in this conference and I hope the one-day intellectual discourse during this event is able to generate several pertinent resolutions on this issue.

With successful introduction of International Science and Engineering Expo (i-STEEEx) in EnCon2016 to showcase the latest innovation and research projects by high school students and institutions of higher learning and the industries, this year, once again i-STEEEx 2019 is reaching out to the researchers and innovators to fulfill one of its objectives that is to encourage youth to demonstrate their creativity and problem solving skills. This expo will focus on enhancing creativity among the youth to spark innovative interest in science and technology to showcase their innovative product designs. As we strongly advocate STEM education in support of the state's and the country's initiative to increase STEM students, parallel sessions of STEM workshops shall also be held for teachers from schools in Sarawak in this 2-day event. Our collaborations with industries and other Institutions of Higher Learnings are also further strengthened with the signing of six MoUs/MoAs and exchanged in this conference.

Finally, thank you to all delegates and participants for the support and it is hoped that this conference would be stimulating and would provide valuable experience to all. A big thanks to the organizing committee for their great efforts in making this event a success.

YBhg. Prof. Datuk Dr Mohamad Kadim Hj Suaidi
Vice Chancellor
Universiti Malaysia Sarawak

DEAN'S MESSAGE

Assalamualaikum W.B.T. and greetings to all

Once again, the Faculty of Engineering, UNIMAS, is proud to host the 2019 International UNIMAS STEM 12th Engineering Conference (EnCon). On behalf of the EnCon2019 organizing committee, I am honored and delighted to welcome you to this prestigious conference.

This year, EnCon embarks on a very relevant theme entitled "Revolutionized Innovative Engineering and Technology towards Sustainable Development". Topics to be delivered by both our prominent speakers and respected participants will dwell on various areas, directly or indirectly supporting the 4th Industrial Revolution which we hope shall create more opportunities to all delegates in their efforts to support IR 4.0 initiatives. Hence, our technical program is rich and varied with 3 keynote speeches and over 70 technical papers and of course, the success of this conference depends ultimately on strong support of the elite members of the International Steering Committee who are prominent scholars in the dedicated conference theme.



As in previous years, EnCon 2019 continues its past success via strengthened collaborations in promoting Science, Technology, Engineering and Mathematics (STEM) among youths, teachers, and parents as well as the entire community. The integral part of this conference is set with the aim to ensure sufficient number of qualified STEM graduates to be readily absorbed into science, technical and engineering workforce. Our effort continues with the organization of i-STEEx 2019 or the International Science Technology and Engineering Expo which runs in parallel with the conference and already in its 4th year of organization.

To conclude, I would like to express my deepest appreciation to the co-organizers and all the sponsors. Heartiest gratitude goes to the 2019 International UNIMAS STEM Engineering Conference, EnCon2019 organizing committee, the Faculty of Engineering and our supporting partners for their initiatives and commitment in spearheading this conference. To all participants, thank you for your support and hope we will see you again in our future EnCon conferences.

Assoc. Prof. Ir. Dr Siti Noor Linda Binti Hj Taib
Dean, Faculty of Engineering, UNIMAS

CHAIRMAN'S MESSAGE



The Organizing Committee warmly welcomes our distinguished delegates and guests to the 2019 International UNIMAS STEM 12th Engineering Conference (EnCon) held on 28th-29th August 2019 in Kuching, Sarawak, Malaysia. EnCon2019 is co-organized by the Institute of Electrical and Electronics Engineers (IEEE) Malaysia Section and Sarawak Subsection, The Institution of Engineers, Malaysia (IEM) and Sarawak Multimedia Authority (SMA). We would like to acknowledge the financial and moral support from our sponsors and supporters, namely the Ministry of Education, Science and Technological Research (MESTR), Office of the Chief Minister of Sarawak, Ministry of Utilities, Ministry of Industrial Development and Enterprises, Association of Consulting Engineers Malaysia (ACEM), Hoifu Group, Tekmark Sdn Bhd, Anmas Dental Clinic, KiwiTech Sdn Bhd, Printicious, Jana Teraju, and PCSS Consultancy Sdn Bhd.

The conference has solicited and gathered technical research submissions related to all aspects of the conference themes in a broad range field of electronic, electrical, mechanical, chemical, and civil engineering. Papers submitted for presentations come from various countries namely the Pakistan, South Korea, Korea, Saudi Arabia, Indonesia, Bangladesh and Malaysia. The papers will be presented in three keynotes lectures and more than 70 oral presentations. We are grateful to all those who have contributed to the success of EnCon 2019. We hope that all participants benefit scientifically from the paper presentations and find it stimulating in the process. We would like to wish you success in your technical presentations and social networking.

We are also concurrently organizing three workshops on solar photovoltaic system, Internet of Things (IoT) and STEM education, and an innovative school-based science, technological and engineering exhibition and competition, ISTEEX 2019, in order to promote STEM in our schools. We have a record of 41 teams participate in the competition, and five exhibitors promoting their products and services.

Finally, we hope you have a unique, rewarding and enjoyable week at EnCon2019 in Kuching.

Assoc. Prof. Ir. Ts. Dr. Kismet Anak Hong Ping
Chairman, EnCon 2019

ABOUT



International UNIMAS STEM 12th Engineering Conference 2019 (EnCon2019) will be held from August 28 to 29, 2019 in the beautiful city of Kuching, Sarawak. With the theme 'Revolutionized Innovative Engineering and Technology towards Sustainable Development', the objectives of the current conference are to:

- Provide a platform for professionals in the field of science, technology, and engineering to build networking for future collaborations
- Provide a critical discussion platform about new updates in the field of science, technology, and engineering, especially discussion about the theme of the conference
- Enhance the knowledge in the field of science, technology, and engineering through presentation and sharing of innovative ideas towards the 4th Industrial Revolution
- Foster academic-industrial relationship for the benefit and betterment of the society

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**Committee Members of Expo and
Exhibition**

Ir. Hazrul Mohamed Basri
Kasumawati Lias
Assoc. Prof. Dr Hushairi Zen

GENERAL INFORMATION

Registration Desk

Registration for the conference will be conducted at the Registration Desk located at level 3 foyer.

The registration desk is available during the following period:

28th August 2019, Wednesday:

0800 – 1800 (Conference + Workshops + i-STEEEx + STEM Education Workshop)

29th August 2019, Thursday:

0800 – 1200 (Technical Visit)

Lunch, Morning and Afternoon Tea Break

28th August 2019: Lunch will be served at Café Majestic, Casa Blanca and Blue Lagoon (refer to Lunch coupon)

Name Badges

For identification and security reasons, delegates are requested to wear their name badges at all times during each conference sessions and at social functions.

Conference Secretariat

The conference Secretariat room is located at Board Room 2, Level 3. Please visit the Secretariat room if you have any enquiries regarding the conference.

Parallel Oral Presentation

Your presentation is limited to **10 minutes**. If your presentation exceeded the time limit, you will be instructed to stop to avoid encroaching into the next speaker's time slot and disrupting the programme schedule. There will be a **5-minutes** slot scheduled at the end of your presentation for Question and Answer session.

Website

<http://www.conference.unimas.my/2019/encon/>

CCD/CPD/PDP Hours

28th & 29th August 2019: CPD from IEM

3.5 CPD Hours: For each Pre-Conference Workshop

6 CPD Hours: Conference

3 CPD Hours: Technical Visit

DAY 1 | OPENING CEREMONY

Wednesday, 28th August 2019

Sarawak Chamber 3, Riverside Majestic Hotel, Kuching

- 0915 - Arrival of Delegates and Invited Guests
- 0930 - Arrival of **YBhg. Prof. Datuk Dr Mohamad Kadim Suaidi**
Vice Chancellor of UNIMAS
- 0940 - Arrival of **YBhg. Tan Sri Datuk Seri Panglima Sulong Matjeraie**
Chairman, UNIMAS Board of Directors
- 0945 - Arrival of **YAB Datuk Patinggi (Dr) Abang Haji Abdul Rahman Zohari Bin Tun Datuk Abang Haji Openg**
Chief Minister of Sarawak
 - National Anthem – 'Negaraku' and 'Ibu Pertiwiku'
 - Do'a Recitation
 - Welcoming Speech by **YBhg. Prof Datuk Dr Mohamad Kadim Suaidi**
 - Opening Speech by **YAB Datuk Patinggi (Dr) Abang Haji Abdul Rahman Zohari Bin Tun Datuk Abang Haji Openg**
 - Launching Ceremony
 - Accreditation of UNIMAS as a Competency Training and Examination Centre
 - MoU / MoA Exchange Ceremony
 - Certificate Presentation to Sponsors
 - Photo Session
- 1115 - End of the Opening Ceremony
 - VVIPs and VIPs proceed to officiate i-STEEEx 2019 at Sarawak Chamber 1 and 2

DAY 1 | PRE-CONFERENCE WORKSHOPS

Wednesday, 28th August 2019

Riverside Majestic Hotel, Kuching

Time	Activity
0800 – 0830	Arrival and Registration of Participants
0830 – 1230	Venue: Lady Suite, Level 3
	<u>Workshop 1</u> Title: Design of Grid Connected Solar Photovoltaic System Speaker: Ir. Hazrul Mohamed Basri
1330 – 1730	<u>Workshop 2</u> Title: Internet of Things (IoT) : Concept, Benefits and System Design for Local Ecosystem Speaker: Associate Professor Dr Hushairi Zen

DAY 1 | KEYNOTE SPEECH

Wednesday, 28th August 2019

Riverside Majestic Hotel, Kuching

Time	Activity	
0730 – 0830	Registration and Arrival of Participants	
0830 – 0915	Keynote Speaker 1: Associate Professor Dr Toshifumi Moriyama Title: Monitoring and Change Detection of Disasters in Japan by Using Synthetic Aperture Radar	
0915 – 1000	Parallel Arrival of Guest of Honour and VIP	
1000 – 1130	Opening Ceremony Venue: Sarawak Chamber 3	
1130 – 1145	Tea Break (Sarawak Chamber Foyer, Level 3)	
1145 – 1230	Keynote Speaker 2: Professor Ts. Dr M. Iqbal Saripan Title: How Important is Sustainable Design in Digital Imaging? Venue: Sarawak Chamber 3, Level 3	Keynote Speaker 3: Mr Raymond Maurice Anak Stephan Bujang Title: STEM Education Policy from MOE Perspective: Current Outlook and Way Forward Venue: Wind Suite, Level 3
1300 – 1400	Lunch Break	

DAY 1 | STEM

Wednesday, 28th August 2019
Riverside Majestic Hotel, Kuching

Time	Activity
1145 – 1230	Venue: Sarawak Chamber 3, Level 3
	Keynote Speaker: Mr Raymond Maurice Anak Stephan Bujang Title: STEM Education Policy from MOE Perspective: Current Outlook and Way Forward
1300 – 1400	Lunch Break
1400 – 1530	STEM Workshop 1 Facilitator: Mr Noradzahar Bin Hussaini Title: Nuclear Science in Secondary School Approach
1530 – 1545	Tea Break
1545 – 1700	STEM Workshop 2 Facilitator: Ms Chung Sze Meang Title: STEM Innovation in Schools

DAY 1 | i-STEExTuesday, 27th August 2019

Riverside Majestic Hotel, Kuching

Time	Activity
1400-1700	Setup of Venue, Sarawak Chamber 1, 2 and 3
1700-2000	Registration and Booth setup by participants

DAY 2 | i-STEEExWednesday, 28th August 2019

Riverside Majestic Hotel, Kuching

Time	Activity
0730 – 900	Registration of participants
0900 – 1045	Evaluation by Judges, Presentation at booth
1045 – 1300	i-STEEEx and Bridge to Win Session
1130 – 1300	STEM Workshop (Dr Nazeri Abdul Rahman and team)
1300 – 1400	Lunch Break
1400 – 1630	i-STEEEx and Bridge To Win Session
1630 – 1730	Awards Ceremony Speech by Associate Professor Ir. Dr HjH Siti Noor Linda Taib (Dean, Faculty of Engineering, UNIMAS) Speech by Sarawak Energy Berhad Presentation of Certificate for Participants Special Award Presentation End

DAY 1 | CONFERENCE (POSTER PRESENTATION)

Wednesday, 28th August 2019
 Riverside Majestic Hotel, Kuching

Time	Poster Presentation (Lobby, Level 3)	
	SESSION I	
1400 1420	Paper ID: 78	Paper ID: 55
	Paper ID: 84	Paper ID: 69
	Paper ID: 54	Paper ID: 76
	Paper ID: 60	
SESSION II		
1430 1450	Paper ID: 52	Paper ID: 6
	Paper ID: 57	Paper ID: 72
	Paper ID: 89	Paper ID: 79
	Paper ID: 61	Paper ID: 81
	Paper ID: 65	
SESSION III		
1545 1605	Paper ID: 41	Paper ID: 86
	Paper ID: 21	Paper ID: 9
	Paper ID: 75	Paper ID: 71
	Paper ID: 87	Paper ID: 66
	Paper ID: 85	

DAY 1 | CONFERENCE (ORAL PRESENTATION)

Wednesday, 28th August 2019
Riverside Majestic Hotel, Kuching

Time	Parallel Sessions		
	1	2	3
	Deer Suite	Wind Suite I	Wind Suite II
1400 1415	Paper ID: 5	Paper ID: 11	Paper ID: 3
1415 1430	Paper ID: 7	Paper ID: 12	Paper ID: 15
1430 1445	Paper ID: 10	Paper ID: 20	Paper ID: 30
1445 1500	Paper ID: 14	Paper ID: 80	Paper ID: 37
1500 1515	Paper ID: 16	Paper ID: 25	Paper ID: 45
1515 1530	Paper ID: 17	Paper ID: 27	Paper ID: 4
1530 1545		Paper ID: 50	
Tea Break (Sarawak Chamber Foyer, Level 3)			
	4	5	6
	Deer Suite	Wind Suite I	Wind Suite II
1545 1600	Paper ID: 18	Paper ID: 44	Paper ID: 56
1600 1615	Paper ID: 26	Paper ID: 46	Paper ID: 8
1615 1630	Paper ID: 28	Paper ID: 48	Paper ID: 22
1630 1645	Paper ID: 33	Paper ID: 53	Paper ID: 23
1645 1700	Paper ID: 34	Paper ID: 58	Paper ID: 29

1700 1715	Paper ID: 35	Paper ID: 68	Paper ID: 31
1715 1730	Paper ID: 40	Paper ID: 73	Paper ID: 32
1730 1745	Paper ID: 19	Paper ID: 74	Paper ID: 42
1745 1800	Paper ID: 63	Paper ID: 77	Paper ID: 43
End of Conference			

DAY 1 | BEST PAPER AWARDS PRESENTATION

Wednesday, 28th August 2019

Sarawak Chamber 3, Riverside Majestic Hotel, Kuching

- 1800**
- Speech by Associate Professor Ir. Dr Hjh Siti Noor Linda Taib
(Dean, Faculty of Engineering, UNIMAS)
 - Best Paper Awards Presentation

End

DAY 2 | TECHNICAL VISIT

Thursday, 29th August 2019

Kuching-Serian Road Interchange

Technical visit will be at Kuching-Serian Road Interchange. The talk will be handled by Ir. Dahlim Mungkil. The visit will concentrate on structure and M&E works of the KSR Interchange.

Date : 29th August 2019

Fee : RM20 (include lunch)

- 0800** - Bus from UNIMAS to Riverside Majestic Hotel
- 0900** - Pan Borneo Highway Progress & Site Briefing (Presentation)
- 1000** - Construction Site Visit
- 1200** - Lunch & Return to UNIMAS

KEYNOTE SPEAKERS

Keynote Speaker 1

Associate Professor Dr Toshifumi
Moriyama

Title: Monitoring and Change
Detection of Disasters in Japan by
Using Synthetic Aperture Radar



Abstract: Japan is a country where many disasters such as earthquakes, eruptions and typhoons occur. Therefore, in order to know the disaster's damages globally and locally, observations by using various sensors which operated in space and on ground are carried out. Sensors using micro waves have the advantage of being able to observe day and night regardless of the weather. Among the sensors that use micro waves, a synthetic aperture radar (SAR) can produce ground images from airplane and satellite in details and is suitable for observing changes by disasters. The Japanese airborne synthetic aperture radars are Pi-SAR / Pi-SAR2. The resolution of Pi-SAR2 reaches 30cm. Japanese satellite-borne synthetic aperture radars are the advanced land observation satellites (ALOS) 1 and 2. ALOS 2 can observe same area every 14 days. These synthetic aperture radars have observed many disasters in Japan. The interferometry and polarization observation technologies based on SAR provide very useful information about the damages of disasters. In this presentation, we will introduce Japanese SARs and their observation technologies, and show the results of the Niigata Chuetsu earthquake, Kumamoto earthquake, and Mt. Ontake eruption.

Keynote Speaker 2

Professor Ts. Dr M. Iqbal Saripan

Title: How Important is Sustainable Design in Digital Imaging?

Abstract: We are in 1975 (imagine that), and a digital camera had just been invented. It was a 0.01MP camera. What can we do with 0.01MP? No wonder the technology developed very slowly until the year 2000s. It was equivalent to almost 1000 times less spatial resolution than what we have today (in 2019). From time to time, digital imaging has evolved and replacing film-based camera. Whether we realized or not, descriptors that we used in sustainable technology design are also applicable in the development of the digital image technology. Being in digital form enables the images to be reused, re-distributed, recycled and repaired. On top of that, the pixels can be manipulated easily (of course, for good purposes!). Due that, nowadays we can see that everybody is holding a digital camera in their pockets. The camera physical size becomes much smaller than 1975, but the performance is thousand times better. The advantage of digital camera is been utilized not only in normal photography, but also in specialized applications, for instance medical imaging and aerial/satellite imaging. In order to ensure the compatibility between devices, digital image standards were developed, such as JPEG for general imaging and DICOM for medical imaging. In summary, the future of digital imaging looks bright. It is an excellent example of how a sustainable technology was developed to be part of our daily life.

Keynote Speaker 3

Mr Raymond Maurice Anak Stephan
Bujang



Title: STEM Education Policy from
MOE Perspective: Current Outlook
and Way Forward

Abstract: MOE Malaysia is currently promoting STEM for all with effective STEM programmes that engage and inspire students of all abilities and interest. This is to nurture STEM-literate students who are capable of logical thinking, adept at using technology, have the skills to solve problems, innovate, create new ideas, design or invent new products. These skills shall be acquired through an integrated learning of science, technology, engineering and mathematics, and a teaching and learning process that apply the real world context through open-ended exploration and hands-on approach. This presentation explains the importance of STEM education and the initiative to strengthen STEM education by MOE Malaysia in preparing students for the 21st century and 4th Industrial Revolution.

PRE-CONFERENCE WORKSHOP SPEAKERS

Pre-Conference Workshop 1 :

Ir. Hazrul Mohamed Basri

Title: Design of Grid Connected Solar Photovoltaic System



Abstract: The workshop covers information about grid-connected solar PV systems as well as a step-by-step procedure to design of grid-connected PV systems which include solar PV modules, inverter and associated equipment that is suitable for Malaysia climate conditions. The sizing of each solar PV systems components will be elaborated with numerous working examples.

Pre-Conference Workshop 2 :

Associate Professor Dr Hushairi Zen

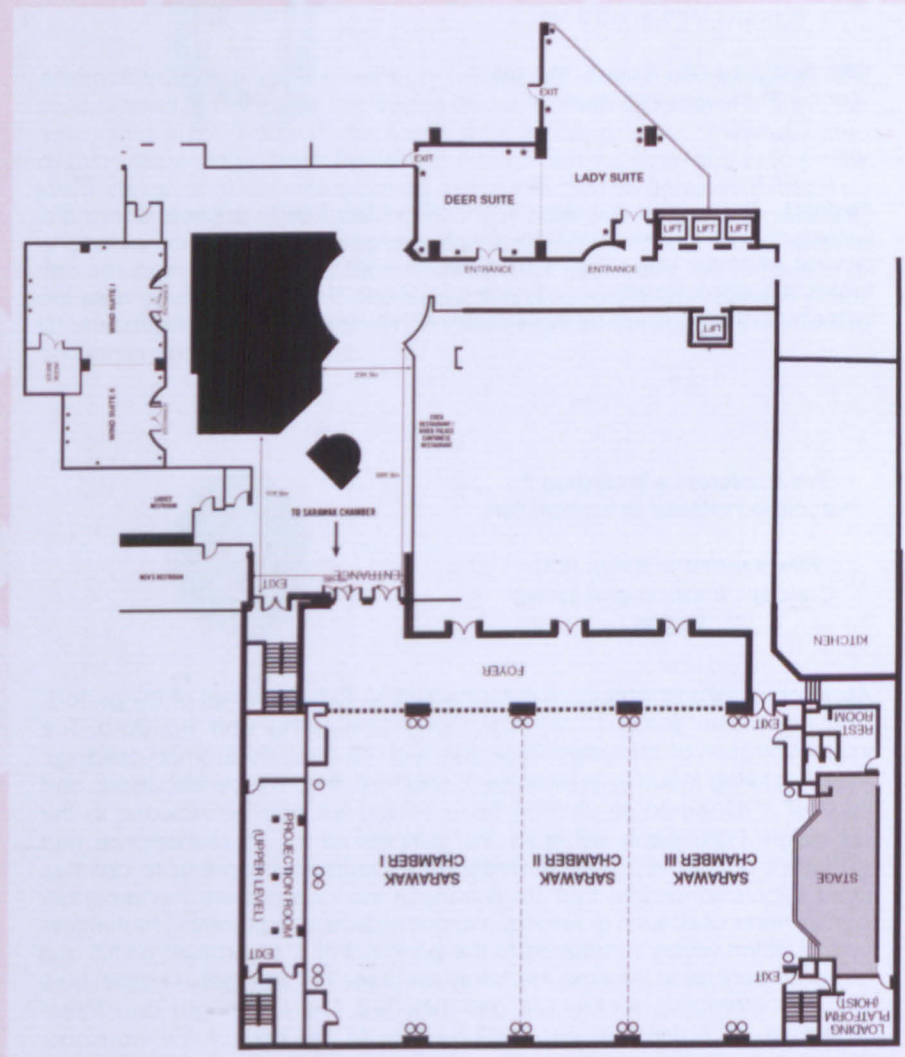
Title: Internet of Things (IoT) :
Concept, Impacts and System
Design



Abstract: This workshop covers the introduction to the Internet of Things (IoT), and the convergence of IoT with Cloud Computing and Big Data. The implementation of IoT system in sectors such as agriculture, smart buildings, manufacturing industry, environment, medical, etc. will be discussed; and how IoT is expected to change these sectors will also be included in the discussion. Participants will learn the concept of IoT, its architecture and standards and ways it can be designed for local environments to optimize production and services that could benefits the local players. The important components of IoT such as sensors, microcontrollers, programming techniques and platform will be introduced to the participants. Deliberations on IoT and big data analysis to increase important local sectors especially in agriculture and manufacturing sectors are also included. The challenges and threat faced by IoT system will also be covered. At the end of the workshop, participants will be able to understand the conceptually design of the IoT system for local ecosystem, and understand the current and future benefits of IoT.

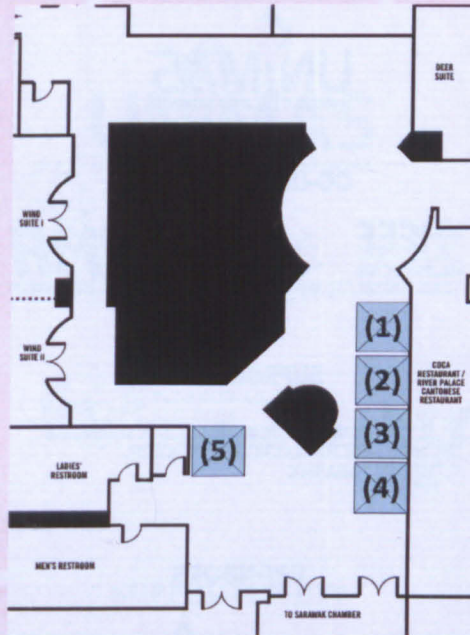
FLOOR PLAN | MEETINGS & BANQUET

Sarawak Chamber Foyer, 3rd Floor
Riverside Majestic Hotel, Kuching



FLOOR PLAN | EXHIBITORS

Sarawak Chamber Foyer, 3rd Floor
Riverside Majestic Hotel, Kuching



- 1 Kiwitech Sdn. Bhd.
- 2 Hoi Fu Group (M) Sdn. Bhd.
- 3 Ministry of Industrial & Entrepreneur Development Sarawak
- 4 Tekmark Sdn. Bhd.
- 5 IEEE Sarawak Subsection / Universiti Malaysia Sarawak

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SRS 888

Tomorrow Technology.
Future Solutions

INTRODUCTION

Stabilised Recycled Sustainable (SRS) 888 is a solution based product specially formulated to treat clayey and peaty soil. These soil type can be found in coastal regions around the world. In general, these soils have natural properties of high swelling effect, high elasticity, low bearing capacity and high moisture content. This is due to adsorption of water which exists in the form of hydroxyl loss by mono layer structure of Kaolin. Furthermore, it can also be incorporated into existing technology.



Figure 1: Clayey soil (left) and Peaty soil (right)



Figure 2

SRS 888 PHENOMENON

SRS 888, a proprietary novel stabilisation product, resolves and re-stabilises the soil by a dehydrating ionic reaction. It infiltrates the structure to react with water and bind the layer structure together permanently (as shown in figure 2). Hence, a new structure with stiffer, lesser rebound and higher strength is formed.

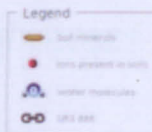
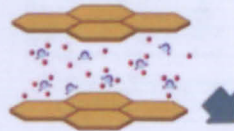


Figure 2: Stabilisation of Mono Layer

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