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On the Horizon of IR 4.0

EDITORIAL NOTE



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Editorial Policy

The FENG Research Bulletin is a publication of the Faculty of Engineering, Universiti Malaysia Sarawak (UNIMAS). It publishes current information on Research Activities, Research Publications, Research Findings, Recent Research Equipment, Conferences, Seminars and Research Students of Faculty of Engineering, UNIMAS.

EDITORIAL NOTE

Our mission at Faculty of Engineering (FENG), UNIMAS is to achieve enduring excellence in research and education in science, technology and engineering for the benefit of society. FENG Research Bulletin provides a glimpse of some of the ways that the FENG community of staff, students and alumni fulfil this mission to benefit society. In this 2017 issue, we learn how artificial intelligence and neural network being applied to smart grid system and wind energy mapping respectively.

We see how in our own home turf, Sarawak, FENG researchers responded to the drive for sustainable development by utilizing renewable energy resources such as solar, wind and micro hydro. This is an example of how UNIMAS uses our excellence in research and education in science, technology and engineering for the good of society. Collaborating with others to improve the world is one of the characteristics of a great university. We need to share our innovations and discoveries more broadly and continue to address global issues while paying increased attention to the ways these issues are manifest close to home in our neighbouring communities. Our research work with our industrial partner in Kanagawa Prefecture, Japan is an example of such collaboration between our staff, students, alumni and partners to test out their creative ideas, and share in the excitement of research and innovation.

We will continue to rise to the challenge of the times. It is a challenge that requires the collective expertise, strengths and goodwill of FENG communities. We are grateful for your support and encouragement.

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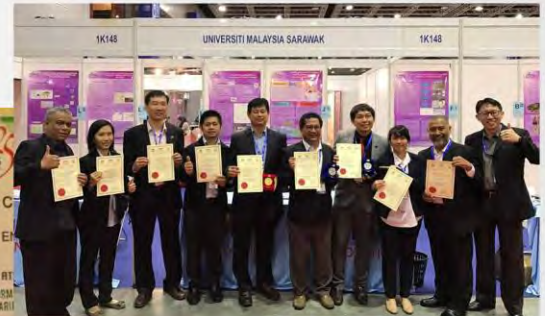
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MESSAGES



Professor Ir Dr Al-Khalid Hj Othman, Dean, Faculty of Engineering, UNIMAS

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Dear Esteemed Readers,

First of all, I would like to sincerely congratulate all Faculty members who participated, conducted and published quality Research and Development, which had important outcome for our Faculty. I also would like to congratulate the team of FENG Research Bulletin 2017 editorial panel who worked hard and published another volume of high quality Bulletin.

Our future is unknown and therefore making accurate predictions is particularly difficult. Yet, the trends, disruptions and scenarios outlined in the research provide clues to help us develop a plausible picture of what the world of work would look like in 2030. By 2020-2025, the Fourth Industrial Revolution or IR4.0 is expected to bring us to the advanced robotics and autonomous transport, artificial intelligence and machine learning, advanced and green materials, biotechnology and genomics. These developments will or may transform the way we live, or even the way we work. Some jobs will disappear, others will grow and jobs that don't even exist today will become commonplace.

The strategic research direction towards Industrial Revolution 4.0 definitely requires and makes more sense through innovation in technology and industrialization, as it is to become a support system for Sarawak's future development.

I assure, by the grace of God, that we would evolve in time and learn how to adapt to these changes taking place in the digital world of today.



Associate Professor Ir Dr Siti Noor Linda Haji Taib Deputy Dean (Research & Graduate), Faculty of Engineering, UNIMAS

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Dear readers

We are delighted to share with all of you our latest publication of FEng Research Bulletin. Various information particularly on research updates and activities are presented for your reference and we hope that this annual publication will be the medium to communicate our aspiration on strengthening our research, innovation, consultancy and services to all stakeholders. The year 2017 has witnessed many achievements by our faculty members whom are as ever very enthusiastic in their research endeavour. Our proudest moments are during InTex (UNIMAS International Exposition on Research and Innovation) and USJC 2017 (UNIMAS Silver Jubilee Conference), in which FEng submitted a record number of participation! Congratulations to all! Do browse through our bulletin to find out more of our 2017 achievements and other news. Also, feel free to contact us for further inquiries.



Noraziah Haji Abdul Wahab Deputy Dean (Industry & Community Engagement and Commercialization) Faculty of Engineering, UNIMAS

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Dear readers,

Well done to all committee for the publication of latest FENG Research Bulletin! It is indeed a great academic journey that we had as a team in 2017. As we embark on 2018, Innovation and Commercialization has been one of the key goals for the faculty as well as the university. Innovation and technology play an important role in enhancing the productivity and competitiveness of an economy. Hence, technology transfer and commercialization by the research experts in the faculty is now the crucial factors in sustaining long-term economic growth of the faculty subsequently the university. As such, the faculty office of Industry & Community Engagement and Commercialization will strengthen our cross-academic and industry partnerships as well as sustaining our regional, national and world-wide opportunities in pursuant of our innovation and commercialization initiatives. It is hope that with various engagements with the community and industry, we can aim at boosting our research, development and innovation from our researchers as wealth generators through commercialization. Looking forward for an exciting 2018 journey!

A Novel Artificial Intelligence Featured Synchronization (AIFS) Scheme for Smart Grid Applications



Mohammad Kamrul Hasan, Musse Mohamud Ahmed

Department of Electrical and Electronics Engineering,
Faculty of Engineering,
Universiti Malaysia Sarawak (UNIMAS), Kota Samarahan, Sarawak, Malaysia
Email: hmkamrul@unimas.my, mamusse@unimas.my



Abstract

Artificial intelligence (AI) is enabling the fourth industrial revolution, and it has the potential to provide the top-level performance to the engineering solutions. Researchers and industries are motivated to implement AI in electronics and communication industry due to its impression of the early level of implementations and precise performances. Phase synchronization plays an important role in the digital smart grid to get the precise and real-time control measurement information. However, the time synchronization is a critical challenge in smart grid applications. The existing systems are designed with the phasor measurement unit along with communication protocol IEEE C37.118 and use the GPS timestamps as the reference clock stamps. The absence of GPS increases the clock offsets which surely can hamper the synchronization process and the full control measurement system that can be imprecise. Therefore, to reduce this clock offsets, a new algorithm is needed which may consider any alternative reference time stamps rather than GPS. Therefore, this paper introduces the revolutionary AI Featured Synchronization (AIFS) scheme. The novel AIFS scheme is designed with the Radio Frequency (RF) functionalities. The performance of the novel AIFS synchronization scheme is evaluated by MATLAB based simulations. The result of the simulation shows that the performance is better than that of the existing system.

Keyword: IEEE C37.118, Smart Grid, Artificial Intelligence

1. Introduction

Synchrophasor innovation has the acquainted with turned into necessary integral parts of digital communication frameworks that include transmission of electrical amounts measured crosswise over various parts, which synchronized the grid applications utilizing outside precise time source [1]. This is accomplished by joining communication infrastructure with smart grid layers while keeping up Phasor Measurement Units (PMUs) as a fundamental part in the system, where the phasors are the representation of a complex number, single recurrence, and enduring state conditions. The utilization of PMUs for Real-time Monitoring and control will enhance the execution of the Wide Area Monitoring (WAM) framework (in Fig.1) since estimations are continuously made [3], [4]. Synchro phasor's with Phase Locked Loops (PLL) and Global Positioning System (GPS) time adjust the crude estimations previously imparting to the Phasor Data Concentrator [2]. The GPS time utilizes the Coordinated Universal Time (UTC) 0° longitude. GPS (Global Positioning System) synchronized with UTC (< 1 μs). Primarily, the GPS collector's sends worldwide time by means of various timecode design that is most broadly utilized is IRIG-B (Inter-Range Instrumentation Group) [5].

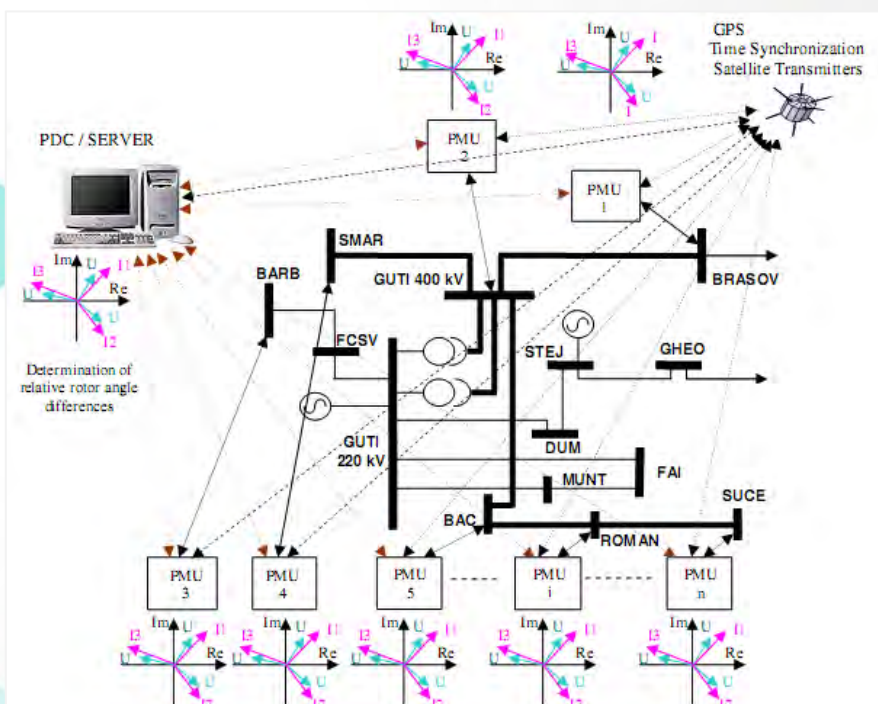


Fig.1. WAM Framework based on PMUs that uses GPS Satellite Timestamp [3]

A PMU is a microchip-based report the size and stage edge of a determined phasor as for the worldwide time reference, according to the synchrophasor models. The synchrophasor is basically employed with IEEE C37.118 or IEC 61850-90-5 rose as two surely communication systems for synchrophasor advancement. Be that as it may, writing does not have a thorough investigation of some key highlights and restrictions. The stage edge reference against worldwide time reference can be presented in Fig 2 [5].

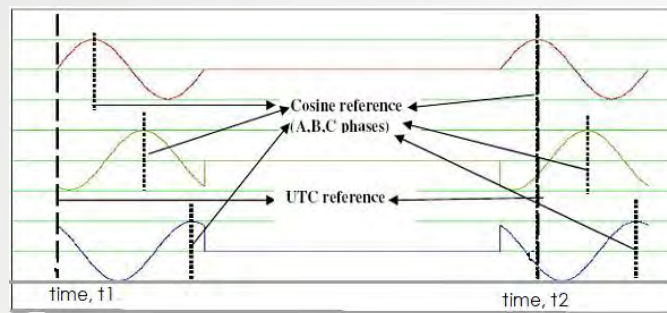


Fig. 2. Phase Angle Reference pertaining to Global Time Reference [5]

The time synchronization protocol such as IEEE C37.118, IEEE1588, and Network Time Protocol (NTP) is extensively designed with the functionalities of precise time synchronization metrics. The Network Time Protocol (NTP) is able to distribute to networked computers the time which is evaluated by means of GPS [6]. Provides a time reference and, in fixed network applications, it is able to distribute synchronization among networked computers. To coordinates, the time of a sender to all receivers a time-stamp has used [7]. Reference broadcast messages do not contain an explicit timestamp; receivers use the broadcast message arrival time to adjust their clocks. The messages are broadcasted at the physical layer and then they arrive at the receivers' variability. Smart Grid Synchronization to an external timescale is typically provided by the Global Positioning System (GPS)[1][5], which allows receivers to achieve an accuracy of some tenth of nanoseconds. GPS receivers are too large and costly. In [8], an algorithm is proposed that, in order to synchronize the entire network, needs a path that contains all sensor nodes. The main idea is to send a message along with a loop recording hop by hop the initial time and the end time of the message. A roundtrip transmission with the direct neighbors is performed to evaluate the average transmission delay and the standard deviation. In such way, each node stores timing information from the others nodes in order to adjust the local time with an accurate estimation of the delay i^{th} a minimum delay. Initially, IEEE C37.118 tended to the execution of synchro phasors just under consistent state conditions disregarding framework unsettling influences and commotion [3], [10]. Nevertheless, an update of IEEE C37.118 with better precision and support for dynamic power communication framework conditions. IEEE C37.118 depicts four sorts of messages: information, configuration, header, and charge. Information messages are utilized to send real continuous estimations made by the PMU. Information from various PMUs might be transmitted in a solitary message corresponded to a specific timestamp [10]. However, the precise synchronization is necessary it's because of the maximum error respect to an external reference time.

The aim of this study is to reduce the phase offset errors in Smart Grid applications. The main contributions of this study are given below:

- A novel AIFS scheme is proposed to alleviate bias error in smart grid applications. In AIFS scheme, an ANN is featured with RF functionalities has approached for the digital smart grid application.
- The performance of the proposed AIFS scheme is evaluated via simulation approach. The considered performance metric is the phase offset error.

2. AIFS System Design and Methods

The communication system model of the proposed AIFS scheme is shown in Fig. 3.

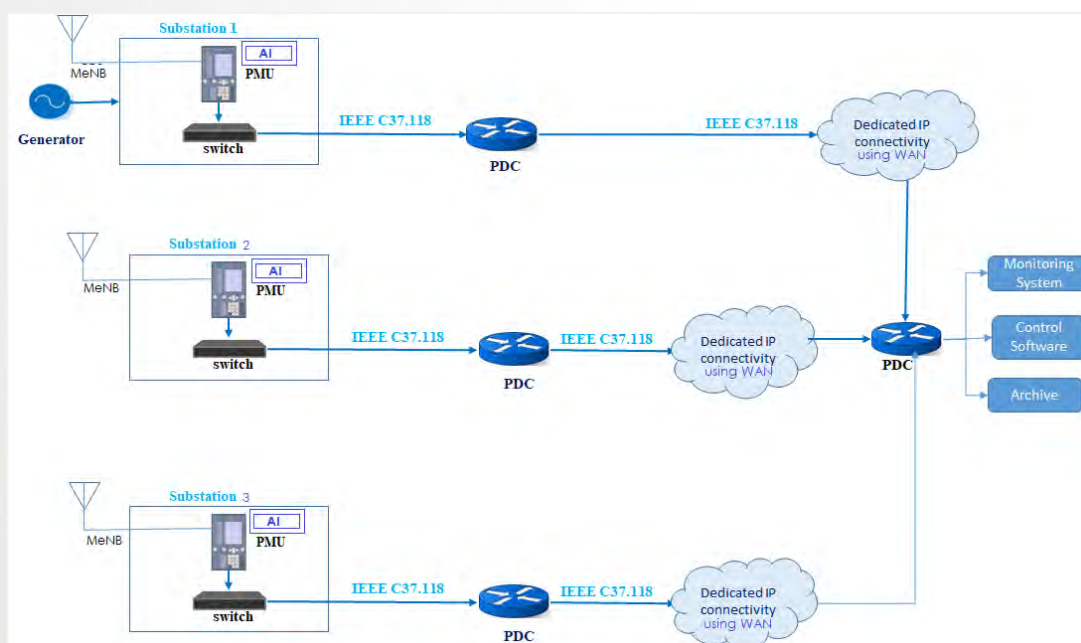


Fig. 3. Proposed AIFS Communication framework

The most revolutionary Artificial intelligence (AI) techniques that are Artificial Neural Networks (ANN) is promising in power electronics and industrial communication engineering. However, this study adopted ANN to design synchronization scheme due to its applicable and inheritable feature of network design, simulation, fault diagnostics, and control and measurement estimation in the digital smart grid. Also, AI is considered to be the brain of the digital future smart grid. The technology is mainly a deep learning algorithm with self-error reduction capability which may continuously collect and synthesize overwhelming amounts of control and measurement data from the grid sensors. The ANN featured AIFS design functionalities considers the phase offset estimation and error synchronization metrics. Moreover, the novel AIFS scheme is also considered the RF embedded functionalities for the time stamps from the mobile network. The design of the AIFS scheme is illustrated in Fig. 4. The AIFS scheme is maintained the following steps:

1. A synchronized *sync_beacon* is transmitted to all of PMUs by the MeNB.
2. All PMUs of i^{th} receives the Sync request and save the influx time $T_{n,i}^{PMU}$. After that it will send the Ack to the corresponding PDCs.
3. Then correct clock reference will be sent by the Synchronized MeNB.
4. The synchronized MeNB will provide latest sync information to swap and compare its clock in order to find out the phase offset errors.
5. The i^{th} PMUs will exchanging each message and updates the *sync_time* and then send an acknowledgment to the PDC

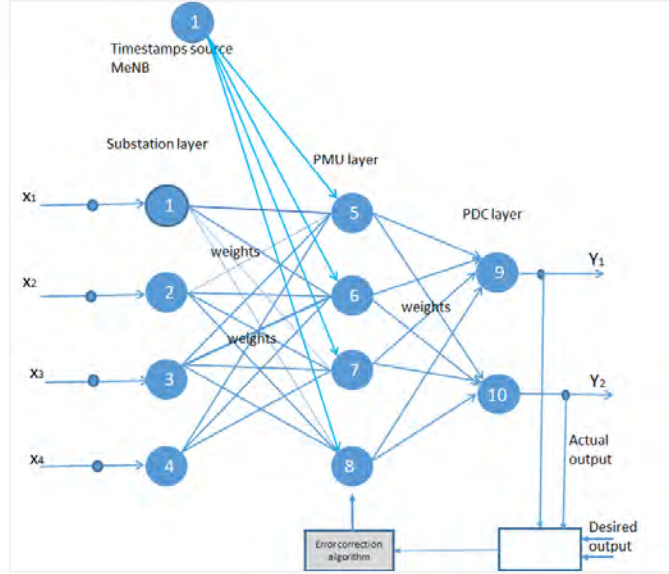


Fig. 4. ANN training system for grid synchronization

To achieve the target synchronization, the performance metric is identified as phase clock offset. The total timing estimation for phase offset errors is represented in the following Equations.

$$T_{A \rightarrow i}^{Sync} = \Phi_{A \rightarrow i}^{frequency_error} \left\{ T_1^{PMU_{A \rightarrow i}} + \frac{\alpha}{2} + \frac{\rho_{prop_uplink}^{PMU_{A \rightarrow i}} - \rho_{prop_uplink}^{PMU_{A \rightarrow i}}}{2} \right\} + \hat{T}_{offset}^{PMU_{A \rightarrow i}} + \frac{\bar{D}_i^{delay} - \bar{D}_i^{delay}}{2} \quad (1)$$

$$\bar{D}_{A \rightarrow i}^{delay} = [(\bar{\rho}_{prop}^{PMU_{A \rightarrow i}} - \mathcal{D}_{rec,i}^{PMU_{A \rightarrow B}}) + (\mathcal{D}_{rec,i}^{PMU_{A \rightarrow i}} - \mathcal{D}_{rec,i}^{PMU_{B \rightarrow C}}) + (\mathcal{D}_{rec,i}^{PMU_{A \rightarrow i}} - \mathcal{D}_{rec,i}^{PMU_{i \rightarrow A}})] \quad (2)$$

$$\rho_{prop}^{PMU_{A \rightarrow i}} = \frac{\rho_{prop_uplink}^{PMU_{A \rightarrow i}} - \rho_{prop_uplink}^{PMU_{A \rightarrow i}}}{2} \quad (3)$$

$$\hat{T}_{actual_offset}^{PMU_{A \rightarrow i}} \cong \frac{1}{M} \sum_{i=1}^M \hat{T}_{actual_offset}^{PMU_{A \rightarrow i}} \quad (4)$$

So the Eqn. (4) representing the estimated total phase offset, therefore finding the real-time error ($e_{offset}^{PMU_{A \rightarrow i}}$) that is occurring due to imprecise synchronization is presented in Eqn. (5).

$$e_{offset}^{PMU_{A \rightarrow i}} = \gamma_{desired_offset}^{PMU_{A \rightarrow i}} - \hat{T}_{actual_offset}^{PMU_{A \rightarrow i}} \quad (5)$$

where The frequency error is stated by $\Phi_{A \rightarrow i}^{frequency_error}$, the outdoor attenuation for propagation delay ($\rho_{prop}^{PMU_{A \rightarrow i}}$) for uplink and downlink communication in between PMUs and master timestamp source i.e. MeNB, and the delay metamorphosis ($\bar{D}_{A \rightarrow i}^{delay}$) can be form seeing that a Gaussian distributed random variation.

3. Simulation Configuration and Result Discussion

To accomplish the aim synchronization, the performance metric is well-known as clock offset which is also known as a phase. Software timestamps are considered [11] as the global bias source which is carried out in the computer-based Monte Carlo simulation. Table 1 [2-6], [10-11] illustrates the simulation parameters. For HetNet, the phase correction is done and it is found that its result is better than the required timing.

Table 1. Simulation parameters

Parameters		Data
Number of PMU		20
Initial Phasor angle		0°
Delay variation (σ) for delay		20 μ s, 40 μ s
Number of progressions		15
Number of samples		1024
Carrier bandwidth		10MHz
Payload size		118 Bytes
Slave clock offset		50 s
Payload size		118 Bytes
Bias source clock transmit speed		1 Mbps
Slave clock transmit speed		11 to 20 Mbps
Communication link speed	Low speed	10ms
	Medium speed	100ms
	High speed	1ms

The connection speed, deviations of zero mean σ^2 delay difference variation and number of synchronization processes are the measured performance metrics in this case. Fig. 5 and Fig. 6 represents that the enforced offset impacts depends on the changing connection velocity while receive delay difference are 20 μ s, and 40 μ s. Fig. 5 demonstrated the average phase offsets at the receive delay difference are 20 μ s, and 20 numbers of PMUs while the reference time stamps are used MeNB in AIFS scheme. Likewise, Fig. 6 depicted the performance measurement for 20 PMUs at 40 μ s delay deviations. Complying all parameters for AIFS scheme, IEEE C37.118, and IEEE 1588 is compared and it can be seen that, the AIFS is outperform in compare with IEEE C37.118, and IEEE 1588.

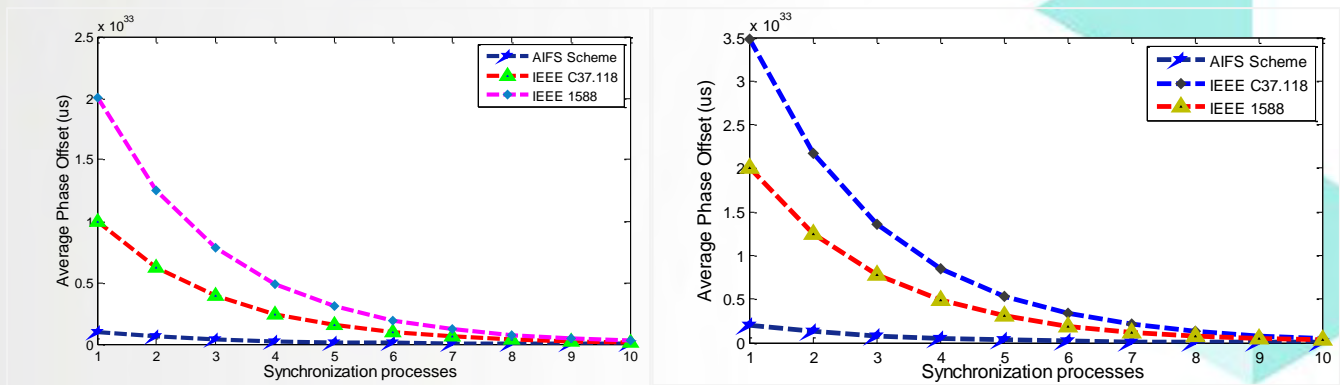


Fig.5. Average Phase Offset estimation while standard delay deviation is 20 μ s (Left). Average Phase Offset estimation while standard delay deviation is 40 μ s (Right).

Specifically, the offset error for the AIFS schemes of 20 numbers of PMUs is less than 0.5 μ s which satisfy the grid minimum phase offset tolerance. In addition to that, the offset error in few synchronization processes can be reduced by proposed AIFS scheme. Therefore, from the outcome, it is implied that the AIFS scheme is far accurate than the popular IEEE C37.112, and IEEE 1588. Furthermore, the bias errors beyond 10 synchronization processes are generally larger for IEEE 1588 and IEEE C37.118 in the case when the GPS timestamps are inaccurate or when GPS is not available. As a result of these delays effects the phase offsets which may not be allowed for several smart grid applications.

4. Conclusions

The enactment of the smart grid communication system is effected on Wide Area Measurement System by the unexpected phase offsets. The larger the phase offsets more the negative effects that hamper the measurement of the real-time pre-fault situation and exigence occurrence in the smart grid applications. Therefore, phase offset synchronization in PMU based WAMs smart grid applications have become popular research area to researchers as well as industry. This paper assesses the synchronization communication architecture along with IEEE 1588, and IEEE C37.118 for the smart grid synchronization. The study suggests that IEEE 1588 is still one of the most reliable synchronization technique for internet and mobile communication applications. The IEEE C37.118 is also promising communication protocol for PMU based WAM applications in a smart grid-enabled technology. However, the performance of IEEE C 37.118 is still questionable in the absence of GPS, which may increase the phase offsets errors. Likewise, for the depended media there is a big chance to enforce various delays intended for transmitting and receiving routes, as a result, asymmetry has been created, and this asymmetry cannot be predicted in pairwise synchronization processes. Thereby in the proposed scheme is considered as a prior issue. However, the proposed AIFS scheme which is mainly imposed learning based artificial intelligence for the PMUs in smart grid applications. The proposed AIFS scheme also employs novel concepts of mobile communications backbone for the reference timestamps along with artificial intelligence which is extremely able to achieve the precise timings for the smart grid applications. The simulation results demonstrate the effectiveness of this novel AIFS scheme and present some important features such as the properties that the synchronization errors do not increase when the number of PMUs also increase in a WAM applications.

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GETTING MATURED AFTER 25 YEARS WITH UNIMAS

By: Associate Professor Dr Mohammad Ibrahim Safawi Bin Mohammad Zain

One day my Head of Department, Dr Mohamad Raduan, requested me to write an article for Feng Research Bulletin. I wondered for a while what can I write about, neither am I a prolific writer nor a well-known personality. Since the boss is always right I negotiated with him that I will write about my 25 years of service in UNIMAS and got his approval. So here it goes...

In the beginning (or in the beningging)

I got married in June 1994 while UNIMAS was formed in Dec 1993. My wife and I were working in a local consultant office and life was hectic due to urgent deadlines. Before our marriage in June 1994 we agreed that she should apply UNIMAS while I remain in the private sector. Unfortunately, the plan had to change because my wife had to pursue her master degree overseas. Being newly-wed I did not fancy life away from one another so I joined UNIMAS just to be with her. So I started life in UNIMAS on 1st November 1994 and started teaching the first cohort of students consisting of 7 male and 3 female students. At that time, the faculty members were Assoc Prof Dr Khairuddin Ab Hamid (the Dean), Assoc Prof Dr Bujang Kim Huat (Deputy Dean), En Ahmad Kamal, Puan Azida (my wife) and myself. The first assignment was to design the curriculum for Civil Engineering Programme. Ironically, the same curriculum devised in 1994 still have relevance to the one we use today.

The visionary Tok Wi

We fondly called our founding VC by the generic name Tok Wi. That breaks down all formality when we are around him in the same manner Sarawakians used to call our previous CM as Tok Nan. When Tok Wi established the university he promoted a curriculum that is supposed to produce employable graduates. He embedded generic courses like *Ketrampilan Diri*, *Pengurusan Masa*, *Sistem Nilai*, *Senggang* and many others. It was something new at that time and not easy to implement. Based on my observation and little experience, visionary ideas are either not easily understood or often difficult to implement. I took a lesson in this and kept it to myself. Several years later my opportunity came. I was assigned to work under the Chancellery in August 2008. I took it upon myself to translate and operationalize whatever the VC's vision is. I put in a lot of hard work to ensure the VC's vision was translated and cascaded to the rank and file. It demanded perseverance, patience and focus if one were to be successful in doing that. I learnt that a leader needs a good team to work together with.

Starting a career

Frankly I never thought what a career as a lecturer would be like. In the early years of UNIMAS we used to be reminded of three different responsibilities of a lecturer, viz teaching, research and consultancy. The first responsibility was easily understood but the other two were a bit challenging. Also, one had to take up administrative position when appointed as part of contribution to university. In the early years, I prepared notes, taught students and ensured the positive development of students. The research responsibility was a bit difficult to grasp. The senior lecturers seemed to be doing well with research grants and postgraduates while young ones like us were still wondering how to start research. When I was Programme Coordinator (1998) I invited Prof Law, Prof Putuhena, Prof Zoynul, Assoc Prof Dr Kolay and few others to share whether one should first focus on having a research grant or postgraduate students. It was not an easy equation but several years later I realized it is a chicken and egg

question. Both are important to start with. I cannot forget during those early years, our Deputy VC Research Prof Charlie, would support young lecturers like us with a RM20,000 research grant. Nonetheless, I started to

do research on something and anything. The third responsibility, the consultancy work, is something that I preferred to avoid if possible unless if I were to do it alone. Those days we got good contracts doing training. There is always the money matter that had to be divided properly amongst us and yet people tend to be biased.

Area of specialization

After doing my master degrees I never knew what my area of specialization should be. Actually fate decided that for me. Before I proceed further I like to express my sincere appreciation to Prof Zoynul Abideen, a contract lecturer, for his presence in my life. I was teaching Civil Engineering Materials then. In 1999 there was an offer to do intensive training in concrete for six months in Japan. Assoc Prof Dr Bujang, our Dean at that time, wanted to send Mr Sim for the course. Prof Zoynul rationalized with him that I should be the one instead because I was teaching materials. From that six-months stint in Japan, my specialty in concrete commenced. After the training, I pursued my Phd in concrete at Tohoku University. After completing PhD, my research work is also in concrete and that continued for the next thirteen years. I became a Concrete Man till today. At point of writing this article, the Malaysian Concrete Canoe Competition 2017 organized by American Concrete Institute Malaysia Chapter had just concluded yesterday. The event was at UM lake. UNIMAS sent a team to compete and I was with them as the team advisor. Our concrete canoe team won second place after UM and brought home a trophy and RM 10,000. Kudos to the UNIMAS WAKA team!!!!

Construction on soft soil

In 2006 the faculty was still developing its talent and not many Phd holders are around. Most lecturers were on study leave. I was a bit matured then to understand that research cannot be done alone. I invited Assoc Prof Dr Kolay, Dr Linda, Ahmad Kamal and Azida to form a research group called Construction on Soft Soil (COSS). It was to find solution to construction problem in peat. At that time, I was the Deputy Dean. COSS engaged JKR Sarawak, Jabatan Minerals and private consultants during its early formative years. Our first grant was from MOSTI eScience research grant. We were amongst the 3 successful proposals throughout UNIMAS to be awarded that new grant. Things went very well for COSS with more grants from Assoc Prof Dr Kolay and Dr Linda. We started to enrol postgraduates. However, in 2008 I was transferred out of the Faculty to take up administrative position in Chancellery. Our meetings became less and less. Nonetheless, a decade later our team propose a pilot project to use foam concrete on peat. One of the reasons we managed to achieve this is because we stayed together, respected one another and remained enthusiastic on the topic.



Administrative role

This is one topic I can write about for pages but I will try to be brief and concise. There is one person I must thank for identifying and developing my skills in doing admin job and he is Datuk K. He appointed me as Penyelaras Kursus Generik Fakulti (1994), Penyelaras Program (1998), Ketua Jabatan Sivil (2004), Timbalan Dekan (2005) and Ketua Bahagian Jaminan Kualiti (2008). I realized that he is developing my skills and perseverance in becoming a university administrator. I took all appointments with seriousness and integrity. My drive is to ensure UNIMAS is above our peers, if not equivalent. I practice change leadership and not merely managing. It was tough for me balancing between admin and research publications. I was holding admin position for the last 14 consecutive years and I kept to patience. To me admin post is a trust (*amanah*) from Allah SWT and longed for the day to return as an ordinary lecturer.

Academic expertise

At certain years of my career I questioned myself what it takes to make UNIMAS or any university an asset to the stakeholders particularly, the government. No doubt we produce graduate year after year and enrol new ones at the same time. We do have beautiful campus with aesthetic buildings, large spaces for labs and studios, scenic man-made lake with an over-arching bridge and many other physical facilities. The number of staff increases steadily by the year. What is it that matter most to a university like UNIMAS? The answer to my question is in having academic members who are experts in curriculum development. Our curriculum must be innovative, updated and contemporary in content, proven to produce graduates demanded by the industries. I find curriculum, delivery methods and assessment constitute a pivotal element in a university. Our programme can be above our peers through innovations in teaching-learning, blending with industries, real project exposures and many more. All lecturers must learn and become experts in designing the curriculum and ensure their academic program is the best amongst their peers. The minimum is for us to understand the philosophy of *Majlis Pendidikan Tinggi Negara* (MPTN). This element of expertise is called academic autonomy. All academic members must be involved in the process of curriculum development and avail themselves to learn the philosophy and concept of a good curriculum. We may not have an education background but as lecturers we can build the expertise. As the saying goes *tepek dada tanya selera*. This is a lifelong learning demand on us and the onus is on lecturers to be willing to learn.

Research and commercialization

I believe if one is true to his work as a researcher, busy conducting researches, seeking grants and enrolling postgraduates then one should achieve a certain achievement or recognition within ten years. I started my research in foam concrete almost 8 years ago. Other than winning a silver medal in SIF Seoul, an industry partner had agreed to sign a technology licensing to commercialize the research product. UNIMAS signed a technology licensing agreement with a local ready mix plant last year. We started to commercialize the research product this year. Currently, we have 3 projects at different locations to apply this technology for the construction industry. When I started my research works little did I know where the research will bring me. I guessed hard work, perseverance and staying focus does have its reward. I did not diversify too much from foam concrete. I do not want to be Jack of all trades, Master of nothing. My advice to everyone is that once you finished your PhD, do not delay in doing research lest you got trapped into a complacency zone. My late father used to say hit when the iron is hot. As I have shared in the earlier paragraph, you

should start forming a research team and you will not regret in future.

Quality and strategy

This is one of my favourite topics and fits my natural-self. I have this personality as someone who stays focus in what I do and question status quo. Soon after I came back from my PhD in March 2003 it was time to prepare for the accreditation of our programme. We should be ready for EAC visit in 2008. I can still recall in one of our senate meetings, I was representing the Dean, the then VC Datuk Rashid was stressing on a successful accreditation in 2008. I gave him my commitments that the faculty will do well. All of us worked hard and prepared well. In 2008 the UNIMAS engineering programmes got a 5-year accreditation while some other universities got less than that. Right after the successful accreditation, I was assigned as Head of Quality Assurance Division. I had many sweet memories with respect to the quality agenda. Amongst them were expanding the scope of MS ISO 9001, gaining the MS ISO/IEC accreditation, UNIMAS leading MyMoheS ratings and cascading the LOKI from the Ministry of Higher Education to the faculties. Under this agenda I broadened up my network with MAMPU, MPC, MQA, Chief Minister Department, state agencies, NGOs and few others. I have been Panel Penilai for Anugerah Kualiti Ketua Menteri Sarawak every year since 2009 till today. In 2016 I was appointed as MQA Auditor to re-assure the Self-Accreditating Status of UM, UPM, Monash University and Swinburne University of Technology Sarawak. My best surprise was the recognition as a Productivity Champion (one out of 11 recipients in Sarawak) by MPC Putrajaya in 2016.

On the strategy agenda, I designed the UNIMAS Balanced Scorecard (BSC) strategy tool between 2009-2013 with annual faculty report book being produced for 3 consecutive years. I can never forget the day when Hjh Ratifah (Ketua Pegawai Teknologi Maklumat), Pn Latifah and few others from CICTS came to my office and proposed additional budget to appoint BSC consultant for the business intelligence application. The estimated cost demanded was an additional RM300,000. I convinced them that my team in QAD (Dr Siti Halipah and I) will take up the challenge and learn about BSC. The experience was unforgettable, very difficult and full of sacrifices but Dr Siti and I kept our words. We finished the project with sweet success. It was a worthy experience to install a business intelligence application system (PerforMS) as a KPI measurement system. Other than *Pelan Strategik UNIMAS 2015* (the blue book) I was fortunate to produce a number of other blueprints including the Malaysian Citation Center blueprints (2012), the Review of *Pelan Strategik Pengajian Tinggi Malaysia* (2014), the *Pelan Strategik Amanah Khairat Yayasan Budaya Melayu Sarawak* (2015) and *Pelan Strategik Bahagian Samarahan 2016-2026* (2016). It gave me a pleasure to share all these happenings. All the above had changed me into a new person with a new set of skill.

Opening a window of opportunity

Despite the many successes and challenges in my career at UNIMAS I am always eager to do more. The window of opportunity came when I was appointed the Assistant Vice Chancellor (Industry and Community Engagements) and thanks to our present VC Prof Datuk Dr Mohamad Kadim. This job gave me a great opportunity to canvass the many expertise in UNIMAS and contribute toward industry and community projects. It was about translational research and challenging the researchers to apply their in-depth knowledge to bring innovations to the industry and community. As AVC, my challenge was to solicit budget for the projects from external stakeholders and indeed there were plenty of money around. Again my network increased

tremendously. I realized that the world outside UNIMAS is much bigger and there are plenty of things to do. My heart yearns for new challenges in life. I like to do more for the people and contribute my skills for their well-being. Money has never been pivotal in my decision making. I owe it to the taxpayers for funding my education and developing my skills into what I am today. I like to think that it is payback time.

Closing remarks

I hasten to say that what I have experienced in my 25 years in UNIMAS is not the best of examples. There are many more

other staff with notable achievements. This article is merely my reflection of the 25 years of life in UNIMAS and how it has changed me. My intention is to share how I matured and developed myself into a new person compared to 25 years ago. Hopefully readers will find it enlightening and give them some ideas where, when, how to start their career as an academician. If there is any word or sentence deemed harsh or offensive in this writings, please forgive me. It is never my intention to hurt anyone. Last but not least, I wish UNIMAS happy 25 year's birthday!!!!...or in my mum's *kampong* english "Appy Berstday"

30 Years of Research Work in Materials (1987-2017)

By: Professor Dr Sinin Hamdan

The first research work (MSc in 1986) was on the surface treatment and adhesive bonding of polyetheretherketone. This work involves a range of surface treatments including degreasing, abrasion, chromate etching, plasma ashing and nitric-sulfuric acid etching applied to unreinforced and 20 vol. % glass fiber reinforced polyetheretherketone. Single lap shear adhesive joints were prepared using a nylon-fabric-supported epoxy resin film adhesive. Plasma ashing produced adhesive joint strengths of 13 MPa in lap shear and correlated with substantial cohesive failure within the adhesive resin. Adhesion to the abraded surface was very low but it was significantly improved by grit blasting and by chromate etching. The PhD work started in 1990 was on the strain-rate & temperature dependence of the mechanical properties of polyetherketone and polyetheretherketone. The mechanical properties of polyetheretherketone and polyetherketone were studied as a function of strain rate and temperature in the ranges 10^{-3} to $10^3 s^{-1}$ and 20-200°C. At temperatures below the glass transition temperature, T_g , the strain-rate sensitivity of both polymers was found to be almost independent of temperature with a value of ~4 MPa per decade of strain rate and the behavior was well described by an Eyring relationship leading to an activation volume of ~1nm³. Above T_g , X-ray and differential scanning calorimetry studies show that cold-crystallization phenomena plays a very important part in the polymer behavior, leading to an increase of yield stress with increasing temperature. The crystallization was found to be highly strain-rate dependent with no increase in crystalline content occurring in quasi-static tests and increases of up to 20% in higher rate tests. Much of the data have been gathered using novel test equipment.

In 1999 the post doctoral work in Kyoto University Wood Research Institute was on the softening characteristics of wet wood. In order to examine the possible influences of temperature on the wood constituents, two groups of wood species namely softwood (needle leaf wood) and hardwood (broad leaf wood) were subjected to heat or steam treatment during large radial compression between 0°C and 200°C. Two well-defined softening regions are observed. Both species showed the glass transition T_g of lignin at ~90°C and ~60°C for softwood and hardwood respectively and a second transition region at ~160°C. The softening behavior between the first and second transition in softwood is in contrast with the softening behavior of hardwood. This difference reflects the difference in the distribution of the relaxation process due to lignin, which suggests the difference in chemical structure of lignin between softwood and hardwood. The fitting parameters were done for softening of wet wood under quasi static loading. After postdoctoral research the following works were done by the final year student projects. The first one was on compatibility studies of polypropylene-sago starch, the effect of storage time on the curing process of sheet molding compound, Dynamic Mechanical Thermal Analysis (DMTA) of

Thermoplastic Rubber (TPNR) Barium Ferrite ($BaFe_{12}O_{19}$) composites, thermal analysis of natural rubber *Hevea brasiliensis* latex, acoustic properties of four types of Malaysian wood, experimental determination of sound absorption coefficients of four types of Malaysian wood, the influence of porosity to the accuracy of ultrasonic pulse velocity method, marimba instrument construction from *Kayu Malam* wood (*Diospyros maingayi*), and investigation of the acoustic properties of chemically impregnated *Kayu Malam* wood used for musical instrument (figure 1 and Figure 2).

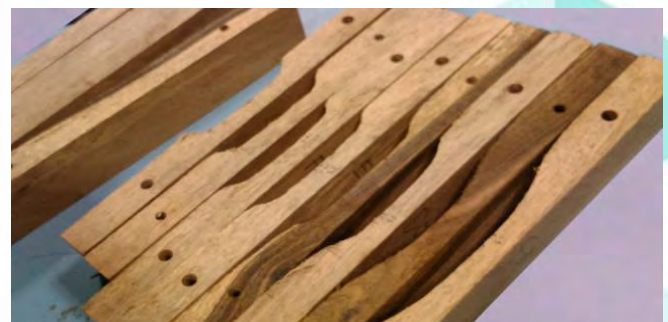


Fig 1. Kayu malam after rasping process (Hamdan et al. 2017)

The works based on masters project are as follows: studies of monomer impregnation and polymerised in situ in wood using Dynamic Mechanical Thermal Analyser, acoustic properties of selected tropical wood species, comparative study of dielectric properties of chicken feather/*kenaf* fiber reinforced unsaturated polyester composites, synthesis of cotton from Tossa jute fiber and comparison with original cotton, the effects of binder on the physical and mechanical properties of chemically treated sawdust-reinforced polypropylene composites. The following PhD student works are: 4-methylcatechol-treated jute-bamboo hybrid composites (effects of pH on thermo-mechanical and morphological properties), study of sound absorption coefficients and characterization of rice straw stem fibers reinforced polypropylene composites, water absorption and thickness swelling behavior of sago particles urea formaldehyde particle board, reinforced oil palm fiber epoxy composites (an investigation on chemical treatment of fibers on acoustical, morphological, mechanical and spectral properties).

The latest work is on the mechanical and anatomical properties of woods which are important for the sound quality of musical instruments. Depending on the role of the wooden elements, these properties may differ. Xylophone sounds are produced by striking wooden bars with a mallet, and thus the mechanical properties of the wood are important. This study

is the first step towards understanding what makes the sound of an impacted wooden bar attractive for xylophone makers from a musical point of view. For this purpose, we record sounds from a wide variety of wood species to compare their sound quality and relate it to the wood properties. An original methodology is proposed that associates analysis-synthesis processes and perceptual classification analysis. The choice by xylophone maker community agrees that this is driven by the sound quality, but other non-acoustically relevant properties are considered as well e.g., robustness; esthetic aspects. The wood species most used in xylophone manufacturing is *Dalbergia* sp. Several authors have sought to determine which physical characteristics are of importance for the generated sound. In particular, Holz (1996) concluded that an ideal xylophone wood bar is characterized by a specific value range of density, Young's modulus, and damping factors.



Fig 2. Completed marimba from kayu malam wood (Hamdan et al. 2017)

Ono and Norimoto (1983) demonstrated that samples of spruce wood (*Picea excelsa*, *P. glehnii*, *P. sitchensis*) considered suitable material for soundboards had a high sound velocity and low longitudinal damping coefficient as compared to other softwoods. The cell-wall structure may account for this phenomenon. Internal friction and the longitudinal modulus of elasticity are markedly affected by the microfibril angle in the S2 tracheid cell layer, but this general trend does not apply to all species. For instance, pernambuco (*Guilandina echinata* Spreng), traditionally used for making violin bows, has an exceptionally low damping coefficient relative to other hardwoods and softwoods with the same specific modulus. This feature has been explained by the abundance of extractives in this species. Obataya et al. (1999) confirmed the importance of extractives for the rigidity and damping qualities of reed materials. Matsunaga et al. (1999) reduced the damping coefficient of spruce wood by impregnating samples with extractives of pernambuco (*Guilandina echinata* Spreng). The high sound quality conditions are met by the wood species commonly used by xylophone makers (like *Dalbergia* sp.), but other tropical woods may serve.

We propose to focus on the perceptual properties of impacted wood bars as the basis for pointing out woods suitable for xylophone manufacturing. Several studies using natural or synthetic sounds have been conducted to point out auditory clues associated with geometry and material properties of vibrating objects. These studies will reveal the existence of perceptual clues allowing the source of the impact sound to be identified merely by listening. In particular, the perception of material correlated mainly with the internal friction (related to the damping factors of the spectral components) as theoretically shown by Wildes and Richards (1988). Nevertheless, it has not been determined whether the perceptual clues highlighted in the distinction of different materials are those used to establish the subjective classification of different species of wood.

The perceptual differences reported in the literature are linked with subtle changes in timbre, defined as the perceptual attribute that distinguishes two tones of equal, pitch, loudness,

and duration (ANSI, 1973). This definition points out the importance of comparing sounds with similar loudness, duration, and pitch. Concerning loudness and duration, the sounds of interest can easily be adjusted in intensity by listening, and they have about the same duration since they correspond to the very narrow category of impacted wooden bars. Concerning pitch, the bars do not have the same values because the pitch depends on the physical characteristics of the wood, i.e., essentially of the Young's modulus and the mass density. To tune the sounds to the same pitch, we propose to digitally process the sounds recorded on bars of equal length. Synthesis models can be used for this purpose, allowing virtual tuning by altering the synthesis parameters. Such an approach combining sound synthesis and perceptual analysis has already been proposed. Most of the proposed models are based on the physics of vibrating structures, leading to a modal approach of the synthesis process or to a numerical method of computation. Yet, although these models lead to realistic sounds, they do not easily allow for an analysis synthesis process implicating the generation of a synthetic sound perceptually similar to an original one. To overcome this drawback, we propose an additive synthesis model based on the physics of vibrating bars, the parameters of which can be estimated from the analysis of natural sounds.

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Topographical Feedforward Neural Network (T-FFNN) Technique for Wind Speed Prediction and Energy Mapping in Sarawak

S. M. Lawan¹ and W. A. W. Z. Abidin¹

¹Department of Electrical and Electronic Engineering, Universiti Malaysia Sarawak, MALAYSIA

E-mail: malsalisu@unimas.my, wzaazlan@unimas.my

ABSTRACT

This study presents the potential of harvesting wind energy in Sarawak, Malaysia based on the ground station and prediction models. A topographical feedforward neural network (T-FFNN) is proposed as an alternative to predict the wind speed in the areas where wind speed measurements are not done. The model has nine meteorological, geographical and topographical parameters as inputs while monthly winds speed as an output variable. The suitability of the model was assessed based on the mean absolute percentage error (MAPE). The most effective network design with lowest MAPE of 3.4% and correlation R between the predicted and the ground station wind speed of 0.91 was obtained. The study shows the characteristics of wind speed at 10-40 m heights. For the wind speed distribution, in addition to the widely applied Weibull and Rayleigh models, Gamma, Erlang and Lognormal are included. It was found that Gamma and Weibull outperform the others based on the three goodness-of-fit (GOF). An assessment of wind energy potential was performed using the measured and predicted wind speed data. The outcomes show that wind power density falls within class 1 (P_{D100} W/m²). Final results from micro-sitting investigating the performance of annual energy output (AEO) in the examined area are presented. The results indicate that the AEO differs with altitudes. In all the examined areas, the AEO values varied from about 5,800-13,622 kWh/year. These results show the possibility of using wind energy for small-scale purpose.

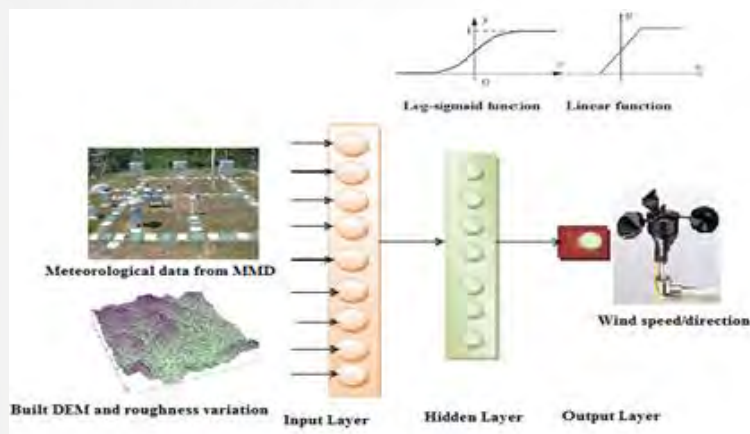


Figure 1. Data Generation Modeling.

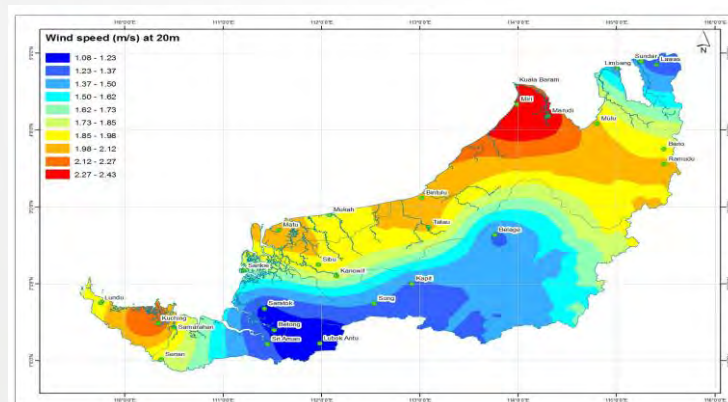


Figure 2. Developed Wind Atlas Map of Sarawak

Keywords: Neural network, Renewable energy, Sarawak, Wind energy.

Acknowledgment: The authors would like to express appreciation for the support of the Universiti Malaysia Sarawak (UNIMAS) who funded the data used in this research work.

Fuzzy FMEA Risk Assessment of Hydraulic Flushing in Managing Sedimentation in Open Storm Drain

C.H.J. Bong^{*1}, K.M. Tay², C.K. Ng³ and F.Y. Teo⁴

^{1,3} Department of Civil Engineering, Faculty of Engineering, Universiti Malaysia Sarawak, MALAYSIA.

E-mail: bhjcharles@unimas.my, ckng@unimas.my

² Department of Electrical and Electronic Engineering, Universiti Malaysia Sarawak, MALAYSIA.

E-mail: kmtay@unimas.my

⁴ Faculty of Engineering, University of Nottingham (Malaysia Campus), MALAYSIA.

E-mail: FangYenn.Teo@nottingham.edu.my

ABSTRACT

Sedimentation in open storm drain has an adverse effect to the drainage system such as flash flooding due to blockage and environmental pollution. Currently there is no proper guidelines and management plan for sedimentation control once it enters the watercourse, hence the risk associated with the occurrence and control needs to be established. This is in line with the focus area in the 11th Malaysia Plan of strengthening disaster risk management and improving flood mitigation. Thus, this study aims to address the fundamental problem associated with sedimentation management in open storm drain via active control through hydraulic flushing. The current study has the objectives of determining the hydraulic characteristics and factors that may affect sediment removal efficiency of hydraulic flushing; to gather expert's opinion on the potential failure mode of hydraulic flushing; to apply Fuzzy Failure Mode and Effect Analysis (FMEA) to obtain Risk Priority Number (RPN) for risk assessment of hydraulic flushing; to establish general guidelines and management plan for active sediment control in open storm drain as well as implement, review and adjust the plan. This study involves laboratory and on-site observation of the flush characteristics and potential failure mode; development of scale tables for severity (S), occurrence (O) and detection (D) as well as Risk Priority Number (RPN); seeking expert opinion through questionnaire; generation of surface plot for RPN using Matlab software and develop general recommendations and guidelines as well as to implement and adjust the recommendations and guidelines if necessary. The expected outcomes will be the identification of the components that are the more likely failure mode with severe consequences toward sedimentation control and management in open storm drain. The findings from the current study can provide a better management of sedimentation problem in open storm drain and reduce the cost for manual cleaning as practice now.

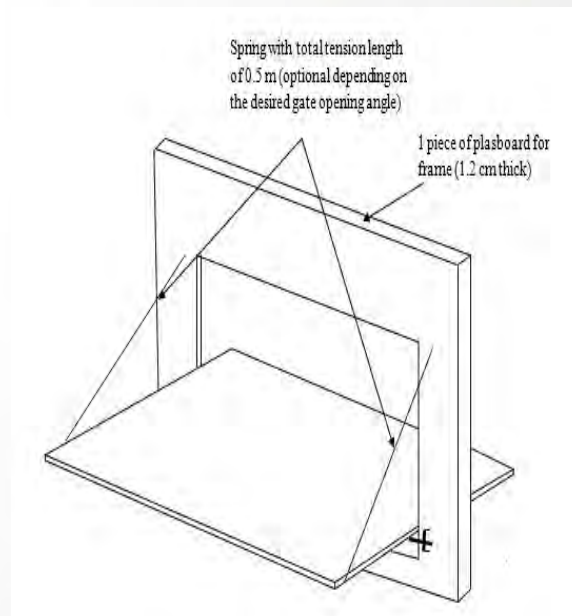


Fig 1. Hydraulic Flush Gate

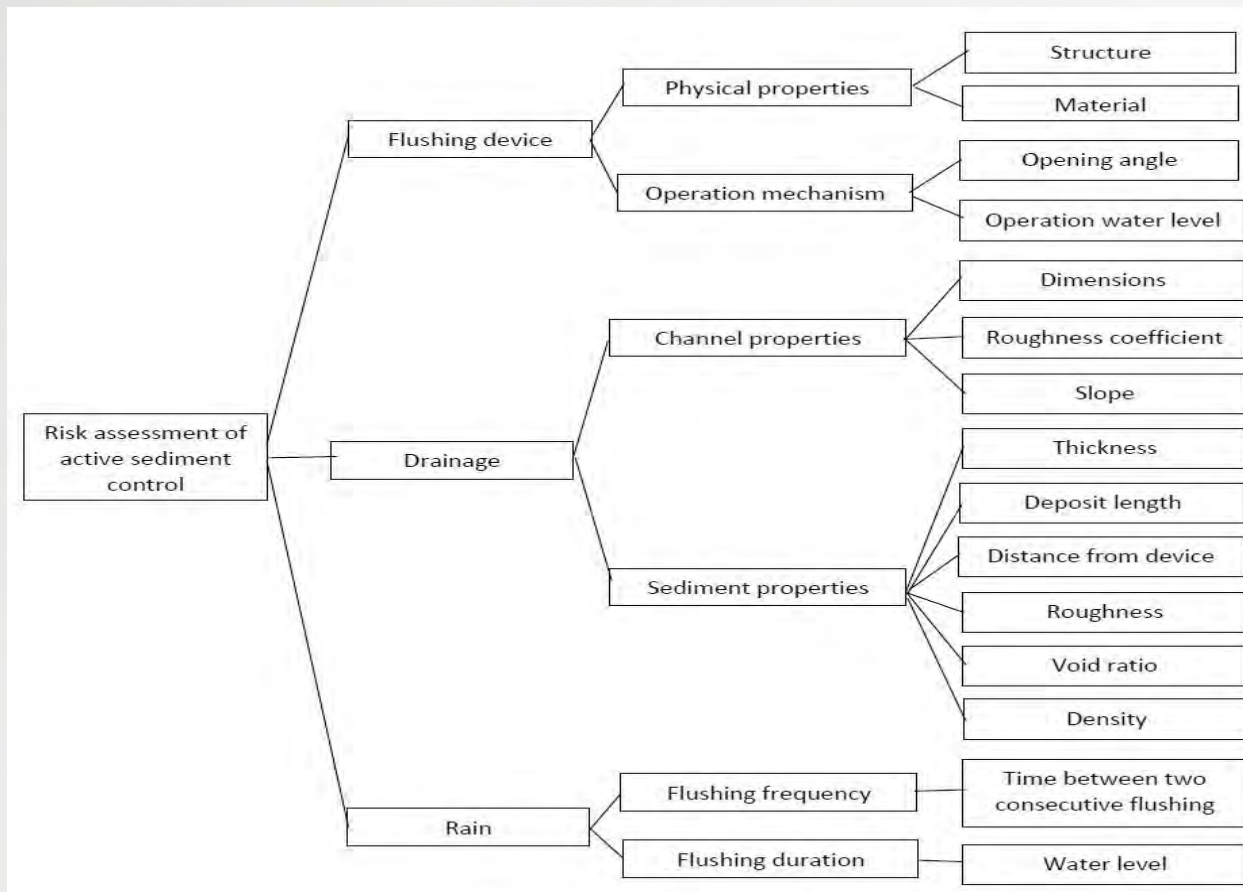


Fig 2. Components for Risk Assessment of Active Sedimentation Control

Keywords: Hydraulic Flushing, Risk Assessment, Sedimentation

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Investigation of Three-dimensional (3D) Precision Laser Cutting of Non-metals using Modified Computer DVD Writer Drives

K. F. Tamrin^{*1}, A. A. Khan², A. S. Ahmed³, S. Mohamaddan⁴, N. Yusoff⁵ and S. Salit⁶

^{1, 2, 3, 4} Department of Mechanical and Manufacturing Engineering, Universiti Malaysia Sarawak, MALAYSIA.

E-mail: tkfkr@unimas.my, akamir@unimas.my, aasaleh@unimas.my, mshahrol@unimas.my

⁵ Department of Mechanical Engineering, Universiti Malaya, MALAYSIA.

E-mail: nukman@um.edu.my

⁶ Department of Mechanical and Manufacturing Engineering, Universiti Putra Malaysia, MALAYSIA.

E-mail: sapan@upm.edu.my

ABSTRACT

Laser cutting machine is an indispensable tool for the production of numerous intricate parts and miniature components, and currently being employed in the biomedical, automotive, and aerospace sectors for reasons of precision, flexibility, and accuracy. Nevertheless, the initial investment cost for procuring high-end laser cutting machines is prohibitively expensive and often beyond the budget of many local universities and *small-* and *medium-*sized enterprises (SMEs). Meanwhile, stiff competition in the computer hardware industry coupled with strong demand for the state-of-the-art hardware have resulted in the increasingly growing volume of waste electrical and electronic equipment (WEEE or e-waste). The primary objective of the study is to investigate the applications of discarded DVD writer drives as inexpensive tools for precision laser cutting of various non-metals, with the aims of reducing e-waste and creating job opportunities. Firstly, a decent DVD writer drive will be removed from discarded computers, and the internal laser component will be taken out using a soldering iron. Following this, a custom-made driver will be designed to regulate voltage going to the laser diode. A laser power meter will be used to characterize beam properties. The complete laser system will be mounted on a programmable 5-axis robotic arm. Artificial intelligence and optimization techniques will be employed to evaluate optimum processing parameters while cut characteristics will be examined

using a scanning electron microscope. The study is anticipated to develop an inexpensive laser system capable of performing two-dimensional (2D) and three-dimensional (3D) cutting processes of various non-metal substrates (e.g., screen protectors of smartphones and microfluidic devices). The developed laser system is also foreseen employable for low-power machining processes such as welding/joining, cleaning, surface texturing, etching and engraving, to name but a few.

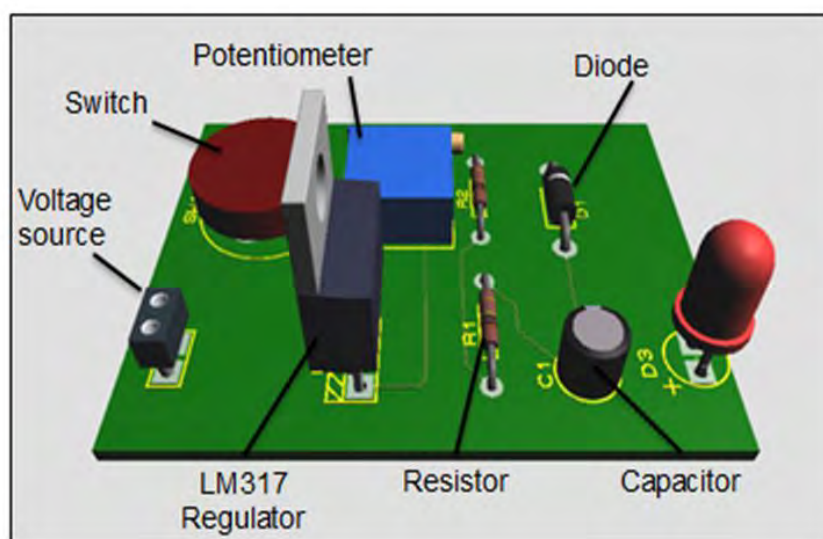


Figure 1. Diagram of Custom-Made Driver for Regulating Voltage Delivered to the Laser Diode.

Keywords: DVD writer, laser cutting, precision, three-dimensional.

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A Novel Multi input DC-DC Power Converter for Integrated Solar PV-Micro Hydro Hybrid Renewable Energy System

Yonis. M.Yonis Buswig*¹, A. K. Othman¹, N. Julai¹, H. Zen¹, and S.Y. Sim²

¹ Department of Electrical and Electronic Engineering, Faculty of Engineering, Universiti Malaysia Sarawak, 94300, Kota Samarahan, Malaysia.

E-mail: byonis@unimas.my, okhalid@unimas.my, jnorhuza@unimas.my, and zhushair@unimas.my

² Department of Electrical Engineering Technology, Faculty of Engineering Technology, Universiti Tun Hussien Onn, 86400 Parit Raja, Batu Pahat, Johor, Malaysia.

E-mail: sysim@uthm.edu.my

ABSTRACT

Hybrid energy systems have a vital role to play if the potential of renewable energy is to be fully exploited. More mature technologies include wind energy and the solar energy (PV) cells, other than the micro-hydro energy systems. Strong industries are already associated with these technologies and government deployment measures in several countries are helping to drive rapid market growth. The main contribution of this research is to improve performance and help to reinforce the role of renewable energy in a sustainable energy system. Areas of focus for this research will be to improve performance, including conversion efficiency, reliability, durability and lifetime. Besides, improved methods for integrating renewable energy into buildings in rural communities will be explored. Suitable integration of several energy sources profoundly depends on the power electronic converters which interface multiple energy sources that having different characteristics. In this research, the proposed multi-input power converter is composed of two voltage resources solar PV and micro-hydro. In the controller design, Pulse Width Modulation technique is used to control the commuting switches while the artificial neural network control algorithm is used to manage and regulate output voltage of the proposed power converter. The artificial neural network controller will be trained by the online back propagation algorithm to achieve output voltage regulation despite variations in line voltage and the load; as well output voltage tracking capability. The proposed power converter system will be investigated through simulation using the MATLAB/Simulink and validated experimentally on a laboratory prototype using Dspace controller board. The objectives to conduct simulation and experiments are to develop the suitable controller; to improve the output voltage regulation and to maintain the output voltage of the hybrid source system. Subsequently, to obtain an integrated renewable energy resources for generating electrical power that is sustainable, environmentally benign and feasible to rural villages in the state of Sarawak.

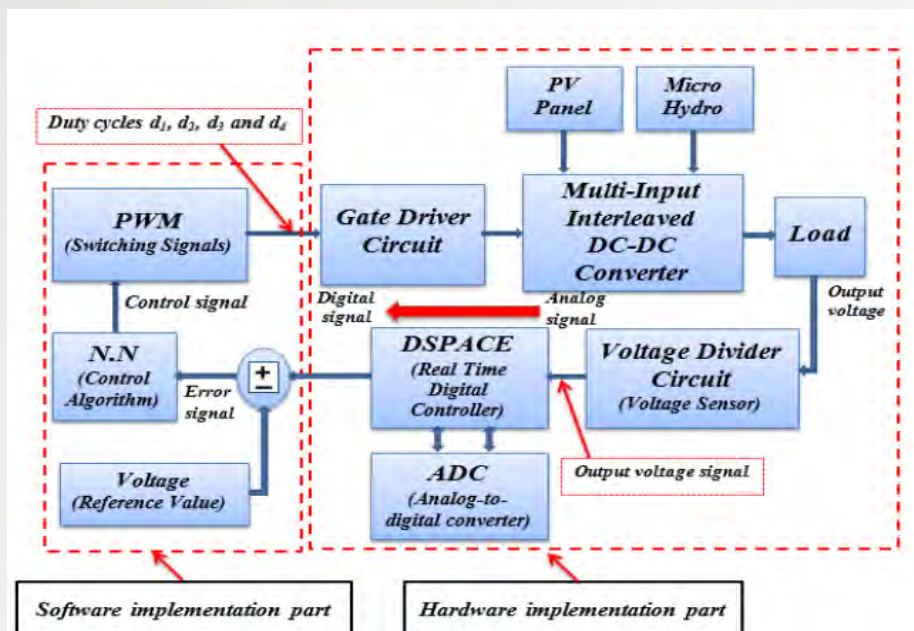


Figure 1. Block Diagram of PV-Micro Hydro Hybrid Renewable Energy system.

Keywords: Multi-Input Power Converter, Solar PV, Micro Hydro, Hybrid renewable energy system, Artificial neural network control.
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Efficient Wireless Communication Framework for Smart Grid Systems

Mohammad Kamrul Hasan· Musse Mohamud Ahmed
 Faculty of Engineering, Universiti Malaysia Sarawak, Kota Samarahan, Malaysia
hmkamrul@unimas.my

ABSTRACT

Smart Grid a leading technology that presents the massive integration of distributed platforms for synchronous generators driven by hydro, thermal and coal and other fossil fuel based systems. This is because of its high demand for timely synchronous and consistency monitoring, measurement, control, and fault analysis. The sophisticated large power system components require efficient techniques and methods to monitor, measure and protect the electrical and mechanical variables to detect and act timely to power swing events and/or contingency leading to an outage in the interconnected system. Therefore, in smart grid, the two-way communication of energy and information of the various components of the smart grid is very crucial in measuring, controlling and monitoring the several intelligent power management applications. The existing PMU is deployed to be communicated to the grid systems to measure, control and the real-time information. However, PMUs are the dependences of GPS external timestamps, and the absence of GPS can imbalance the precision of the grid monitoring system that leads to asynchronous and error occurs in measuring the real-time data. Also, the lack of standard data names prevents auto-discovery and self-description without knowledge of configuration messages, security issues as well. Therefore, the main idea of this concept is to develop a Machine-to-Machine (M2M) communication framework that can maintain a wide range of sensory data, including high rate synchro-phasor data for real-time communication. Moreover, this concept enhanced the appropriateness of the communication protocol by developing its significant features for the smart grid sensory data in accordance with specific traffic features.

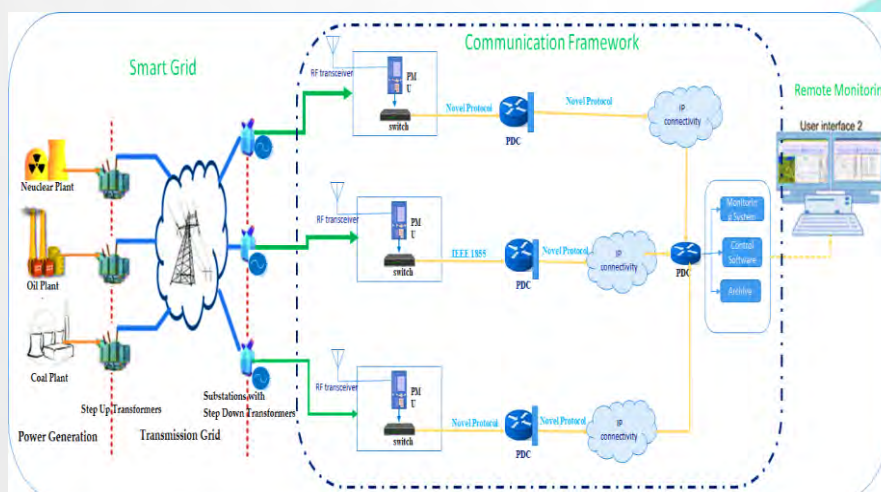


Fig 1. Proposed Communication Framework for Smart Grid Systems

RESEARCH NEWS

Conference and Seminar

UNIMAS STEM Engineering Conference 2017



FENG successfully organised the 10th UNIMAS STEM Engineering Conference (EnCon) 2017 themed “Gearing towards a Greener Future” at Imperial Hotel, Kuching from 13 to 15 September 2017. The 2-day conference attracted speakers from more than 10 countries with 100 papers being presented. Also held in conjunction with EnCon were the pre-conference workshops and the International Science, Technology and Engineering Expo (i-STEEEx) 2017 “Nurturing Green Innovation for the Future” which hosted 42 entries in the school category, opened to all secondary schools. This event was organised with the assistance from Tabung Gagasan Ekonomi Anak Bumiputera Sarawak (TEGAS), JPNS, IEM, MyRIS and Yayasan Sarawak

Ir Dr Ting wins Best Paper Award in Thailand



Ir Dr Ting Sim Nee, a senior lecturer in Project Management, won the best paper award at the 7th International Conference on Studies in Architecture, Civil, Construction and Environmental Engineering (SACCEE-17) held in Phuket, Thailand from 25-26 May 2017. Her paper is entitled “Quantitative Method of Measurement for the Rights and Obligations of Contracting Parties in Standard Forms of Contract in Malaysia: A Case Study”.

FYP Symposium 2017



FENG organised the 4th FYP Symposium 2017 which witnessed more than 300 FYP posters being presented at the Faculty of Engineering. The FYP Symposium is an annual faculty event for showcasing the projects completed by the final year students in 9 months. This event is usually held in May or June and open to public (free admission) and industry.

Research and Development

FENG bags 1 Gold, 1 Silver and 2 Bronze at Malaysian Technology Expo (MTE) 2017



FENG staff won 4 medals and a merit at the Malaysian Technology Expo (MTE) 2017 held at Putra World Trade Centre from 16 to 18 February 2017. They were among the 18 UNIMAS representatives.

Ir Dr David Bong Boon Liang Fingerprint Verification System By Using Bit-Plane Extraction and Phase-Only Correlation Function	Gold
Dr Norazzlina M.Sa'don Strength Characteristics of Stabilized Peat Using Lightweight Materials as Reinforcement Layer for Sub-grade Road Construction	Silver
Dr Lim Soh Fong Production of Water Soluble Lemongrass Essential Oil from Lemongrass Leaves Using A Steam Distillation	Bronze
Pn Nur Alia Athirah Hj Mohtadzar Wrist Module as an Applied Health Monitoring System in Wireless Body	Bronze
Ir Dr Mohd Danial Ibrahim Micro-needle with Modified Inner Structure Integrated with Micropump for Improved Blood Deliveries	Merit

Major haul at InTex 2017



FENG is among the major contingent at InTex 2017, exhibiting 115 products of the total 304. FENG bagged 16 Gold, 30 Silver and 41 Bronze Medals in the Engineering and Technology Category at the InTex 2017 from May 2017.

AP Dr Azhaili and AP Dr Cirilo settle for Silver at ITEK 2017



AP Dr Azhaili Baharun and AP Dr Cirilo Nolasco Hipolito were awarded Silver at ITEK 2017 held at Kuala Lumpur Convention Centre from 11 to 13 May 2017. They were among the 10 UNIMAS representatives.

AP Dr Azhaili Baharun Night Cooled Water for Radiant Modular Cooling Prototype in Malaysian Building	Silver
AP Dr Cirilo Nolasco Hipolito Production of Bacteriocin from Sago Starch in Continuous Mode	Silver

FENG shine at Pecipta 2017



3 FENG staff won medals at Pecipta 2017 held at Stadium Tertutup Kompleks Sukan Negeri Gong Badak, Kuala Nerus, Terengganu Darul Iman from 7 to 9 October 2017.

Ir Dr David Bong Boon Liang Hybrid Biometric Authentication System	Silver
AP Ir Dr Siti Noor Linda Taib Chemical Stabilization of Mukah Peat with Locally Available Agricultural and Industrial By-Products	Bronze
AP Dr Cirilo Nolasco Hipolito Continuous Liquefaction of Sago Starch	Bronze

Ir Dr Mohd Danial and Ir Dr Leonard Lim get Silver at Seoul International Invention Fair (SIIF) 2017



Ir Dr Mohd Danial and Ir Dr Leonard Lim won Silver Prize at the Seoul International Invention Fair 2017 held at COEX Mall, Seoul, Korea from 30 November till 3 December 2017. They were among the 6 UNIMAS representatives and 632 exhibitors

Ir Dr Mohd Danial Ibrahim Streamlined Marine Vessels Inspired by Shark Denticles	Silver
Ir Dr Leonard Lim Lik Pueh A Versatile Biochar Reactor for Sustainable Biomass Management in Remote Areas	Silver

Dr Shafrida led Students to Silver at 2017 IEEE Malaysia Final Year Project (FYP) Competition



Dr Shafrida Sahrani led her students Mohd Helmi bin Mustafa and Mohd Nazreen bin Khalid to Second Place in the Telecommunication Section with their Final Year Projects entitled "Public Transport Journey Tracker or RAON" at the 2017 IEEE Malaysia Final Year Project (FYP) Competition organised by Institute of Electronics and Electrical Engineers (IEEE) Malaysian Section

in July 2017. Public Transport Journey Tracker or RAON on Android is developed using Android Studio platform and Raspberry Pi to detect the current location of public transport in a real time, which will assist user or passenger with planning trip according to the schedule. The competition is opened to all Undergraduate Electrical/Electronic/Computer Engineering Students around Malaysia, who just completed or currently

undertaking their Final Year Project in Malaysia Universities/Institutions.

7 FENG Students shine at the Innovation Design Research International Symposium (IDRIS) 2017



Ir Dr Mohd Danial Ibrahim led the UNIMAS contingent of 7 FENG students to 2 Special Awards, 4 Gold and 3 Silver Medals at the Innovation Design Research International Symposium (IDRIS) 2017 from 23 to 25 April 2017 at Silka Maytower Hotel, Kuala Lumpur. IDRIS 2017 attracted participants across the world including Indonesia, South Korea, Vietnam, Cambodia, China, Morocco, Thailand, Canada, Taiwan, Romania, USA, Hong Kong and Macau.

Michelle Lim Shing Yong Optimization of Blade with Better Temperature Distribution for High Viscous Sago Starch Mixing Industry	Korea University Invention Association Special Award and Gold Award
Phillip Mapang Anak Angking Resonance-Less High Density Polyethylene Pipe For Water Pipeline Industry	Special Award Classed D (Building, Construction and Materials) and Double Gold Award
Faiz Othman Efficiency Eco-Burner with Recirculated Air System for Charcoal Production	Gold Award
Bong Kuek Kong Mixing Optimization in Sago Starch Suspensions	Gold Award
Alif Falatin Abdul Latif Fish Dorsal Inspired Skew Turning Vanes for HVAC System	Silver Award
Emerald Michelle Sulong Design Optimization of Micro-Hyro Turbine Blade for Cavitation Reduction	Silver Award
Yasmin Syazwani Mohammad Effects of the Defective Die-Casted Alsigcu ₃ (ADC ₁₂) Automobile Steerig Housing	Silver Award

Collaboration

FENG paving the way with Geo Crete Specialist Sdn Bhd



Centre of Excellence Construction on Peat Soil (CoPS), Universiti Malaysia Sarawak (UNIMAS) signed an MOU with Geo Crete Specialist Sdn Bhd, a local specialist in innovative highway construction and soil stabilisation on 11 December 2017. This MoU establishes the collaboration of the parties in terms of expertise and knowledge sharing on techniques and innovation on construction on peat soil. CoPS was established in October 2016 and based in UNIMAS, to function as a focal point for the construction industry on issues with peat soil in Malaysia.

FENG Researchers involve in the Development of Foam Concrete (FC) and Eco Raft Pile (ERP) Road Construction on Peat Soils



AP Ir Dr Siti Noor Linda Taib, AP Dr Mohd Ibrahim Safawi and Mr Ahmad Kamal Abdul Aziz are among the researchers for the Development of Foam Concrete (FC) and Eco Raft Pile (ERP) Road Construction on Peat Soils. The MoA for the pioneering research project between Construction Research Institute of Malaysia (CREAM) and Lembaga Lebuhraya Malaysia (LLM) was signed and exchanged on 11 December 2017, witnessed by YB Dato' Sri Haji Fadillah bin Haji Yusof, Minister of Works. This project involves collaboration among government agencies i.e. the Department of Public Works (JKR), Department of Irrigation and Drainage (JPS)), Centre of Research Excellence Construction on Peat Soil (CoPS), Universiti Malaysia Sarawak (UNIMAS) and Universiti Tun Hussein Onn Malaysia (UTHM).

MoU Exchanges with Several Research Collaborators during EnCon 2017



UNIMAS sealed several research collaborations via MoU exchanges with the Institutions of Engineers Malaysia (Sarawak Branch), Geocrete Specialist Sdn Bhd, The Welding Institute UK, Universitas Panca Bhakti, Indonesia, ACME Integrated Services Sdn Bhd, Turbowolf Resources Sdn Bhd and Pakistan Institution of Engineers and Applied Sciences (PIEAS), respectively, during the opening ceremony of EnCon 2017 on 13 September 2017. The MoU exchange was witnessed by the Chief Minister of Sarawak, Datuk Patinggi Abang Haji Abdul Rahman Zohari Tun Datuk Abang Haji Openg.

Awards and Recognition

FENG bag Awards at Majlis Anugerah Gemilang UNIMAS (MAGU) 2017



FENG bagged 17 awards at the Majlis Anugerah Gemilang UNIMAS (MAGU) 2017. Among the awards related to research excellence were namely Highest Impact Journal Publication Awards by Prof Dr Mohammad Omar Abdullah and AP Dr Abu Salleh Ahmed, UNIMAS Product Innovation and Commercialisation Award by Prof Dr M. Shahidul Islam, and MAGU Special Recognition 2017 for eBario UNIMAS and Renewable Energy Groups.

Conference and Seminar

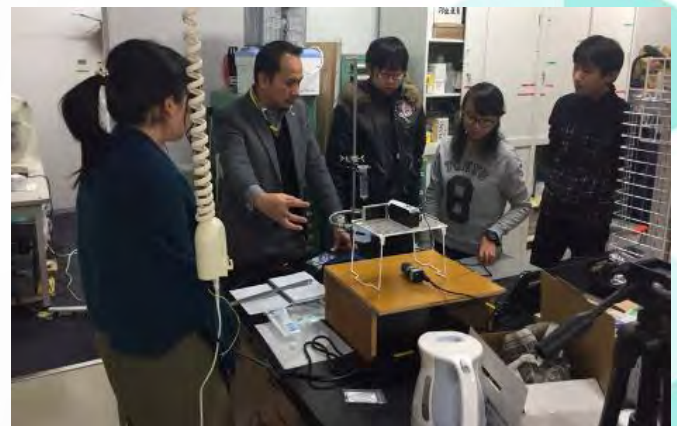
Keynote and Invited Speaker

Keynote Speaker in Ocean Renewable Energy in Islandic Conditions, Nanyang Technological University (NTU), Singapore



Prof. Ir Dr Andrew Ragai Henry Rigit was invited by Nanyang Technological University, Singapore to deliver a keynote address at a workshop on Ocean Renewable Energy in Islandic Conditions, 8-9th March 2017. The workshop discussed the opportunities and challenges of ocean Renewable Energy in South East Asia specifically in relation to islandic and remote coastal areas.

Ir Dr Mohd Danial Ibrahim was Visiting Researcher at Tokai University and Shibaura Institute of Technology, Japan



Ir Dr Mohd Danial Ibrahim visited Tokai University and Shibaura Institute of Technology from 16th December 2016 until 31st January 2017. At those two institutions, talks were given to the students and lecturers. There were two talks at Tokai University, one conducted by the Global Initiative and Consistent Education, Head of International Affairs, and was conducted at the Tokai University International Cafe. The other talk was conducted by Micro/Nano Technology Center (MNTC), Tokai University. The talks were basically the sharing session of what Ir Dr Danial Ibrahim has conducted as his lecturing and engineer career at UNIMAS back then. At Tokai University, the discussion to conduct collaboration was conducted between UNIMAS and Tokai University. Tokai University (Shonan Main Campus) preliminary agreed to make a visit to UNIMAS to furthermore strengthen the two collaboration researches at international level.

Industrial Collaboration Research Kyokuto Die-Casting Co., Ltd., Yamakita-Machi, Kanagawa Prefecture, Japan

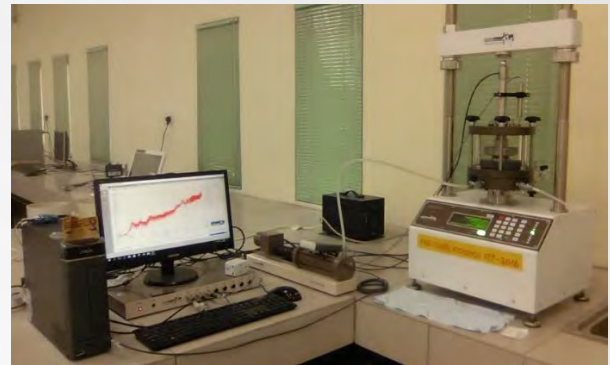
Research and Development

New Facilities

Constant Rate of Strain (CRS) Consolidation Machine



On August 28, 2017, Ir Dr Mohd Danial Ibrahim from Department of Mechanical and Manufacturing Engineering visited Kyokuto Die-casting Co. Ltd. in Yamakita-machi, Ashigarakami-gun, Kanagawa Prefecture, Japan. The visit was a continuation of research collaboration between UNIMAS and HICOM Die-casting Sdn Bhd. The international collaboration was initiated by Tokai University and UNIMAS in their research collaboration in die-casting processes improvements. The visit is aimed to have a joint-collaboration between UNIMAS-Tokai University, Kyokuto Die-casting, Japan and HICOM Diecastings, Malaysia. UNIMAS was represented by Ir Dr Mohd Danial Ibrahim, while Tokai University was represented by Dr Yuta Sunami of Micro/Nano Technology Center, Tokai University.



The Geotechnical Engineering Laboratory has a fully automated CRS machine, manufactured by GDS Instruments UK, to determine consolidation properties of soils. CRS machine is capable of measuring consolidation properties of soil samples in much shorter time than the conventional Oedometer system. The CRS machine enables the adjustment of strain rate in order to study the effect of strain rate to the consolidation properties of the soil sample.

Seminar on IR 4.0

Auger Drill, Sampler and Standard Penetration Test



Universiti Malaysia Sarawak (UNIMAS) conducted a seminar on Meeting the Challenges of 4th Industrial Revolution & Sarawak's Digital Transformation at Arena Gemilang DeTAR Putra, UNIMAS on 29 August 2017. The 4th Industrial Revolution (4th IR) will lead in an era of disruptive and exponential change, impacting all disciplines by merging together the physical, digital and biological worlds. With these changes come the new opportunities for human development, knowledge construction and cross - cultural communications. One of the speakers is the Dean of the Faculty of Engineering, Prof Ir Dr Al-Khalid bin Hj Othman on 'The Future of Jobs for Sarawak 4th Industrial Revolution Initiatives: Employment, Skills and Workforce Strategy'. This seminar is one of the events organised in conjunction with UNIMAS 25th Year Jubilee Celebration and attended by all UNIMAS academicians and officers.



The Geotechnical Engineering Laboratory has a new auger drill for making boreholes via rotating cutting tip; to retrieve undisturbed sample from a specific depth. The auger drill is usually used in site investigations involving soil characterisation. It is one-man portability, 2,500-lbs lifting capacity, drills 6-inch diameter holes up to 100-feet deep. The auger drill is equipped with sampler and Standard Penetration Test (SPT) apparatus. SPT is the most common field test to determine in-situ strength of soil.

LT Furnace



The Geotechnical Engineering Laboratory acquired a LT furnace for heating soil samples up to 1200 °C, which can be

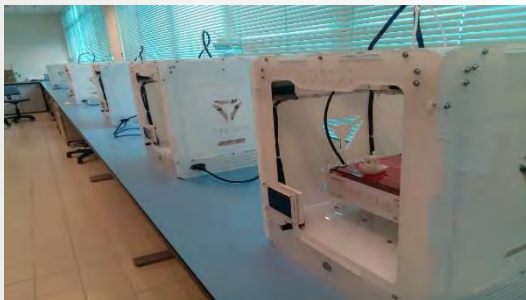
set using digital temperature controller system. The furnace is a top loading type, in which the door of the furnace chamber is open via a pulley system to avoid direct contact with human when opening the chamber at high temperature.

Experimental Chamber for Miniature Full-flow Penetrometers



This experimental chamber is used to consolidate and apply a constant vertical stress to a reconstituted soil sample (peat soil). The principle is the same as the conventional Oedometer system but at much larger scale. The desired vertical stress is maintained through a loading plate at the top of the chamber pressured by hydraulic motor system. The loading plate is equipped with openings where miniature full flow penetration tests can be done. Both the miniature T-bar and ball penetrometer are designed to be fit into the experimental chamber. Eight penetration tests can be done in one set of reconstituted samples.

3D Printers in Process Control Laboratory



The Department of Mechanical and Manufacturing Engineering Unimas had acquired 5 units of Proteus 3D printers, allocated at Process Control Laboratory (Level 1). 3D printer is a new generation of machines, which can create a three-dimensional object from different kinds of design with different materials. This printer can print the product up to a maximum size 200x200x200 mm, with resolution of 0.1mm to 0.3 mm and printing speed from 20 to 150 mm/sec. The printers are mainly used for teaching especially in certain subjects such as KNP4414 Integrated Design, KN3093 Engineering Design, KNP 4073 Advanced Manufacturing System and FYP4214 Final Year Project 2. The department also plan to provide special service (with payment) to the researchers from UNIMAS and other institutions, who need to fabricate the sample using the 3D printer.

Department of Mechanical and Manufacturing Engineering
Install state of the art Micro Hardness Tester



The Department of Mechanical and Manufacturing Engineering received state of the art lab equipment during 2017. The Micro Vickers Hardness tester installed at the Department's Materials Processing and Characterization Lab is SCIMADZU HMV-G21. The machine is capable of testing Vickers and Knoop hardness of metals, ceramics, polymers and composites. The specific range of force is from 98 mN to 20 N, hence range of materials which are very soft to very hard can be tested. The observation procedure is automated with image of the indent being captured by a 40x microscope and projected on a large high resolution screen. The dimensions of the indent are also measured with high precision. The machine is supplied with a motorized X-Y stage where samples can be placed.

Collaboration

Industrial Laboratory

Kiwitech



Universiti Malaysia Sarawak and Kiwitech sealed their collaboration through the Memorandum of Agreement (MoA) signing at KLCC in October 2016. The main objective for the establishment of the UNIMAS-KIWITECH Industrial Laboratory is to develop the idea of Smart City; to establish the first Smart City Industrial Laboratory which will be located at Universiti Malaysia Sarawak, (UNIMAS). Smart City Industrial Laboratory will be used as a platform for both students and the staffs of UNIMAS as well the employees of KIWITECH to provide training, to acquire knowledge, skills and hands-on experiences in operating widely used equipment in the Smart City Industrial Laboratory and to initiate and develop a holistic Smart City Research and Development (R&D) activities in Sarawak. The collaboration and the laboratory activities will allow sharing of expertise and knowledge between both sides and eventually boost the technology that could be implemented in sites identified for smart city projects.

Visitors

Academic Visit

On 17 January 2017, Dr Muhammad Azhar Khan Nlazi and his members represented Qurtuba University had visited Faculty of Engineering, UNIMAS to discuss on the cooperation between UNIMAS and Qurtuba University through research collaboration, staff exchange and student exchange.

Academic and Research Visit

On 21 September 2017, Mr Visalok Touch and his team members represented University of Kratie (JKC) had visited Faculty of Engineering, UNIMAS to discuss on the cooperation between UNIMAS and UKC through research collaboration, staff exchange and student exchange.

Research Visit

On 26 September 2017, Dato Saruji Johan and his members represented Goodwater Engineering had visited Faculty of Engineering, UNIMAS to introduce Goodwater Engineering Sdn Bhd being a sewage treatment plant specialist and Manufacturing Compan and locally owned. In addition, Sharing Goodwater Engineering Sdn Bhd have good experience in Semenanjung Malaysia especially on the benefits of the priva.

Research Visit

On 10 October 2017, Prof Jean Claude Labbe and Dr Nicolas Glandut represented University Limoges had visited Faculty of Engineering, UNIMAS to discuss on the cooperation between UNIMAS and University Limoges through research collaboration, staff exchange and student exchange.

Academic Visit

On 26 January 2017, Mr Arif Parabi represented Fakultas Teknik Universitas Panca Bhakti had visited Faculty of Engineering to discuss on the cooperation between UNIMAS and Universiti Panca Bhakti through research collaboration, staff exchange and student exchange.

Research Visit

On 21 September 2017, Mr Dara Pin represented University of Heng Samrin Thbongkhu (UHST) had visited Faculty of Engineering, UNIMAS to discuss on the cooperation between UNIMAS and UHST through research collaboration, staff exchange and student exchange.

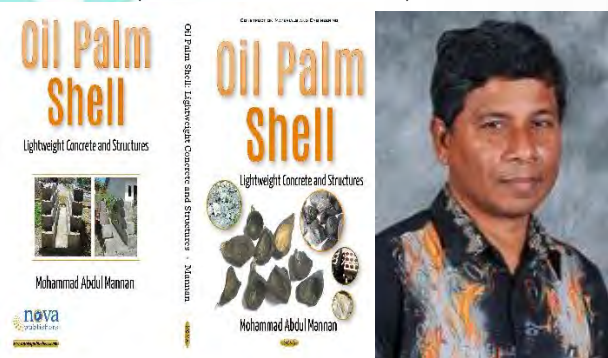
Academic Visit

On 9 October 2017, Prof Dr Ing and Ir Gagoek Hardiman represented Architecture Department of Unversitas Diponegoro had visited Faculty of Engineering, UNIMAS to discuss the relevance of sketches and architectural designs with architecture students and lecturers as well as explaining and sharing some of his sketches in Asia Sketschwalk Link Sarawak 4-8 Oct 2017.

Publication

Books

Oil Palm Shell: Lightweight Concrete and Structures by Prof Dr Abdul mannan (ISBN: 978-1-53610-900-9)



Prof Dr Abdul Mannan based on his 20 years research on OPS concrete has published a book "Oil Palm Shell: Lightweight Concrete and Structures". The book covers a wide range of

topics from the generation of solid wastes in the oil palm industry and characteristics of oil palm shell, to the application of oil palm shell in lightweight concrete, IBS structures, and water seepage drain. This book also explains how houses and eco-resort in marine environments can be built using precast concrete components.

Sediment in Open Storm Sewer and Its Removal by Dr Charles Bong (ISBN: 978-967-5527-98-2)



Dr Charles Bong Hin Joo, a senior lecturer specializing in Urban Drainage Management, published a book entitled "Sediment in Open Storm Sewer and Its Removal". The book, published based on his research works, contains the essential reading for the understanding of sediment characteristics, the concept of self-cleansing design and potential for sediment removal using flushing. This book provides a useful reference for drainage engineers, municipal bodies and sewer undertakers for detailed studies of the design and operation of open storm sewer systems. It can also be used by academicians and postgraduate students who wish to develop their knowledge on this subject. This book was awarded the Anugerah Buku Negara 2016 (National Book Award 2016) for "Kategori Pengajian Tinggi: Buku Sains dan Teknologi Terbaik" by Yayasan Pembangunan Buku Negara (YPBN).

Wood Polymer Nanocomposites by Dr Md Rezaur Rahman (ISBN:978-3-319-65735-6, 978-3-319-65734-9)



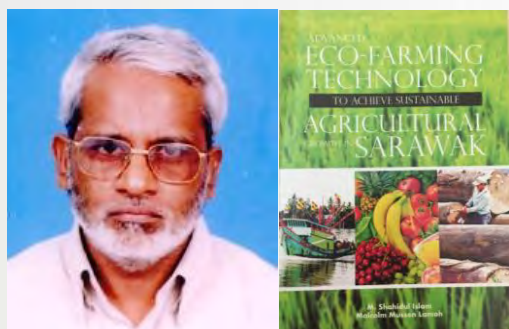
Dr Md Rezaur Rahman, a senior lecturer specializing in Polymer and Composites Materials, published a book entitled "Wood Polymer Nanocomposites: Chemical Modifications, Properties and Sustainable Applications". The book, published based on his research works, which demonstrated better mechanical and thermal properties as compared to nanoclay-reinforced polymer composites. This book focused on chemically dispersed nanoclay-impregnated wood polymer nanocomposites properties and applications. It also highlights the role of reinforcing agent in wood nanocomposites. Readers will find complete information about preparation and characterizations of various clay and monomers dispersed wood nanocomposites. It can also be used by academicians and postgraduate students who wish to develop their knowledge on this research area.

Dr Nur Tahirah Razali published 2 books on Solar and Photovoltaic Cells



Dr Nur Tahirah Razali is a senior lecturer specializing in Polymer Solar Cells (PSC), has co-authored in two book chapters. The first one entitled "Systematic study of organic solar cells cross-section by EDS to correlate donor-acceptor vertical concentration gradients and device performances" published in Science and Applications of Tailored Nanostructures, and the second one entitled "Interface Engineering: A Key Aspect for the Potential Commercialization of Printable Organic Photovoltaic Cells" published in Printable Solar Cells. These two chapters provide useful information on the parameters that contribute to high power conversion efficiency of PSC, which can be used by academicians and postgraduate students who wish to develop their knowledge on this subject.

Prof Dr Shahidul published books on Mitigating Climate Change and Advanced Eco-Farming Technology
ISBN: 978-967-14177-0-6 and 978-967-2008-28-6



Professor Dr M. Shahidul Islam specializing in water, energy and resources optimization in industrial application, published two books entitled "Engineering Role in Mitigating Climate Change Effect on Water and Energy in Achieving Environmental Sustainability" and "Advanced Eco-Farming Technology to Achieve Sustainable Agricultural Growth in Sarawak". The first book, published based on his research on climate change due to pollutions of wastewater, waste-energy, waste-biomass. The book contains the essential reading for the understanding of water, energy and biomass use in manufacturing process with roadmap of reducing wastage of these high value resources. Authors provided readers with concept on optimization of water and energy use in manufacturing process to minimize pollution in environment in order to mitigate climate change effects. Additionally, recycling technology of these high value resources has written in this book as a guideline for professionals involved in industry working for increasing productivity, reducing pollutions in air, water and soil. This book is a useful reference for industrial engineers working in manufacturing process design, plant operations, maintenance, water and energy management, pollution control and environmental safety. It is also an important handbook for academicians, researchers and postgraduate students who wish to develop their knowledge on this subject.

The second book contains the essential reading materials for the understanding of barriers to adopt eco-farming technology in agro-industry specially in commercial crops production

including timber, palm oil, poultry, and dairy products. The use of green technology in agriculture is the ground work of this book which guides stakeholders to convert biomass waste to high value resources in the form of organic fertilizer and biogas. The authors provide readers with useful information on agro-process technology, plant operations and maintenance for controlling pollutions and environmental safety. This is a hand book for farm level executives who wish to improve their knowledge to optimize water, energy and fertilizer use in agro-process industry with aim to contribute to achieve economic and environmental sustainability. This book provides useful references for engineers, academicians, researchers and postgraduate students who wish to develop their knowledge on this subject.

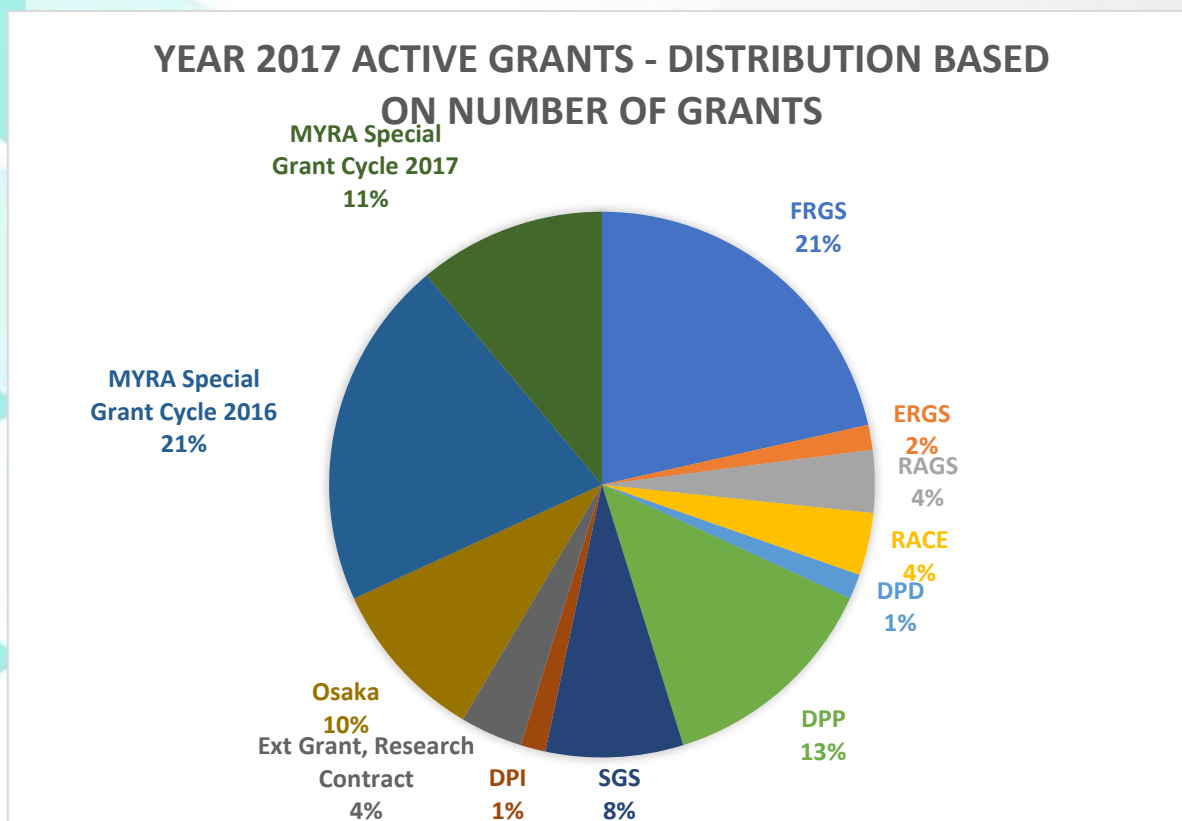
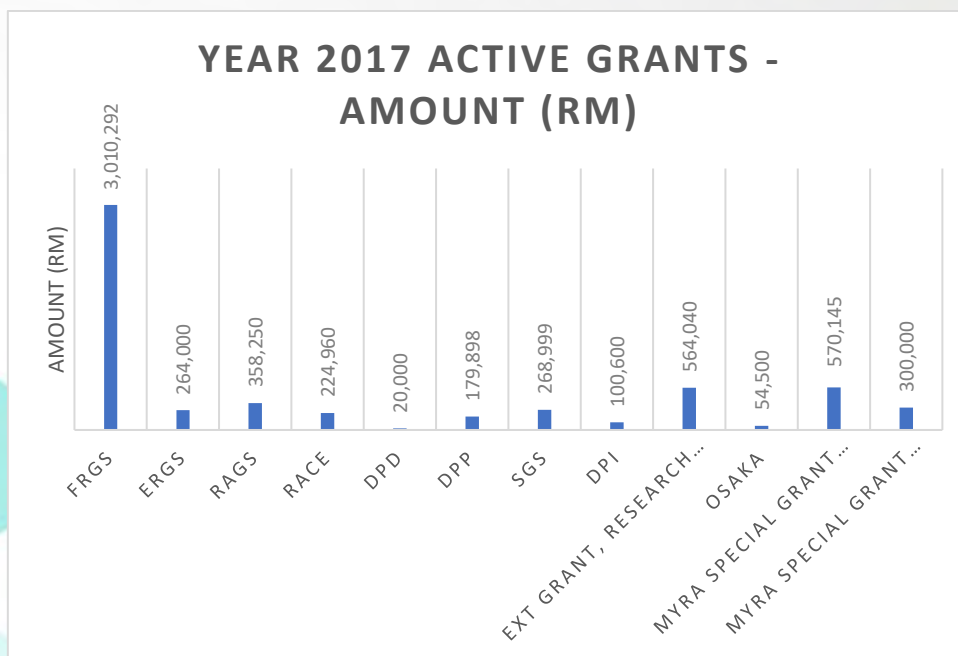
Dr Raudhah Ahmadi contributes to Malaysian Guideline for Design of Structures for Earthquake Resistance



Dr Raudhah Ahmadi, a lecturer specializing in seismic hazard assessment was involved as a technical committee in the development of a guideline entitled MS EN 1998-1, Malaysia National Annex to Eurocode 8 (2017): Design of structures for earthquake resistance - Part 1: General rules, seismic actions and rules for building. She is working together with local experts from various universities, government and non-governmental bodies in Malaysia that are related in this field. This guideline will be useful for engineers who are concerned with construction that are to be built in areas susceptible to seismic hazard. This guideline is recently published by the Department of Standards Malaysia and SIRIM Berhad, in January 2018.

Research Grants & Student Enrolment Statistic 2017

In the year 2017, FEng have managed to secure several important internal and external grants. Fifteen of our academics staff secured the MyRA 2017 grants which amounted to RM300,000. The ever competitive MoHE grants i.e. the FRGS are awarded to 6 of our researchers which bring in grants totaling about RM600,000. Internationally, the Osaka Gas Foundation of International Cultural Exchange (OGFICE) has been continuously supporting researches in the faculty and recently awarded RM54,200 value of grants. Various local and international counterparts have contributed, directly and indirectly, through support in grant money, materials and ideas to researches in FEng. To add, our postgraduate enrollment is encouraging and without doubt, year 2017 is one of our productive years.



FRGS					
Grant No	Project Leader	Co-Researcher	Title	Duration (Month)	Budget (RM)
FRGS/ICT02 (01)/997/2013 (38)	Tay Kai Meng	Prof Dr Lim Chee Peng (USM) Mah Yau Seng Asrani Lit Delsye Teo Ching Leng	A Novel Theoretical Synthesis of Fuzzy Causal Modeling and Information Theory: Mathematical Extensions, Evaluations, and a Real World Application in Sarawak	36	68,900
FRGS/TK07 (01)/1055/2013 (01)	Siti Noor Linda Taib	Norsuzailina Mohamed Sutan Ibrahim Yakub Ron Aldrino Chan@Ron Baking Norazzlina M.Sa'don Prof Dr Fauziah Ahmad (USM)	Strength, Morphological and Chemical Characterizations of Pavement Subbase Modified by Chemical and Industrial Waste for Durable Road Construction.	36	75,000
FRGS/TK01(01) /1059/2013 (05)	Mohd Danial Ibrahim	Dr Miyanaga Norifumu Nabilah Ibrahim Muhd Fadzli Ashari	Investigation of Non-Newtonian and Multiphase Laminar-Turbulent Flow Regime Rheology of Modified Nano-Macro Boundary Surfaces	36	96,850
FRGS/TK01(01) /1136/2014 (03)	Shahrol Mohamaddan	Annisa Jamali Siti Zawiah Md Dawal Ahmad Hata Rasit Mohd Syahmi Jamaludin Noor Aliah Abdul Majid	Investigation of the Required Parameters for Club Foot Treatment Based On Non-Invasive Medical Approach	24	91,400
FRGS/TK04(02) /1138/2014 (05)	Norsuzailina Mohamed Sutan	Ibrahim Yakub Prof Dr Taufiq Yap Yun Hin Khairul Anwar Mohamad Said	An investigation on agrowaste-based Selective Catalytic Reduction (SCR) catalyst in a denitrification of biomass-combustion flue gas	36	126,200
FRGS/TK02(01) /1211/2014 (12)	Gaddafi Bin Ismail	Anissa Jamali, Iskandar Openg (UiTM), Dr Alik Duju (Sarawak Forestry Corporation)	Establishment of actual strength group and utilization of modified of Acacia mangium Timber of Sarawak	24	100,000
FRGS/TK03(02) /1212/2014 (13)	Rohana Sapawi	Siti Kudnie Sahari, Dyg Nur Salmi Dharmiza Awg Salleh, Dr Sohiful Anuar b. Zainol Murad	Mathematical Modeling of Minima Phase Nonlinearity CMOS Power Amplifier for Ultra Wideband Communication	24	121,200
FRGS/TK04(03) /1140/2014 (07)	Khairul Anwar Mohamad Said	Khamirul Amin Bin Matori(UPM), Norsuzailina Mohamed Sutan, Ibrahim Yakub, Prof Dr Taufiq Yap Yun Hin	Kinetic analysis of heavy metal and bacteria removal using PEI/nano-Ag membrane incorporated with biomass-based Activated Carbon	24	134,300
FRGS/2/2013/TK04/UNIMAS/02/1	Nicholas Kuan Hoo Tien	Prof. Dr. Amir Azam Khan	An investigation of the analytical tensile model and mathematical impact response formula for the novel lightweight eco-friendly Pandanus atropacus based composite	36	74,500
FRGS/TK04(01) /972/2013(13)	Delsye Teo Ching Lee	Prof. Ng Chee Khoon, Prof. MD Abdul Mannan, Prof. Hilmi Mahmud (UM), Norsuzailina M Sutan.	Chloride Penetration and Time to Corrosion Initiation of Concrete Produced from Agricultural Waste	36	73,000
FRGS/TK(01)/973/2013 (14)	Syed Tarmizi Syed Shazali	Prof Dr Shahidul Islam, Abdullah Yassin, Hishammudin Afifi, Ahmad Adzlan Fadzli, Mohd. Azrin Mohd Said	Modelling of Energy Extraction from Low Velocity Water Stream with Micro Hydro Turbine	36	128,000
FRGS/2/2013/SG02/UNIMAS /01/1	Prof. Dr. Sinin Hamdan	PM Dr. Hasnizam Abdul Wahid, Prof Dr. Ismail Jusoh	Sound Quality Assessment of Wood	36	112,000
FRGS/TK04(06) /1304/2015/(23)	Shafrida Sahrani	Kismet Anak Hong Ping, Dayang Azra Awg Mat, Norsuzailina Mohamed Sutan, Dr Idrin Pasya Ibrahim	Development of Time Domain Inverse Scattering Algorithm for the Detection and Imaging of Buried Objects.	24	68,200

FRGS/1/2015/ TK01/UNIMAS/ 02/2	Alsidqi Hassan	Prof Abdul Aziz (UMP) Siti Noor Linda Taib Norsuzailina Binti Mohamed Sutan Fauzan Sahdi Andries Fourie (University of Western Australia)	Mathematical formulation of factors affecting total stress propagation anomaly in cemented slurry deposition within narrow walls	30	75,500
FRGS/1/2015/ TK02/UNIMAS/ 03/1	Noraziah Abdul Wahab	Shanti Faridah Salleh, Ivy Tan Ai Wei, Nazeri Abdul Rahman, Mohd Farid Atan	Phytoremediation Mechanism Towards Ammoniacal Nitrogen Reduction in Industrial Effluent	36	128,000
FRGS/1/2015/ TK02/UNIMAS/ 01/1	Prof. Ir Dr Andrew Ragai Henry Rigit	Khairuddin Sanaullah	Modeling transport processes of microscale non-thermal plasma discharge in liquids applicable to long chain crude oil molecules cracking	36	124,000
FRGS/1/2015/ SG06(02)/1287 /2015(04)	Muhammad Kashif	Pro Uda Hashim (UniMAP); Dr M. Eaqub Ali (UM); Prof Dr Zainab Ngaini; Prof Mohamad Rusop Mahmood (UiTM); Siti Kudnie Sahari	Synthesis and characterization of Graphene Oxide via Hummers' Method As a Hole Transport Layer on Azo-Kojic Compound or Organic Photovoltaics (OPVs) Applications	24	138,200
FRGS/1/2015/ SG06/UNIMAS /03/1	Nur Syuhada Ahmad Zauzi	Rubiyah Baini, Md Rezaur Rahman, Prof. Dr Sinin Hamdan, Norsuzailina bt Mohamed Sutan	Influence of Chemical Treatment on the Physicochemical Properties of Aluminium Dross in Industrial Applications	24	94,200
FRGS/DK02 (04)/1302/201 5(21)	Rubiyah Baini	Nur Syuhada Ahmad Zauzi, Md Rezaur Rahman, Noraziah Abdul Wahab, Norlisa Mili, Prof Dr Mohd Omar Abdullah	Study of Drying Characteristics for Lemantak (Sarawak Sago Starch)	36	104,550
FRGS/1/2015/ TK01/UNIMAS/ 02/3	Fauzan Sahdi	Fauzan Sahdi, Alsidqi Hasan, Siti Noor Linda Taib, Norazzlina M. Sa'don, Dr Noel Boylan (Norwegian Geotechnical Institute (NGI)), Prof. Dr. Bujang Bin Kim Huat (UPM):	Laboratory Modelling of The Rate Dependent Behaviour of Penetrometers For Improved Geotechnical Characterisation of Peat	36	98,500
FRGS/1/2016/ TK07/UNIMAS/ 01/1	Prof Dr Paul Ratnamahilan Hoole	Kismet Hong Ping Dr C Aravind Prof K Pirapaharan Prof SRH Hoole	Finite Difference Computational Model of Smart Grid Low Voltage Distribution Cable Fields for Design and Monitoring using Graphics Processing Unit (GPU) Parallelization	36	109,000
FRGS/1/2016/ TK07/UNIMAS/ 01/2	Prof Dr Mohammad Omar Abdullah	Nur Syuhada Ahmad Zauzi, Cirilo Nolasco Hipolito, Tan Yie Hua	A study of biodiesel from waste cooking oil catalyzed by Sarawak novel ostrich-eggshell based catalyst	36	116,500
FRGS/1/2016/ TK04/UNIMAS/ 02/1	David Bong Boon Liang	Prof Ir Dr Andrew Ragai Henry Rigit, Annie Joseph, Nordiana Rajae, PM Dr Khoo Bee Ee, PM Dr Goh Hui Hwang	Pointwise Distortion Index for Blind Quality Assessment of Stitched Image	36	101,800
FRGS/1/2016/ TK04/UNIMAS/ 02/2	Ahmed Mohamed Ahmed Haidar	Mohd Wazir Mustafa (UTM), Hushairi Zen, Prof Dr Ir Al-Khalid Othman, Norhuzaimin Julai, Prof. Dr. Paul Ratnamahilan Hoole	Optimization of a Smart Grid Containing Renewable Energy Resources to minimize Power Blackouts in the State of Sarawak	36	108,000
FRGS/1/2016/ TK08/UNIMAS/ 02/1	Mohamad Raduan Bin Kabit	Prof Dr Wan Hashim Wan Ibrahim, Norehan Zulkiply, Prof Dr Ahmad Farhan Mohd Sadullah	Modelling distracted driving behaviours associated with phone usage on driving errors	24	74,500
FRGS/1/2016/ TK02/UNIMAS/ 02/1	Cirilo Nolasco Hipolito	Khairuddin Sanaullah, Prof. Dr Mohammad Omar Abdullah, Shanti Faridah Salleh, Prof Dr Kopli Bujang, Samuel Lihan, Octavio Carvajal Zarrabal	Isolation and Characterization of a Lactic Acid Bacterium and Testing its Productivity in a Stirred Tank Bioreactor.	36	131,000

F02/FRGS/1618/2017	Charles Bong Hin Joo	Tay Kai Meng, Prof Dr. Ng Chee Khoon, Ir. Dr. Teo Fang Yenn (SPAN)	Fuzzy FMEA risk assessment of hydraulic flushing in managing sedimentation in open storm drain	24	91,892
F07/FRGS/1615/2017	Nor Hasmaliana Abd Manas	Azham Zulkharnain, Nor Hasmaliana Abdul Manas, Rubiyah Bains, Cirilo Nolasco Hipolito, Prof Dr ROSLI BIN MD. ILLIAS (UTM), Dr Aizi Nor Mazila Binti Ramli (UMP), Rohaida Che Man (UMP), Dr. MOHD ANUAR BIN JONET (NIBM)	Investigation on kinetic and efficiency of heterocyclic aromatic compounds biotransformation by immobilized <i>Thalassospira profundimaris</i>	36	187,800
F02/FRGS/1617/2017	Siti Kudnie Sahari	Prof Dr. Zainab binti Ngaini, Muhammad Kashif, Nur Tahirah Razali, Prof Dr Uda bin Hashim (UniMAP), Mohamad Rusop Mahmood (UiTM)	Study on the Effect of TiO ₂ Doped Graphene Oxide and Reduced Graphene Oxide for Perovskite Solar Cell Application	36	93,200
F02/FRGS/1619/2017	Khairul Fikri Tamrin	Prof Ir Dr Amir Azam Khan, Abu Saleh Ahmed, Shahrol Mohamaddan, AP Dr. NUKMAN BIN YUSOFF (UM), Prof Dr Mohd Sapuan bin Salit@Sinon (UPM)	Investigation of three-dimensional (3D) precision laser cutting of non-metals using modified computer DVD writer drives	24	67,500
F02/FRGS/1620/2017	Mohamed Abdel Moneim Shaaban	Prof Dr. Musse Mohamud Ahmed, Hushairi Zen, Dr Md Pauzi bin Abdullah (UTM)	A New Smart Microgrid Scheduling Approach for Flexibility Provision to Central Utility Grid Using Disjunctive Programming	24	73,000
F02/FRGS/1621/2017	Yonis M. Yonis Buswig	Hushairi Zen, Prof Ir Dr Al-Khalid Hj Othman, Norhuzaimin Julai, Dr Sim Sy Yi (UTHM)	A Novel Multi input DC-DC Power Converter for Integrated Solar PV-Micro Hydro Hybrid Renewable Energy System	24	93,500

PRGS

Grant No	Project Leader	Co-Researcher	Title	Duration (Month)	Budget (RM)
PRGS/TK01/ (01)1167/ 2014 (01)	Shahrol Mohamaddan	Annisa Binti Jamali Khairul Aidil Azlin Abd Rahman Helmy Hazami Mohd Syahmi Jamaludin Noor Aliah Abdul Majid	Development of Finger Rehabilitation Device for Post Stroke Patient	24	190,000

RAGS

Grant No	Project Leader	Co-Researcher	Title	Duration (Month)	Budget (RM)
RAGS/TK06 (1)/1184/2014 (07)	Hishammudin Afifi Huspi	Mohd Azrin Mohd Said Syed Tarmizi Syed Shazali Ahmad Adzlan Fadzil Khairi	Study and Improvement of Liquid Fueled Pulse Detonation Engine using Pre-heated Mixing Chamber	24	69,000
RAGS/1/ 2015/TK0/ UNIMAS/03/ 2	Abg Mohd Aizzuddin	Adrus Mohd Tazudin, Azfar Satari Abdullah	Investigation of Machinery Faults Through Vibration Analysis Using a Modular Vibration Test Rig	24	77,000
RAGS/1/ 2015/TK0/ UNIMAS/03/ 1	Nazreen Junaidi	Mohd Syahmi Jamaludin, Ana Sakura Zainal Abidin, Nurul 'Izzati Hashim	Investigation of Automated Cooling System for Kek Lapis Production Line	24	75,250
RAGS/1/ 2015/TK0/ UNIMAS/03/ 3	Mohamad Syazwan Zafwan Mohamad Suffian	Shahrol Mohamaddan, Nur Alia Athirah Mohtadzar	Investigation on Vibration Characteristics of Keropok Keping Drying Machine	24	67,000
RAGS/1/ 2015/TK0/ UNIMAS/02/ 1	Mah Yau Seng	Charles Bong, Prof Dr Md Abdul Mannan Mohd Syahmi Jamaludin	Fundamental Flow Characteristics of Individual Lot Stormwater Detention Underneath Residential Car Porch	24	70,000

RACE					
Grant No	Project Leader	Co-Researcher	Title	Duration (Month)	Budget (RM)
RACE/c(3)/1110/2014 (18)	Tay Kai Meng	Prof Dr Lim Chee Peng (USM), Nicholas Kuan Hoo Tien, Dyg Nur Salmi Dharmiza Awg Salleh, Hazmi Hijazi Abdul	A novel Interval Type-2 Single-Input-Rule-Modules Connected Fuzzy Inference System: Theoretical Analysis, Extensions and Practical Applications	36	50,000
RACE/c(1)/1108/2014 (16)	Norsuzailina Mohamed Sutan	Dato Ir Dr Mohd Saleh Jaafar (UPM), Dr Khamirul Amin Matori (UPM), Ibrahim Yakub	Characterizations and morphology of Tobermorite and Jennite like Calcium Silicate Hydrate (C-S-H) during hydration of Nano Pozzolanic Modified Binder (NPMB)	24	45,000
RACE/c(2)/1109/2014 (17)	David Bong Boon Liang	Prof Dr Nor Ashidi Mat Isa (USM), Dr Khoo Bee Ee (USM)	Blind-PSNR Model For No-Reference Image Quality Assessment	24	50,000
RACE/c(1)/1252/2015 (08)	Ting Sim Nee	Prof Madya Dr. Razali Abdul Hamid (UTM), Tay Kai Meng	A Theoretical and Mathematical Formulation for Qualitative and Quantitative Evaluation of Engineering Procurement Contractual Documents, Specifically for Malaysian Construction Industry	24	46,600
RACE/F3/TK5/UNIMAS (14)	Siti Kudnie Sahari	Prof. Dr Burhanuddin, PM Dr Azrul Azlan (UKM), Norsuzailina M. Sutan, Marini Sawawi	Experimental and Mathematical Modelling of Germanium Oxidation	24	39,500
RACE/F3/TK8/UNIMAS (20)	Kismet Hong Ping	Prof. Dr Mohd Hamiruce (UPM), Shafrida Sahrani	Inverse Scattering Technique with Overset Grid Generation Method for Shape Construction of Multiple Objects	24	38,860
RACE/F3/TK6/UNIMAS (18)	Shahrol Mohamaddan	AP Dr Siti Zawiyah (UM), Dr. Helmy Hazmi, Ana Sakura Zainal Abidin, Noor Aliah Majid	Development of the Anthropometric Database for Children with Dissability in Malaysia	24	50,000

DPP					
Grant No	Project Leader	Co-Researcher	Title	Duration (Month)	Budget (RM)
F02(DPP15)/1242/2014 (15)	Prof Dr Amir Azam Khan	Abdullah Yassin, PM Dr Faiz Ahmad, Wan Farhana Mohamad	Optimization of the Sintering Parameters of Ni/Cr - MoS ₂ Self Lubricating Metal Ceramic Composites produced by Powder Metallurgy process	24	10,000
F02(DPP31)/1246/2015 (06)	Prof Dr Md. Abdul Mannan	Prof Dr Wan Hashim Wan Ibrahim, Lee Shyue Loeng	Enhanced Service Life of Flexible Pavement-Surface Coated with Fibres-Mixed Resin (FMR)	36	9,898
F02(DPP32)/1247/2015 (07)	Prof Dr Md. Abdul Mannan	Lau Pei Ching	Performance of Lightweight Aggregate using Sewage Sludge and Oil Palm Boiler Waste	36	10,000
F02(DPP33)/1248/2015 (08)	Prof Dr Md. Abdul Mannan	Lim Hung Ling	Structural Performance of Precast Honeycomb Pavement	36	10,000
F02(DPP40)/1260/2015 (15)	Abu Saleh Ahmed	Prof Dr Sinin Hamdan Md Rezaur Rahman Amaranadha Reddy Manchuri	An Investigation of Novel Heterogeneous Nanocatalyst for Biodiesel Production from Jatropha Oil	36	10,000
F02(DPP45)/1265/2015 (20)	Norsuzailina Mohamed Sutan	Prof Dr Amir Azam Khan Ibrahim Yakub Khairul Anwar Mohd Said	Mircrostructural Investigations on Potential Pozzolanicity of Petrochemical Spent Catalyst Composite Binder	24	10,000
F02(DPP47)/1271/2015 (22)	Leonard Lim Lik Pueh	Ivy Tan Ai Wei, Karlvin Jungan	Sustainable Water Purification and Soil Conditioner for Communities Living in Remote	36	10,000

			Area using Locally Synthesised Biochar		
F02/(DPP52)/1281/2015 (27)	Khairuddin Sanaulah	Lim Soh Fong, Haji Al Haji	Development of an Efficient Photocatalytic Reactor for Degradation of Palm Oil Mill Effluent (POME)	36	10,000
F02/DPP65/1446/2016/12	Md Rezaur Rahman	Md Tipu Sultan, Prof Dr Sinin Hamdan	Study on Acacia Mangium Wood Polymer Composites (WPCs) for Sustainable Application	36	10,000
F02/DPP64/1445/2016/11	Mah Yau Seng	Prof FJ Putuhena, Onni Suhaiza Selaman, Prof Dr Wang Yin Chai, Marina Patrick	Spatial and Temporal Variability of Rainfall Analysis using Remote Sensing and GIS Approach for Application in Sarawak River Catchment Models	36	10,000
F02/DPP61/1358/2016/8	Prof Dr Md Abdul Mannan	Siti Noor Linda Taib, Onni Suhaiza Selaman, Hisyamuddin Maseri	Efficiencies of Cylindrical Detention Pond (CDP) as Innovative Green Pavement System	36	10,000
F02/DPP/1604/2017	Shafrida Sahrani	Dyg Azra Awg Mat, Rafiq Tamin	Finite Difference Time Domain (FDTD) with OpenFOAM Approach for the Surface Plasmon Polariton with Nanoscale Metallic Materials	36	10,000
F02/DPP/1602/2017	Kismet Hong Ping	Shafrida Sahrani, Bong Siaw Wee	A Novel Algorithm for the Detection of Buried Objects with Arbitrary Shapes	36	10,000

DPI					
Grant No	Project Leader	Co-Researcher	Title	Duration (Month)	Budget (RM)
F02(DPI26)/1126/2014(02)	Hushairi Zen	Prof Ir Dr Al-Khalid Othman, Prof Datuk Dr Khairuddin Abd Hamid, Bello Olalekan	Cross Layer Scheduling and Resource Allocation in WIMAX	36	51000
F02(DPI28)/1244/2015(02)	Nordiana Rajaee	David Bong Boon Liang, Nurlaila Rosli	Music using Artificial Neural Network via Instrumental Timber Analysis	36	49,600
F02(DPI27)/1215/2015(01)	Prof Ir Dr Al-Khalid Othman	PM Dr M Shahidul Islam, Dr Hushairi Zen, Mohd Azlan Ismail	Improving Pump as Turbine Efficiency for Microhydro Applications	24	50,000

MyRA Special Short Term Grant (SpSTG) Cycle 2016/2017					
Grant No	Project Leader	Co-Researcher	Title	Duration (Month)	Budget (RM)
F02/SpSTG/1386/16/28	Nur Alia Athirah Mohtadar	Mohd Danial Bin Ibrahim, Dyg Norkhairunnisa Abang Zaidel	Automated Digital Blood / Drug Delivery System of Polygonal Inner Structure Microneedle with Micropump for Biomedical Application	24	20,400
F02/SpSTG/1371/16/13	Nur Amalina Shairah Abdul Samat	Rubiyah Baini, Nur Syuhada Ahmad Zauzi, Md. Rezaur Rahman	Investigative Study on the Conversion of Extracted Silica from Sarawak Crops Wastes into Silica Absorbent	24	20,000
F02/SpSTG/1372/16/14	Abdul Razak Abdul Karim	Norazzlina M. Sa'don, Jethro Anak Henry Adam, Mahsuri Yusof	Recommendations to MS 544 in Designing the Timber Bolted Connection Strength of Sarawak Hardwoods	24	20,000
F02/SpSTG/1373/16/15	Dyg. Norkhairunnisa Abg. Zaidel	Norhudah Seman, Dayang Azra Awang Mat, Mohd Ridhuan Mohd Sharip, Nur Alia Athirah Mohtadar	The Design of 5G Coupler in Constructing 4x4 Butler Matrix Beam Forming System for the Use in Intelligent Transportation System (ITS)	24	20,000
F02/SpSTG/1388/16/30	Hikma Shabani	Norhuzaimin Julai	Modelling of Wireless Sensor Network Protocol for Smart Grid Distribution Systems	24	20,100
F02/SpSTG/1389/16/31	Idawati Ismail	Nur Amalina Shairah Abdul Samat, Raudhah Ahmadi	Chloride Induced Reactions in Alkali Activated Binders	24	20,000
F02/SpSTG/1374/16/16	Kuryati Kipli	AP Dr Norhayati Soin, Sharifah Masniah Wan	Development of a Classification Algorithm for Brain Structural	24	20,000

		Masra, Mohd Saufee Muhammad, Rohana Sapawi, Muhammad Hamdi Mahmood, Dr Aditya Tri Hernowo, Dayang Zuryaini Abg Mouhammad Hashim	Magnetic Resonant Imaging (sMRI) based Depression Detection System		
F02/SpSTG/1375/16/17	Lakshmanan Gurusamy	Muhammad Kashif, Prof Ir Dr Andrew Ragai Henry Rigit	Fabrication and Characterization of Nanostructured CdTe/Cds Thin-Film for Solar Photovoltaics (PV)	24	20,000
F02/SpSTG/1376/16/18;	Marini Sawawi	Muhammad Kashif, Siti Kudnie Sahari	Optimization of Absorption Coefficient of Titanium Dioxide (TiO ₂) Thin Film Towards Solar Cell Application by Sol-Gel and Spin Coating Method	24	20,000
F02/SpSTG/1377/16/19;	Norazzlina M. Sa'don	Abdul Razak bin Abdul Karim, Prof Siti Noor Linda Taib, Mahsuri Yusof, Jethro Anak Henry Adam	Strength Characteristics of Stabilised Peat using Lightweight Material as Reinforcement Layer for Sub Grade Road Construction	24	20,000
F02/SpSTG/1378/16/20;	Norhuzaimin Julai	Ahmed Mohamed Ahmed Haidar	The Analysis of Soft Error in Asynchronous Circuits Involving C-Elements	24	20,000
F02/SpSTG/1379/16/21;	Nur Taherah Bt Razali	Mahsuri Yusof, Tuan Zaharinie Tuan Zahari, Leong Yeng Weng	Mechanical Properties of Transporting Layer and Active Layer of Organic Solar Cells Fabricated by Using Spray Coating and Conventional Technique	24	20,000
F02/SpSTG/1380/16/22	Raudhah Ahmadi	Fauzan Sahdi, Norazzlina M. Sa'don	Development of Seismic Hazard and Seismic Micronization Maps of Sabah and Sarawak Offshore Concessions	24	20,305
F02/SpSTG/1387/16/29	Shanti Faridah Salleh	Khairuddin Sanaullah, Marini Sawawi, Nordiana Rajae	Modelling and Evaluation of Thresher Performance in Palm Oil Mill	24	20,500
F02/SpSTG/1381/16/23	Aidil Azli Alias	Mohd Danial Ibrahim, Azham Zulkharnain	Improvement of Blower for Biosafety Cabinet (BSC)	24	20,000
F02/SpSTG/1382/16/24	Mohd Afizal Mohd. Amin	Khairul Anwar Mohamad Said, Prof Dr. Mohammad Omar Abdullah	Performance of an Ion Exchange Membrane Coated with a Polymer based Electrode incorporated with Activated Carbon (SP-AC)	24	20,000
F02/SpSTG/1383/16/25	Rudiyanto Philman Jong	Mohd Danial Bin Ibrahim	Extra Low Pressure Automatic Sprinkler System for Residential Building	24	20,000
F02/SpSTG/1384/16/26	Mahshuri Yusof	Nur Taherah binti Razali, Jethro Anak Henry Adam, Norazzlina M. Sa'don, Abdul Razak Abdul Karim, Amalina Muhammad Afifi	Effect of Stearic Acid Treatment to the Aragonite Calcium Carbonate-Filled Polymer Matrix Composites	24	20,400
F02/SpSTG/1385/16/27	Shahrol Mohamaddan	Mohd Syahmi Jamaludin, Prof Dr. Ahmad Hata bin Rasit, Noor Aliah Abdul Majid	Investigation of the Effect of Current Oil Palm Harvesting Tools Towards Human Muscle using Ergonomics Software	24	21,700

MyRA Special Grant Scheme (SpGS) Cycle 2016/2017

Grant No	Project Leader	Co-Researcher	Title	Duration (Month)	Budget (RM)
F02/SpGS/1443/2016/25	Md. Rezaur Rahman	Prof Dr. Sinin bin Hamdan, Rubiyah Bains, Shanti Faridah Salleh, Nur Syuhada Zauzi	Evaluation of Various Combined Monomer with Nanoclay Crosslinker Impregnated Wood Polymer Composites against <i>Trametes Versicolor</i> and <i>Chaetomium Globosum</i> decay fungi	24	20,000

F02/SpGS/1406/16/7	Ivy Tan Ai Wei	Prof Dr. Mohammad Omar Abdullah, Noraziah Abdul Wahab, Nur Syuhada Ahmad Zauzi	Study on Adsorption Behaviours of Activated Carbon in a Hybrid Microbial Fuel Cell-Palm Oil Mill Effluent (POME) Treatment System	24	20,000
F02/SpGS/1404/16/5	Lim Soh Fong	Prof Dr. Mohammad Omar Abdullah, Khairuddin Sanaullah, Rubiyah Baini	Synthesis, Characterization and Adsorption Behavior of Iron Oxides Based Magnetic Particles for Aqueous Contaminants Removal	24	21,700
F02/SpGS/1408/16/9	Prof Ir Dr Al-Khalid Othman	Prof Datuk Dr Mohamad Kadim Suaidi, Nasser Rostam Afshar, Mohd Danial Ibrahim, Ngu Sze Song, Kho Lee Chin	Analysis of Solar Photovoltaic (PV) Electrification Designs and Cost Benefit Analysis for Rural Applications	24	20,000
F02/SpGS/1405/16/6	Mah Yau Seng	Onni Suhaiza Selaman, Beatrice Christianus, Syah Runniza Ahmad Bakri, Nasser Rostam Afshar	Development of Mathematical Model for Prediction of Impact of Climate Change on Rainfall Magnitude in Asajaya Basin in Sarawak	24	22,000
F02/SpGS/1407/16/8	Khairuddin Sanaullah	Prof Ir Dr Andrew Ragai Henry Rigit, Lim Soh Fong, Shanti Faridah Salleh, Prof Ir Dr Law Puong Ling, Cirilo Nolasco Hipolito, Prof Mohd Sobri Takriff	Transforming Palm Oil Mill Effluent (POME) Waste Water for Reuse by the Application of Efficient Photocatalytic Reactor with Immobilized Catalyst	24	20,000

MyRA Special Funding for Research Centres (SpFRC) Cycle 2016/2017

Grant No	Project Leader	Co-Researcher	Title	Duration (Month)	Budget (RM)
F02/SpFRC /1436/16/4	Martin Anyi	Kismet Ak Hong Ping, Shirley Rufus, Assoc Prof Dr Nasser Rostam Afshar	Design and Development of A 500W Micro Hydro System for Rural Communities in Sarawak	24	23,040

MyRA Special Top Down Grant (SpTDG) Cycle 2016/2017

Grant No	Project Leader	Co-Researcher	Title	Duration (Month)	Budget (RM)
F02/SpSDG /1439/16/2	Noraziah Abdul Wahb	Prof. Dr Mohd Omar Abdullah, Lesley Maurice Bilung, Ivy Tan Ai Wei, Prof. Dr Mohd. Sobri b. Takriff (UKM)	Microbial Fuel Cell (MFC) with Algal Biocathode: Bioenergy Production and Wastewater treatment using Sago Mill Effluent	24	20,000
F02/SpSTDG /1440/16/3	Prof. Dr Wan Hashim Wan Ibrahim	Mohd. Raduan Hj. Kabit, Prof Ir Dr Al-Khalid.Othman, Prof. Dr M. Abdul Mannan, Prof. Dr Nasser Rostam Afshar	Mechanistic and Economical Analyses of Green IBS StormPav	24	20,000

MyRA Special Short Term Grant (SpSTG) Cycle 2017/2018

Grant No	Project Leader	Co-Researcher	Title	Duration (Month)	Budget (RM)
F02/SpSTG/1 567/2017	Khairul Fikri Tamrin	Abu Saleh Ahmed, Shahrol Mohamaddan, Mohamad Syazwan Zafwan Mohamad Suffian, David Chua Sing Ngie	Use of discarded DVD writer drives for precision laser micro-drilling of non-metals	24	20,000
F02/SpSTG/1 568/2017	Mohd Ridhuan Mohd Sharip	Norhuzaimin Julai, Prof Dr Paul Ratnamahilan Hoole, Ahmed Mohamed Ahmed Haidar, Dyg Norkhairunnisa binti Abang Zaidel, Dalilla binti Mat Said, Associate	Power Quality Analysis of Grid Integration with Renewable Energy Sources (RES): A Case Study From Sarawak	24	20,000

		Professor Mithulananthan Nadarajah, Professor Samuel Ratnajeevan Herbert Hoole			
F02/SpSTG/1569/2017	Abang Mohamad Nizam Abang Kamaruddin	Abdullah bin Hj Yassin	Performance of the titanium alloy cutting utilizing palm oil as lubricant	24	20,000
F02/SpSTG/1582/2017	Yonis. M.Yonis Buswig	Norhuzaimin bin Julai, Mohamed Abdelmoneim Shaaban Mohamed	Development Of A Multi-Input Power Converter For Hybrid Enewable Energy System Using Intelligent Control System (Artificial Neural Network Control)	24	20,000
F02/SpSTG/1583/2017	Norlisa Mili	Rubiyah Bains, Khairul Anwar Mohamad Said, Shirley anak Rufus, Harunal Rejan Ramji, Shanti Faridah Salleh, Cirilo Nolasco Hipolito	Application of water pinch technology in minimization of water consumption for palm oil refinery	24	20,000
F02/SpSTG/1584/2017	Noor Hisyam Noor Mohamed	Prof Dr. Sinin Hamdan, Marini Sawawi, Mahsuri Yusof, Md. Rezaur Rahman	Mechanical characterization of cellulose nanofiber reinforced polymer composites	24	20,000
F02/SpSTG/1585/2017	Harunal Rejan Ramji	Khairuddin Sanaullah, Prof Ir Dr Andrew Ragai Henry Rigit	Design and Application of Mechanical Driven Aerator to Circulate and Oxygenate Hypolimnetic Layer in Hydro Power Reservoirs Across Sarawak	24	20,000
F02/SpSTG/1586/2017	Abdul Rahman Kram	Norhuzaimin Julai, Nurdiani Zamhari	High Capacity Performance Using New modulation Technique in Free Space Optical System Under Severe Weather	24	20,000

MyRA Special Grant Scheme (SpGS) Cycle 2017/2018

Grant No	Project Leader	Co-Researcher	Title	Duration (Month)	Budget (RM)
F02/SpGS/1541/2017	Mohamad Raduan Kabit	Johnson Olufemi Adebayo, Prof Dr. Mohammad Abdul Mannan	Development Of High Performance Eco-Friendly Rubbercrete Paving Stone (HPRPS) For Rural Roads	24	20,000
F02/SpGS/1544/2017	Mohamed Abdelmoneim Shaaban Mohamed	Prof Dr. Musse Mohamad Ahmed, Mohd Ridhuan Mohd Sharip	Flexibility-based Scheduling of Microgrids in a Smart Distribution System	24	20,000
F02/SpGS/1543/2017	Syed Tarmizi Syed Shazali	Magdalene anak Andrew Munot, Abang Mohamad Aizuddin, Fabian Halley Pata Anak Alban Dattu, Noor Hisyam Noor Mohamed	Development of Finite Element Model of Futsal Ball And Simulation of Its Impact Characteristics	24	20,000
F02/SpGS/1542/2017	Charles Bong Hin Joo	Tay Kai Meng, Prof Dr. Ng Chee Khoon, Cirilo Nolasco Hipolito	Investigation on the Factors Influencing the Efficiency of Flushing Gate for Sediment Removal in Open Channel	24	20,000

MyRA FRGS 2016 Cycle (SpFRGS)

Grant No	Project Leader	Co-Researcher	Title	Duration (Month)	Budget (RM)
F02/SpFRGS/1537/2017	Mohd Danial Ibrahim	Prof Ir Dr Al-Khalid bin Hj Othman, Hushairi Zen, Aidil Azli Alias, Rudiyanto Philman Jong, Muhammad Shukry Fasihuddin, Zalikha Farhah Ismail	Low Carbon Organizations Through System Optimization for Unimas, Manufacturing Industries and SMEs	24	20,000
F02/SpFRGS/1538/2017	Abu Saleh Ahmed	Prof Dr. Sinin bin Hamdan, Khairul Fikri Tamrin, Dr Kamakshaiah Charyulu	Synthesis of Dynamic Nanocatalyst from Seashells for Production of Karanja Biodiesel	24	20,000

F02/SpFRGS/1539/2017	Delsye Teo Ching Lee	Prof Dr. Mohammad Abdul Mannan, Prof Dr. Ng Chee Khoon, Norsuzailina Mohamed Sutan	A Feasibility Study on the Development of Artificial Lightweight Aggregates from Locally Available Wastes	24	20,000
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SGS Active grants 2016/2017; 2017/2018

Grant No	Project Leader	Co-Researcher	Title	Duration (Month)	Budget (RM)
F02(S149)/1129/2014(14)	Charles Bong	Prof Ir Dr Frederick Josep Putuhena	Effect of Sediment Deposition Thickness on Incipient Motion in Rigid Boundary Channel	24	25,000
F02(S153)/1154/2014(18)	Nordiana Rajae	Awang Ahmad Sallehin Awang Husaini, Azham Zulkarnain	Design and Synthesis of DNA Sequences for Solving Problems with DNA Computing	36	25,000
F02(S164)/1197/2015(01)	Ana Sakura Zainal Abidin	Annisa Jamali, Shahrol Mohamaddan, Rasli Muslimen, Mohd Syahmi Jamaludin, Muhd Fadzli Ashari	Development of in-pipe Robot for Piping Operations	24	25,000
F02(S166)/1218/2015(03)	Sh Masniah Wan Masra	Mohd Saufee Muhammad, PM Dr Rahardjo Darmanto Djodibroto, Rohana Sapawi	Design and Development of Digital Index Quantitator (DIQ) for Identification of finger Clubbing	24	25,000
F02(S172)/1274/2015(09)	Magdalene Andrew Munot	Abdullah Yassin, Syed Tarmizi, Marini Sawawi	Development and Testing of Simulation Model for Remanufacturing of Automotive Parts	24	25,000
F02(S173)/1275/2015(10)	Muhammad Kashif	Prof. Dr. Amir Azam Khan, Siti Kudnie Sahari	Study on the Effect of Deposition Temperature on Structural, Morphological..	30	23,500
F02(S174)/1276/2015(11)	Prashobh Kumar Karunakaran	Hushairi Zen, Siti Kudnie Sahari, Nazreen Junaidi, Lakshmanan A/L Gurusamy, Shirley anak Rufus	Determination of the Diameter of Carbon Steel Pipes which will Provide a Safe Clearance Point (Point of No Eddy Current) around Electricity Carrying Cables suspended Within Them with Spaced Insulators	24	25,000
F02(S181)/1325/2016(5)	Dyg Azra Awg Mat	Kismet Hong Ping, Shafrida Sahrani, Thelaha Masri	Design of Passive Devices with Patterned Structure for Microwave and Millimeter Wave Applications	24	24,499
F02(S178)/1322/2016(2)	Abu Saleh Ahmed	Mohd Fareez Edzuan Abdullah, Hishammudin Afifi Huspi, Siti Noor Ain Musa	Study of Biofuel Effects on Diesel Engine Emissions	24	21,000
F02/SGS/1524/2016	Norhasmaliana Abd Manas	Azham Zulkarnain, Rubiyah Baina, Siti Hazirah Adam, Nur Syuhada Ahmad Zauzi	Immobilization of Thalassospira Profundimarit Mo2 for improved biotransformation of heterocyclic aromatic compounds for enhanced marine water-treatment system	24	25,000
F02/SGS/1600/2017	David Chua Sing Ngie	Khairul Fikri, Shirley Jonathan, Shahrol M., Rudiyanto Philman Jong, Lim Soh Fong, Mohd Syazwan Mohamad Suffian	Automatic Heatstroke Detection System for an Unattended Child in a Car	24	25,000
F02/SGS/1527/2017	Siti Hazirah binti Adam	Rubiyah Baina, Aishah Abdul Jalil, Prof Dr. Mohammad Omar Abdullah, Shanti Faridah	Removal of Heavy Metal from Plating Industries Wastewater by Coagulation-	24	23,400

		Salleh, Nur Syuhada Ahmad Zauzi, Nor Hasmaliana Abdul Manas	flocculation using Sago Waste		
F02/SGS/1628/2017	Norfamila Che Mat	Nazeri Abdul Rahman, Rubiyah Bains	Carbon Capture Cost Minimization Strategies in Membrane based Hybrid Process for Post-combustion Application	24	25,000

OSAKA Gas Grants (2017/2018)					
Grant No	Project Leader	Co-Researcher	Title	Duration (Month)	Budget (RM)
1.	Josephine Lai Chang Hui	Rubiyah Bains Rezaur Rahman Nur Syuhada Ahmad Zauzi Nur Amalina Shairah Abdul Samat	Enhancing Durability of Natural Softwood Using Polymer Matrix	12	7,500
2.	Norhuzaimin Julai	Shamsiah Suhaili	Low Power and Low Energy Design of Asynchronous Communication Circuit with Novel Design of Completion Detectors	12	4,700
3.	Ade Syaheda Wani Marzuki	Dayang Azra Awang Mat Dyg Norkhairunnisa Abg Zaidel Kismet anak Hong Ping Shafrida Safrani Rohana Safawi	Energy-Efficient Resources Management for Massive MIMO-Enabled Small Cell Networks	12	8,000
4.	Dona Rose Amer Koesmeri	Prof NurAkmal Abdullah Goh Siti Halipah Ibrahim Azhalil Baharun Bambang Karsono Zayn Al-Abideen Gregory Yon Syafni Samat	A Study on Pocket Unused Space at UNIMAS West Campus for Potential Infill Development Towards A Livelier, Conduasive Sustainable Campus	12	7,000
5.	Zayn Al- Abideen Gregory	Bambang Karsono Yon Syafni Samat Dona Rose Amer Koesmeri Prof NurAkmal Abdullah Goh	Conserving Indigenous Culture Through Fire Prevention: Developing a Longhouse	12	7,000
6.	Hazrul Mohamed Basri	Hazrul Mohamed Basri Kasumawati Lias Wan Azlan Wan Zainal Abidin Prof Ir Dr Al-Khalid Othman	A Mathematical Approach of Predictive Control Formulation for Three Level Neutral Point Clamp Based Indirect Matrix Converter	12	4,000
7.	Muhamad Fadzli Ashari	Shahrol Mohamaddan Abang Mohd Nizam Abang Kamaruddin Abang Mohamad Aizuddin Abang Mohamad Mohtar	Drying Processing of Lemantak (Sago Powder) Using an Automated Machine for Cottage Industries in Sarawak	12	10,000
8.	Raudhah Ahmadi	Idawati Ismail Prof Dr Mohammad Abdul Mannan	Development of High Strength and Ductile Fiber Reinforced Concrete (FRC) mixed with Treated Palm Oil Fuel Ash (POFA)	12	6,000

Journals Articles

1. Carvajal-Zarrabal, O., Hayward-Jones, P. M., Nolasco-Hipolito, C., Ma Barradas-Dermitz, D., Laura Calderon-Garciduenas, A., Lopez-Amador, N. Use of Cardiac Injury Markers in the Postmortem Diagnosis of Sudden Cardiac Death. *Journal of Forensic Sciences*, 62(5), 1332-1335.
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3. Marzuki A.S.W., Ahmad I., Habibi D., Phung Q.V. (2017). Mobile Small Cells: Broadband Access Solution for Public Transport Users. *IEEE Communications Magazine*, 55(6), 190-197.
4. Haidar A.M.A., Muttaqi K.M., Hagh M.T. (2017). A coordinated control approach for DC link and rotor crowbars to improve fault ride-through of dfig-based wind turbine. *IEEE Transactions on Industry Applications*, 53(4), 4073-4086.
5. Hikma, S., Ahmed, M.A.H., Norhuzaimin, J., Musse, M.A., Hoole, P.R.P., Majdi, M. (2017). Adaptive Algorithm for Optimal Route Configuration in Multi-Hop Wireless Sensor Network. *International Journal of Control Theory and Applications*, 10(16), 267-275.
6. Hasan A., Karrech A., Chareyre B. (2017). Evaluating force distributions within virtual uncemented mine backfill using discrete element method. *International Journal of Geomechanics*, 17(7).
7. Shafqat, S.S., Khan, A.A., Khan, M.A., Salleh, S.F., Jamaludin, M.S., Cem, P.S. (2017). Green synthesis and characterization of 3-carboxycoumarin and ethylcoumarin-3-carboxylate via Knoevenagel condensation. *Asian Journal of Chemistry*, 29, 2-266.
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10. Ebtehaj, I., Bonakdari, H., Khoshbin, F., Bong, C.H.J., Ab Ghani, A. (2017). Development of group method of data handling based on genetic algorithm to predict incipient motion in rigid rectangular storm water channel. *Scientia Iranica*, 24(3), 1000-1009.
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12. Thong C.C., Teo D.C.L., Ng C.K. (2017). Durability characteristics of polyvinyl alcohol-treated oil palm shell concrete. *Journal of Materials in Civil Engineering*, 29(10).
13. Seman N., Zaidel D.N.A., Wahid Z.A.A., Shukor N.A.M., Rahman T.A. (2017). Compact wideband broadside-coupled microstrip-slot bandpass filter for communication applications. *Indonesian Journal of Electrical Engineering and Computer Science*, 5(3), 650-655.
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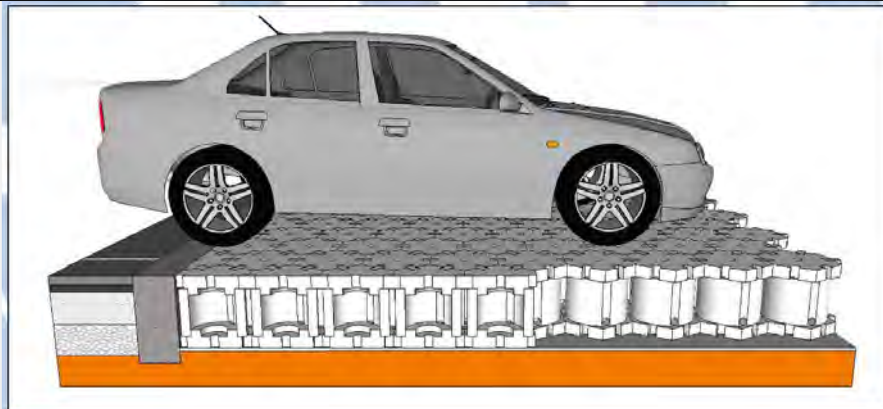
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Professor Dr. Mohammad Abdul Mannan (Project Leader; mannan@unimas.my)
Department of Civil Engineering

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➤ Number of unit made using 1m3 concrete = 24 units	➤ Area coverage with 24 units = 4.0m2 area
➤ Units required for 1m2 area = 6 units	➤ Performance: Providing uniform load distribution through interlocking and monolithic characters
➤ Production type: Full Precast	➤ Total thickness =450mm
➤ Lifting type: using simple mechanical lifting device	➤ Cost-effective: Dry-stacked with interlocking system <ul style="list-style-type: none"> • Assembled on flat subgrade directly • Saving installation time and manpower
➤ Aesthetics: Enduring beauty on exposed surface	➤ Environmental friendly: <ul style="list-style-type: none"> • User-and environmental-friendly system • Capable of providing stormwater detention for 3 hours continuous rainfall with magnitude of 10-year ARI as worst case scenario • Able to provide surface permeation at 180mm/hr of rain water to detention storage



Pavement Section



Fig 1. StormPav products (base and cover blocks) [products made through kind support of JKR Sarawak for Kg Mang, Samarahan pilot road project]



Fig 2. StormPav products (Hollow cylinder blocks), [products made through kind support of JKR Sarawak for Kg Mang, Samarahan pilot road project]

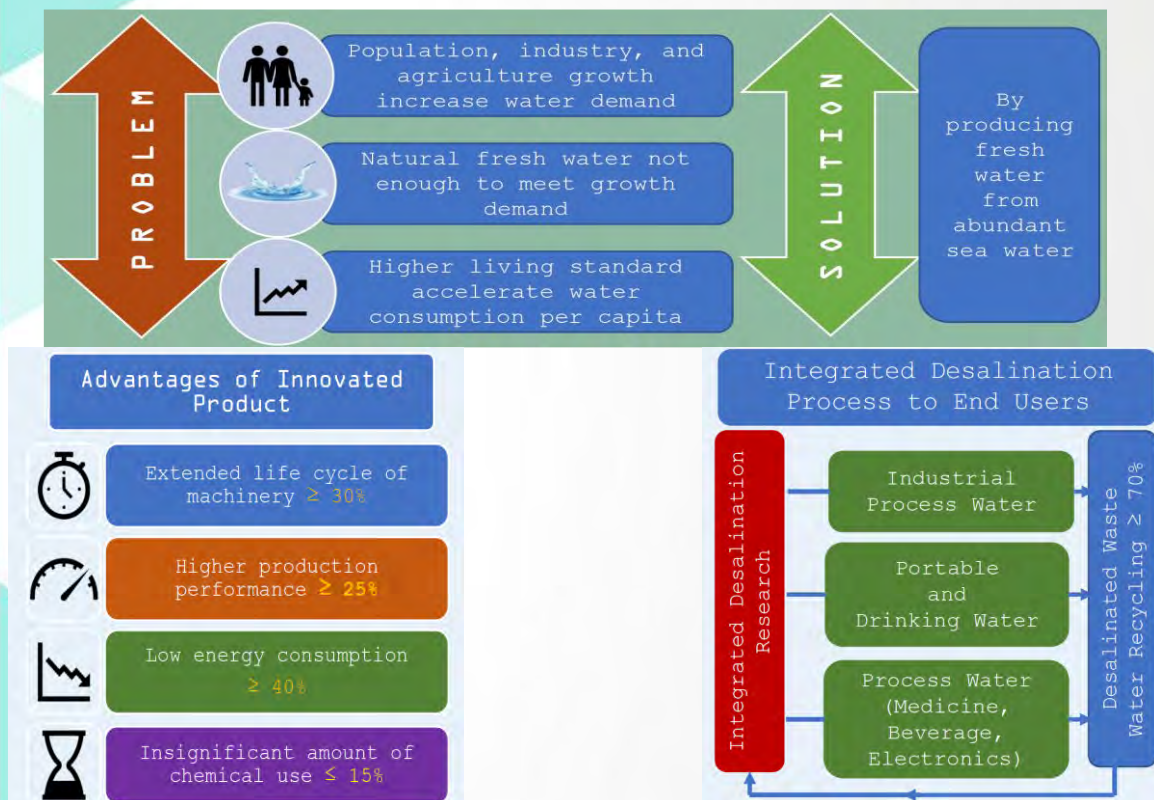


Fig 3.4 Pilot road project using StormPav green pavement at Kg Mang, Samarahan, Sarawak, funded by JKR Sarawak [in progress]

Integrated Desalination Process for Achieving Sustainability Of Water Supply And Environment

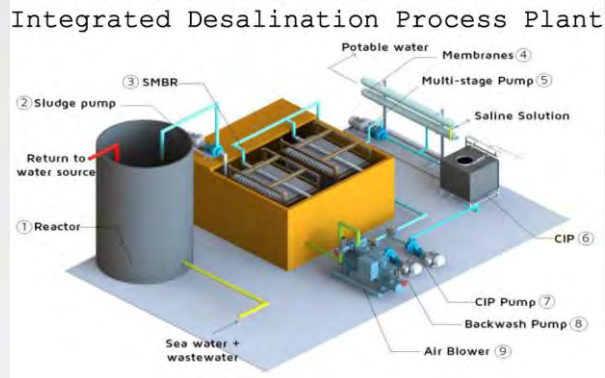
Prof. Dr M. Shahidul Islam (Project Leader; mislam@unimas.my)
Department of Mechanical and Manufacturing Engineering

This project has benefitted various communities and industries namely communities in Sadong Jaya and Bakun township in Sarawak and Kampung Laloh in Kelantan. An integrated system for producing usable water for many, it is both efficient and cost effective which makes the system outstanding among other existing technology.



Fouling Controlling Device for Optimum Performance

- Minimum biofilm formation
- Wastewater Recycling for reducing water production cost
- Optimizing machinery capacity utilization



Benefits to Academic

- Problem-based research on water purification will increase
- University-Industry link research will increase
- Multi-disciplinary research including Health-Economy and Engineering will increase

Benefits to Communities

- 20m³ plant for 200 people, at water cost RM0.12 day/pax
- 100m³ plant for 1000 people, at water cost RM0.10 day/pax
- Sadong Jaya 600 villagers using safe water
- Kg Laloh 500 flood victims and 300 students safe water
- Bakun 10,000 people benefited

Benefits to the Economy

- Opportunity for developing industries for manufacturing desalination machinery
- Contribute to reduce import cost of water purifying machinery
- Increase export revenue from Desalination technology
- Create high skills job including R&D

Benefits to the Environment

- 40% less energy consumption reduces greenhouse gas emission
- 85% less chemical use reduces environment pollution
- 70% wastewater recycling through desalination reduces water and environment pollution

The UNIMAS Pilot Project On Road Construction Using Foam Concrete Replacement Method

By Assoc Prof Dr Mohammad Ibrahim Safawi Mohammad Zain, Assof Prof Dr Siti Noor Linda Taib, Dr Al-Sidqi Hasan & Ahmad Kamal Abd Aziz

On the onset, our team would like to express our sincere appreciation to JKR Sarawak for their courage to collaborate with Faculty of Engineering UNIMAS in this pilot project. In particular, three important personalities are worthy of praise for the successful implementation of this project and they are Ir Hj Junaidi Shahdan (Deputy Director), Ir Vincent Tang Chok Khing (Head of Project) and Ir Chin Hon Sin (Assistant Director). Without their commitments and approvals this pilot project would not have taken off from the confines of UNIMAS laboratory to a full-scale road project. This project manifests the innovation culture in JKR Sarawak in finding solution to the construction problem on peat. The Department of Civil Engineering is honoured to join forces with them in this project.

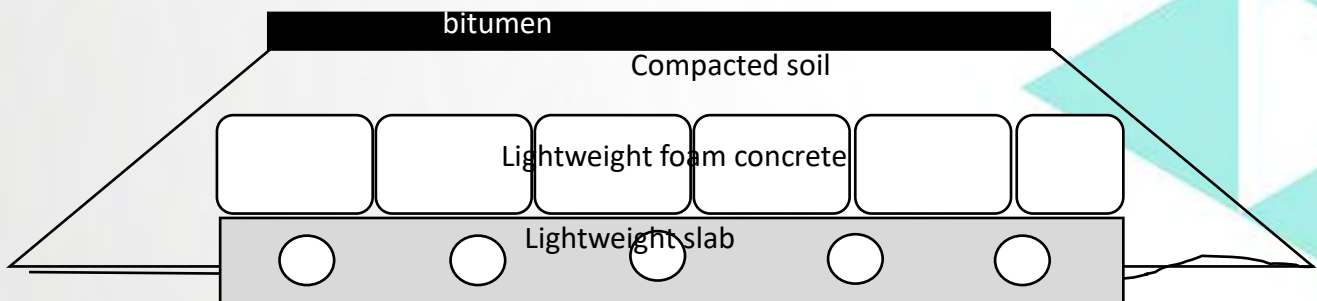


Fig. 1 Schematic diagram of the UNIMAS design in the Bako road project

In 2006 a group of researchers consisting of Dr Mohammad Ibrahim, Dr Siti Noor Linda, Dr Prabir Kolay, Ahmad Kamal and Azida formed a research venture to propose a viable solution to construction problem on peat. Sarawak has the most abundant peat area throughout Malaysia and it has been economically difficult to construct any structure on peat. Thus, such research idea was very noble and impactful for the State. We had a three-throng approach to confront this problem. Azida and Dr Ibrahim shall work on the material aspect of the research particularly peat replacing materials. Dr Kolay and Dr Linda will work on the peat stabilization aspect particularly harnessing the useful properties in peat. Mr Ahmad Kamal is responsible to do numerical modelling of road design on peat.

This article shares our maiden solution to this problem. In layman term peat is a collection of decomposed vegetation many thousands of years soaked in water. It has little or zero ability to accept any loadings while its depth can range from 3 to 10m deep in the ground. Existing road construction methods are many with some degree of success and failures. Present construction approach normally involves removal of peat and replace with fill material, say sand. It is practical except long term settlement will cause the road to be undulating. The fill material is heavier than peat and impose overburden. Other method is to erect concrete piles and transfer the dynamic load to the piles. It is a good solution but economically not practical. In our pilot project we created a lightweight concrete slab as our base. The size and strength of this concrete allow equal distribution of load on the soil within the slab area. Instead of the normal practice of using sand as fill material, lightweight foam concrete is placed on the concrete slab. Thus, the soft soil will not be exerted with too much loadings and any hydraulic pressure from the saturated soil condition will not pose any problem to the structure. In addition, the strength of the foam concrete allows the dynamic loads from the vehicles be absorbed to a certain degree. With respect to such a design, the closest practice is the design by Geocrete product. The difference is that they use stabilized soil while UNIMAS use lightweight concrete. The whole design was done by the UNIMAS team and we appreciate the opportunity offered by JKR to install the system at their project "Proposed Bridge Over Sg. Bako and Access Road To Kpg. Bako, Kuching Division - Soft Soil Construction Using Foam Concrete With UPVC Mattress".



Surface Preparation for RC Slab



Reinforcement, Formworks and Laying of UPVC pipe



Concreting RC slab



200mm thick RC Slab



Foam Concrete Blocks installed



Arrangement of lightweight foam concrete on site

The whole project is very challenging right from the beginning. Since the project involve big volume supply of foam concrete it cannot be done by UNIMAS. A technology licensing agreement was reached with a local ready mix supplier, PCP Concrete Sdn Bhd. Thus, they will be the supplier of the foam concrete in this project. It was a very daunting task translating experimental results from the laboratory that uses a 200 liters mixer to a huge dry batch mixer with 10 liters capacity. The final product must fulfil 5 main criteria, that is, appropriate density, optimum strength, minimal shrinkage upon drying, economically produced and sufficient mixing volume. It was indeed not easy but PCP Concrete was a very patient and willing partner in this project. At point of writing, they are in the process of producing and supplying 330 blocks of foam concrete to site. The whole pilot project is expected to complete by March 2018.

CONSULTANCY

Faculty of Engineering Completes High Voltage Cable Testing Project at SEB

Prof. Ir Dr Amir Azam Khan (Project Leader: akamir@unimas.my)
Department of Mechanical and Manufacturing Engineering



A team of researchers from the Faculty of Engineering, composed of Prof. Ir Dr Amir Azam Khan, Prof. Ir Dr Andrew Ragai Henry Rigit, Prof. Ir Dr Alkhalid Hj Othman, Ir Dr David Bong Boon Liang and Dr Lim Soh Fong, successfully completed 275 kV and 132 kV High Voltage overhead conductors testing for Sarawak Energy Berhad (SEB) under a consultancy project which was managed with UNIMAS Holdings SDN BHD (UHSB). SEB is a major company to produce and distribute electric power in Sarawak and is using overhead high voltage conductors for their two different lines, 275 kV Mambong-Matang line and 132 kV Mambong-Entingan line. Sarawak Energy considered it important to get an assessment about the status of these conductors. Firstly, this knowledge provides them the overview of the quality of the conductor and secondly this is important for the company to assess the conductors in view of specific conditions which may affect the characteristics of high voltage overhead conductors over the time of use. The work was successfully completed in March 2017.

SERVICES

Testing of Polished Stone Value (PSV)

At Civil Engineering Laboratory, Faculty of Engineering
Universiti Malaysia Sarawak

This is the most important test to be performed on aggregates prior to be approved and used as road surface course material. The Polished Stone Value Testing of aggregates measures its resistance to the polishing effect of vehicle tires. If aggregates were highly polished under the polishing effect of vehicle tires, as a result the road surface will become very slippery. Such scenario especially when the road surface is wet can lead towards skidding related accident cases.

The road surface course components are mainly made of aggregate particles, where its polishing property is an important criterion for determining the road surface skid resistance value. However, the actual relationship between the PSV and skid resistance of the road surface is also dependent on the traffic conditions, the type of wearing course used and other factors.

Table 1.0 shows the minimum values of 'skid resistance for three major categories of application sites (measured with the portable tester) (TRRL,1969)

Table 1.0: Skid Resistance Values (TRRL, 1969)

Category	Type of site	Minimum skid resistance (surface wet)
A	Difficult sites such as: 1. Roundabouts 2. Bends with radius less than 150 m on unrestricted roads 3. Gradients 1 in 20 or steeper of lengths greater than 100 m 4. Approaches to traffic lights on unrestricted roads	65
B	Motorways, trunk and class 1 roads and heavily trafficked road in urban areas (carrying more than 2000 vehicles per day)	55
C	All other site (specified for more lightly trafficked in rural and urban areas) with traffic less than 2000 vehicles per day	45



Fig 1. Accelerated Polishing Machine



Fig 2. Portable Skid Resistance Tester

*Ron Aldrino Chan @ Ron Buring, Zamri Bin Bujang, Larry Silas Tirau, Dr Mohamad Raduan b. Hj Kabit
 Department of Civil Engineering
 *Lead Consultant, email: acron@unimas.my

STUDENTS NEWS

Engineering Postgraduate Student Association (EPSA) 17/18 Annual General Meeting 2017



The Engineering Postgraduate Student Association (EPSA) 17/18 had conducted their first general meeting on 17th October 2017, with Assoc. Prof. Ir. Dr. Siti Noor Linda Taib (Deputy Dean) and Prof. Ir. Dr. Amir Azam Khan, the advisors for EPSA 17/18. A second meeting was also conducted on 19th December 2017 with Prof. Ir. Dr. Al-Khalid Hj. Othman (Dean Faculty of Engineering) and Prof. Ir. Dr. Amir. Azam Khan.

In the meetings, some issues and suggestions which aimed to improve the research environment and culture were discussed with the advisors. With regards to the upcoming activities by EPSA 17/18, the Academic EXCO has suggested series of seminar/workshop to improve students' awareness on various elements of performing scientific research. In January 2018 for example, a workshop on publishing in ISI/Scopus journals conducted by Prof. Dr. Hj. Kamaruzaman Jusoff will be organised. The newly appointed EXCO members are ready to lead all FEng postgraduates to strive for research excellence!

5th POSTGRADUATE BORNEO RESEARCH COLLOQUIUM 2017



A 2 day colloquium that focused on ideas as well as view sharing on common research integrity issues were the objectives of the 5th Postgraduate Borneo Research Colloquium organized by the students from the Engineering Postgraduate Student Association (EPSA) together with the Student Association Faculty of Engineering (SAFE) of Universiti Malaysia Sarawak (UNIMAS).

With the theme "Bridging Advancement Together", the colloquium is a platform for thought leaders, academicians, and researchers to share their ideas and views on common research integrity issues, positives approach in inculcating best research integrity practices, which may in turn inspire new and practicable standards in the field. The paper and poster presentation encompass a full range of engineering and business disciplines. The aims of the colloquium were to provide an avenue for the higher degree by research (HDR) students to present their work, improve their presentation skills, facilitate cross-fertilization of research ideas, to engender a corporate research culture and provide a networking as well as fostering friendship and collaboration.

The colloquium, held on 4th until 6th of July featured speakers from Curtin University and UNIMAS who are specialized in their respective field. The delegates were also involved in Technical Sessions and Poster Presentations which covered Electronics, Civil and Chemical Engineering, as well as Business, Language and Education. There were nearly 80 registered participants from UNIMAS, and Curtin University Sarawak. The colloquium had also prepared recreation activities such as trips to Dewan Undangan Negeri Sarawak and around Kuching town on the 6th.

The 5th Postgraduate Borneo Research Colloquium was officially launched by Associate Professor Ir. Dr. Hajah Siti Noor Linda Haji Taib and Professor Ir. Dr. Amir Azam Khan, who are the advisors of EPSA.

Report on Participation in 2017 UEC Sakura Science Program

Reason why I applied for the program

I participated for the UEC Sakura Exchange Plan because I wish to learn the research skills and knowledge from one of the world's leading nation for innovation, Japan. And also, to connect with greater scientific community from Japan and also with research degree candidates from the Asean countries as well as to experience the richness of the Japanese culture first hand.



Fig 1. First day at The University of Electro-Communications, Japan.

The outcome achieved by participating in the program

The University of Electro-Communications or the UEC University has a large number of advanced facilities which can facilitate in making breakthrough in science and it was my first time to be able to witness such advanced technology. I was deeply interested with the BL36XU beamline of which was constructed by the UEC, RIKEN and JASRI. The BL36XU was constructed for the structural and electronic analysis of the dynamic events on polymer electrolyte fuel cell (PEFC) cathode catalysts for the development of next-generation PEFCs. It was an honor to be able to see where and how advanced fuel cell research was done which one day will make a significant contribution to the low carbon effort worldwide. Not only that, during my stay in Japan, I observed two Japanese qualities which have impressed me that are always being mindful of others and their dedication to excellence and precision. I found that these two qualities to be very important and have started adopting these two qualities to myself.



Fig 2. Laboratory Visit at SPring-8 for Advanced Fuel Cell Research



Fig 3. Visit at Miraikan (the Science Museum)

Opinion about the program

All the lectures and visits were very interesting and exciting which have exposed me to different fields of advanced science and technology. This exposure will provide me with more interdisciplinary ideas on my future research especially in tackling challenging problems. Besides that, the program has really benefitted the direction of my future research towards supporting a low carbon society and environment.

Student Exchange Programme

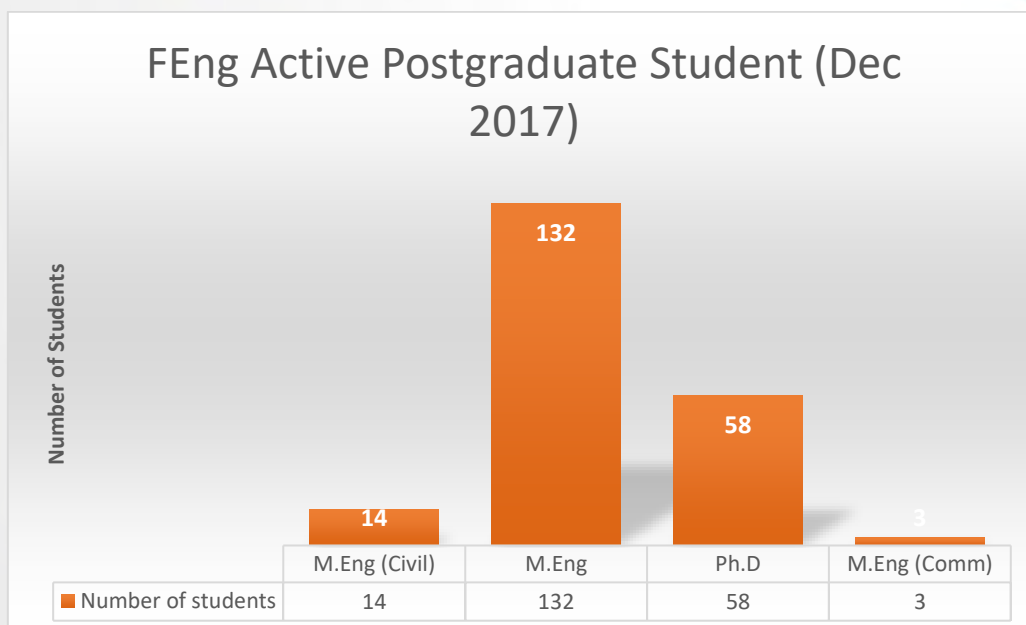
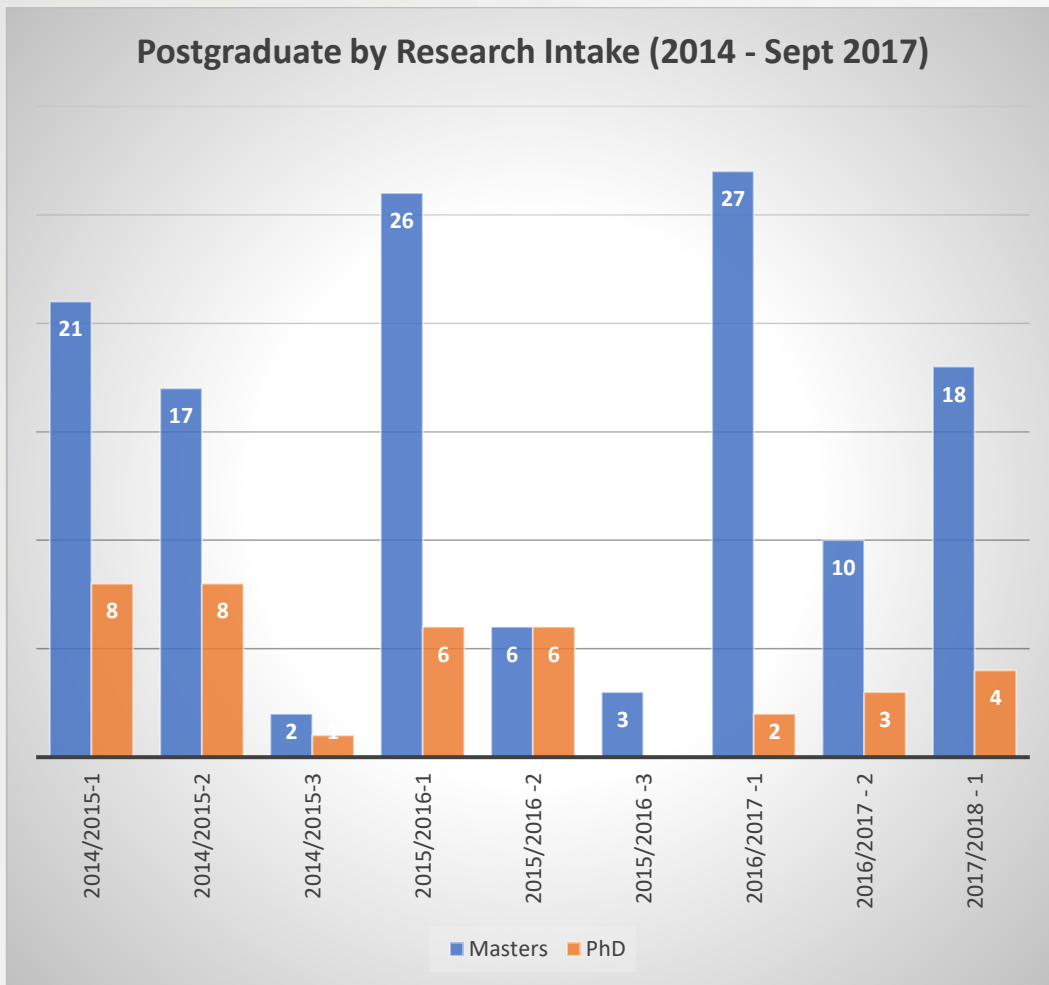
Collaboration with Shibaura Institute of Technology

Collaboration between universities is critical for skills development and knowledge sharing. Universiti Malaysia Sarawak and Shibaura Institute of Technology in Japan have formalized their collaboration and obligation on student exchange program upon the terms and conditions as stated in the Memorandum of Agreement signed on August 2015. This Agreement is considered as a milestone toward a future research collaboration. Such movement will bring significant new strengths and benefits for both sides and will also facilitate research alignment between the two institutions in different engineering fields, thus establishing long term incentives for continued collaboration.

List of Graduated Students in 2017

No.	Name	Degree	Area	Supervisor	Co- Supervisor
1.	Bong Voon Pai	PhD	Electronic Engineering	AP Dr Wan Azlan Wan Zainal Abidin	AP Dr Thelaha Masri Dr Kismet Hong Ping Dr Shapi-ee Abd Rahman
2.	Houssein Mohamed Elawad	PhD	Manufacturing Engineering	Prof Dr M. Shahidul Islam	AP Dr Abdullah Yassin AP Dr Syed Tarmizi Syed Shazali
3.	Ibrahim Abba	PhD	Electronic Engineering	AP Dr Wan Azlan Wan Zainal Abidin	AP Dr Thelaha Masri AP Dr Mohd Saufee Muhammad Dr Kismet Hong Ping
4.	Lee Man Djun	PhD	Manufacturing Engineering	Prof Dr M. Shahidul Islam	AP Dr Abdullah Yassin AP Dr Syed Tarmizi Syed Shazali
5.	Liew Fui Kiew	PhD	Mechanical Engineering	Prof Dr Sinin Hamdan	Dr Md. Rezaur Rahman
6.	Michelle Lu	PhD	Electrical Engineering	AP Dr Wan Azlan Wan Zainal Abidin	AP Dr Thelaha Masri
7.	Muhammad Syukri Imran Abdullah	PhD	Civil Engineering	AP Dr Azhaili Baharun	AP Dr Siti Halipah Ibrahim
8.	Tan Yie Hua	PhD	Chemical Engineering	Prof Dr Mohammad Omar Abdullah	AP Dr Cirilo Nolasco Hipolito
9.	Tee Pei Fang	PhD	Chemical Engineering	Prof Dr Mohammad Omar Abdullah	Dr Ivy Tan Ai Wei
	Agnes Lee Yung Weng	Master by Research	Chemical Engineering	Dr Lim Soh Fong	Dr David Chua Sing Ngie
	Ahmad Salam Farooqi	Master by Research	Chemical Engineering	AP Dr Khairuddin Sanaullah	AP Dr Shanti Faridah Salleh Ir. Dr Shaharin Anwar Sulaiman (UTP)
	Evon Tang Ee Wen	Master by Research	Civil Engineering	Dr Darrien Mah Yau Seng	Dr Onni Suhaiza Selaman
	Johnny Ngu Ong King	Master by Research	Civil Engineering	Dr Darrien Mah Yau Seng	Dr Charles Bong Hin Joo
	Lau Jing Teck	Master by Research	Civil Engineering	Dr Darrien Mah Yau Seng	Dr Alsidqi Hasan
	Nurliyana Hussaini	Master by Research	Electronic Engineering	AP Dr Thelaha bin Hj. Masri	AP Dr Wan Azlan Wan Zainal Dr Kismet Hong Ping
	Puteh Munawarah Ibrahim	Master by Research	Electronic Engineering	Dr Kismet Hong Ping	Dr Nordiana Rajae Dr Martin Anyi
	Sherena Saree	Master by Research	Chemical Engineering	AP Dr Shanti Faridah Salleh	Prof. Dr Mohammad Omar Abdullah
	Tan Ming Yee	Master by Research	Mechanical Engineering	Dr Nicholas Kuan Hoo Tien	Prof. Dr Amir Azam Khan
	Teo Chong Yaw	Master by Research	Mechanical Engineering	AP Dr Abdullah Yassin	-
	Wong Teck Soon	Master by Research	Chemical Engineering	Dr Shanti Faridah Salleh	-
	Carein Yoke Balanda	Master by Coursework	Civil Engineering		
	Joyner Manggang	Master by Coursework	Civil Engineering		
	Normah Jainudin@Mohamad	Master by Coursework	Civil Engineering		
	Nur Humaira Roslan	Master by Coursework	Civil Engineering		
	Philip Ho Chen Yang	Master by Coursework	Civil Engineering		
	Sharon Robert	Master by Coursework	Civil Engineering		
	Siti Mazjida Mazlan	Master by Coursework	Civil Engineering		
	Thenmoli Muyandy	Master by Coursework	Civil Engineering		
	Valerie Lumpu Gerald Dennis	Master by Coursework	Civil Engineering		

Postgraduate Students Statistic



Post Doctorate Fellows Joining in 2017

Dr Salisu M. Lawan



Dr. Salisu M. Lawan is a Research Post-Doctoral Fellow at Universiti Malaysia Sarawak, Faculty of Engineering. He carries out research on renewable energy systems and technologies. His works mainly on areas of wind energy resources assessment (WRA), energy storage and low-wind speed technology utilization, including prediction using soft computing applications and the geographical information system (GIS) using spatial and temporal technologies. Dr Lawan project won Bronze Medal in UNIMAS R&D Expo 2015, among the best engineering posters competition, and he has published many research publications in Scopus indexed journals. By profession, he is a registered electrical engineer, holding an M.Eng and B. Eng. In 2015, he obtained a PhD in Renewable Energy focussing his research on '*Topographical Prediction Models for Wind Energy Evaluation and GIS-Based Mapping in Sarawak Modelling*'.

Dr Mohammad Kamrul Hasan



Dr. Mohammad Kamrul Hasan, currently a Postdoc Researcher at the Department of Electrical and Electronics Engineering, University Malaysia Sarawak (UNIMAS). He has completed his Ph.D. in Engineering in 2016, and Masters in Communication Engineering in 2012 at the Department of Electrical and Computer Engineering, International Islamic University, Malaysia. The current research of Dr. Mohammad is the "**Design and Development of Two-Way Communication System Prototype of PMU for Smart Grid Enabled Digital Substations**". His research interests include Smart Grid Communications, Synchro-phasors, Artificial Intelligence, M2M communications, Wireless Communication Engineering, Resource Optimization, and Optical Communication and Networking. He has published several numbers of international Science Citation Index Expanded (SCIE) and Scopus indexed journals, and conference proceedings. He actively participated in more than 20 technical seminar and workshops at national and international level. He is also a member of research bulletin in the Faculty of Engineering, Universiti Malaysia Sarawak. Dr. Mohammad is a Member of Institute of Electrical and Electronics Engineers (MIEEE), Member of Institution of Engineering and Technology (MIET) and the Member of the International Association of Engineers (MIAENG).

IMPORTANT CONTACTS

Deputy Dean (Research & Graduate)

Assoc. Prof. Ir Dr Siti Noor Linda Taib
tlinda@unimas.my
Tel: +6082-583326
Fax: +6082-583410

Head Quality Unit,
Post Graduate & Research
Prof. Dr. Amir Azam Khan
akamir@unimas.my
Tel: +6082-583322

Deputy Dean (Undergraduate)

Assoc. Prof. Dr. Abdullah Haji Yassin
yabdulla@unimas.my
Tel: +6082-583324
Fax: +6082-583410

Deputy Dean (Industry and Community Engagement and Commercialization)

Noraziah Haji Abdul Wahab
anoraziah@unimas.my
Tel: +6082-583209
Fax: +6082-583410

Deputy Dean (Student Affairs and Alumni)

Dr. Nazeri Abdul Rahman
arnazeri@unimas.my
Tel: +6082-583479
Fax: +6082-583410

Department of Mechanical & Manufacturing Engineering

Head of Department
Dr Shahrol Mohammadan
mshahrol@unimas.my
Tel: +6082-583296
Fax: +6082-583410

Department of Chemical Engineering & Energy Sustainability

Head of Department
Associate Professor Dr Rubiyah Baini
ruby@unimas.my
Tel: +6082-583338
Fax: +6082-583410

Department of Civil Engineering

Head of Department
Dr Mohamad Raduan Kabit
kraduan@unimas.my
Tel: +6082-583337
Fax: +6082-583410

Department of Electrical & Electronics Engineering

Head of Department
Dr. Norhuzaimin Julai
jnorhuza@unimas.my
Tel: +6082-583339
Fax: +6082-583410

Research Cluster

Resilient Infrastructure
Leader: Prof Dr Mohammad Abdul Mannan
mannan@unimas.my
Tel: +6082-583223

Borneo Architecture
Leader: Prof Ar Nurakmal Abdullah
anurakmal@unimas.my
Tel: +6082-583278

Renewable Energy and Sustainability
Leader: Prof Dr Musse Mohamud Ahmed
mamusse@unimas.my
Tel: +6082-583280

Emerging Materials and Smart Manufacturing
Leader: Prof Dr Sinin Hamdan

hsinin@unimas.my
Tel: +6082-582333

Centre for Renewable Energy (CREN)

Director
Ir. Hazrul Bin Mohamed Basri
email:mbhazrul@unimas.my
Tel: +6082583380

Deputy Director
Dr. Abang Mohammad Nizam
akamnizam@unimas.my
Tel: +6082583254

Contacts for research groups:

Solar
Prof. Madya Dr. Wan Azlan Wan Zainal Abidin
wzaazlan@unimas.my
+6082581057

Hydro
Prof. Madya Dr. Thelaha Hj Masri
mthelaha@unimas.my

Biomass
Dr. Ivy Tan Ai Wei
awitan@unimas.my
+6082583312

Wave and Tidal
Prof. Ir. Dr. Andrew Ragai Henry Rigit
arigit@unimas.my
+6082583220

Energy Efficiency
Prof. Madya Dr.Siti Halipah Ibrahim
ihalipah@unimas.my
+6082583283

Wind
Ir. Rudiyanto Philman Jong
jprudiyanto@unimas.my
+6082584232

Fuel Cell
Prof. Dr. Mohammad Omar Abdullah
amomar@unimas.my
+6082583349



+6082-583395 / 3339

+6082 583410

meng_cs@unimas.my, mrdiana@unimas.my

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Master of Engineering (COMMUNICATION SYSTEMS) by coursework

FACULTY OF ENGINEERING

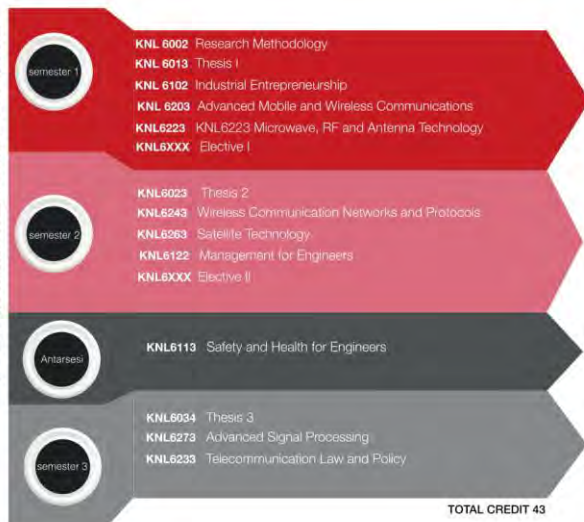
INTRODUCTION

Master of Engineering (Communication Systems) programme by coursework is ideal for fresh graduates, practicing engineers and academicians with primary degrees in Engineering and Science who wish to focus on a career in the telecommunications industry. The programme offers a broad curriculum which focuses on solid theoretical core in communication systems engineering. It is designed to equip students with a detailed knowledge of modern communications technologies, telecommunications and data network systems. The programme also builds interdisciplinary skills in students, to meet current and future needs of telecommunication industry.

ADMISSION

The Master of Engineering (Communication Systems) programme starts in February and September every year. Application is open throughout the year and can be done online via: <https://cgswb.unimas.my/PGApplication/>

PROGRAMME STRUCTURE



PROGRAMME

DURATION OF THE PROGRAMME

The minimum of study is 18 month (Semester 1, Semester 2, Semester 3 and InterSession) on full time to a maximum period of 4 years.

COURSE FEES

Malaysian student is RM 20,175.00
International students is RM 32,070.00

Fees include administrative, tuition and course materials for the duration of the programme. Further payment will be required if the students extend their studies.

FACILITIES AND RESOURCES

To support your study, the university provides various facilities and resources:

- Centre for Academic Information Services (CAIS) – The University library houses more than 200,000 titles of books and journals, and it also provides access to thousands of resources online.
- Resources Rooms – Spaces are provided for students to discuss, collaborate and work on academic tasks within the faculty and throughout the campus.
- Laboratory Facilities – Faculty of Engineering is supported by many research groups, laboratories and equipment's that allow our students to conduct their research in a wide range of fields.

WHO SHOULD APPLY

- Fresh graduates
- Practicing engineers and academicians with primary degrees in Engineering / Science who wish to focus on a career in telecommunication industry

ENTRY REQUIREMENTS

- Candidates must possess at least one of the following qualifications:
- A Bachelor degree in related engineering discipline with a minimum CGPA of 2.50 or equivalent, as accepted by the Senate;
 - A Bachelor degree or equivalent in related engineering discipline but with CGPA less than 2.50, may be admitted subject to a minimum of 5 years working experience in the relevant field; or
 - Other equivalent qualifications approved by the Senate
 - For international students, a minimum IELTS Score of 5.5 or its equivalent (e.g. TOEFL-525; TOEFL Computer Test -196; TOEFL Internet Test 69-70) is required.



- +60 82 581000
- +60 82 583410
- meng@pps.unimas.my



Master of ENGINEERING (Civil)

INTRODUCTION

Master of Engineering (Civil) programme by coursework is specifically tailored to help fresh graduates, practicing engineers and academicians gain advanced Civil Engineering knowledge. The programme offers a comprehensive course structure, which emphasises on recent engineering practices and industrial-based research projects. This programme also focusses on improving the existing civil engineering issues in Sarawak such as soil problems, traffic congestion and building construction technology.

PROGRAMME SCHEDULE

The Programme requires students to accumulate 40 credit hours their studies in which preferably 16 and 18 credit hours are completed in Semester 1 and Semester 2 respectively and 6 credit hours to complete the thesis in the intercession semester.

PROGRAMME STRUCTURE

Semester 1	KNS 6053	Advanced Soil Mechanics	3 hours
	KNS 6013	Advanced Reinforced Concrete Design	3 hours
	KNS 6033	Advanced Surface and Groundwater Hydrology	3 hours
	KNS 6092	Research Methodology	3 hours
	KNS 6063	Transportation Planning	3 hours
	KNS 6102	Research Project (Part 1)	3 hours
	Total Credit Hours for Semester 1		16 hours
Semester 2	KNS 6043	Wastewater Engineering	3 hours
	KNS 6163	Soft Soil Engineering	3 hours
	KNS 6XXX	Elective Course	3 hours
	KNS 6023	Advanced Concrete Technology	3 hours
	KNS 6083	Civil Engineering Project Management	3 hours
	KNS 6143	Research Project (Part 2)	3 hours
Total Credit Hours for Semester 2		18 hours	
Intercession	KNS 6156	Research Project (Part 3)	6 hours
Total Credit Hours for Intercession		6 hours	
TOTAL CREDIT HOURS			40 hours

PROGRAMME

DURATION OF THE PROGRAMME

The minimum of study is 1 years on full time to a maximum period of 4 years. Teaching and learning activities for the programme are conducted on weekends.

COURSE FEES

Fee for candidate completing the MEng (Civil) programme within ONE (1) years are as follows:

- RM 16,000 * for Malaysian candidate, and
- RM 30,000 * for International candidate

FACILITIES AND RESOURCES

- Geotechnical Laboratory
- Heavy structure laboratory
- Light Structure Laboratory
- Concrete Laboratory
- Highway Engineering Laboratory
- Survey Laboratory
- Traffic Engineering Laboratory
- Hydraulics and Hydrology Laboratory
- Environmental Engineering Laboratory
- Building Services Laboratory
- Graphics Lab
- Computer Aided Design (CAD) / Computer Aided Engineering (CAE) Laboratory
- Lecture theater
- CAIS (library)

WHO SHOULD APPLY

The programme aims at providing opportunities to various group of potential candidate such as:

- Fresh graduates
- Practicing engineers
- Academicians

ADMISSION

The Master of Engineering (Civil) programme starts in September every year. Application is open throughout the year and can be done online via: <https://cgsweb.unimas.my/PGApplication/>

ENTRY REQUIREMENTS

For admission into the programme, a candidate must meet the following criteria:

- A Bachelor's Degree with a minimum CGPA of 2.50 or;
- A Bachelor's degree or equivalent but CGPA less than 2.50 may be admitted subject to a minimum of five years working experience in the relevant field or,
- Other equivalent qualifications approved by Senate
- For international students, an IELTS score of 6.0 is required in addition to the entry requirements.

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**Faculty of Engineering
Universiti Malaysia Sarawak
94300 Kota Samarahan
Sarawak Malaysia**

Tel: +60 82-583330 Fax: +60 82-583410

<http://www.feng.unimas.my>