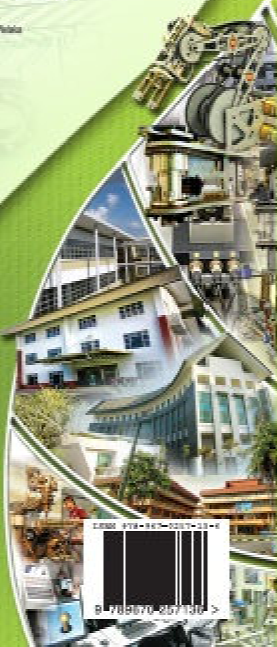
http://icei2012.utem.edu.my

The 3rd International Conference on Engineering & ICT

Conference Secretariat
Faculty of Mechanical Engineering, Universiti Teknikal Malaysia Melaka
Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, MALAYSIA



Hak Cipta Terpelihara
Penerbit Universiti
Universiti Teknikal Malaysia Melaka

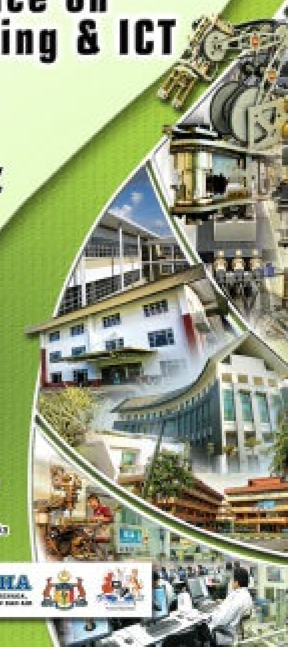
PROCEEDINGS VOL. 2
The 3rd International Conference on Engineering & ICT
"Green Technology for Sustainable Development"

PROCEEDINGS VOL. 2

iCEi 2012

The 3rd International Conference on Engineering & ICT

"Green Technology For Sustainable Development"



Date : 4 - 5th April 2012
Venue : Mahkota Hotel Melaka
World Heritage City Malaysia

Organized by:
Faculty of Mechanical Engineering, Universiti Teknikal Malaysia Melaka

Supported by:
MiGHT, KPT, KeTTHA

ABSTRACT

The 3rd International Conference on Engineering & ICT

"Green Technology For Sustainable Development"

TABLE OF CONTENT

ABOUT THE CONFERENCE

ICEI 2012: "Green Technology for Sustainable Development"

The increasing demand for innovative research ideas, design, architecture and solutions in handling intriguing engineering and ICT problems advocates the provision of rigorous study among various distinct communities. The International Conference on Engineering and ICT (ICEI 2012) brings together educators, researchers and practitioners seeking advancement in engineering and information technology through knowledge sharing and discussion related to current practices, innovations and future trends. It also aims to encourage a broader synergistic collaboration between academics and industry. This conference is organized by Faculty of Mechanical Engineering, Universiti Teknikal Malaysia Melaka.

The theme of the 3rd International Conference on Engineering and ICT is Green Technology for Sustainable Development. The conference will cover all topics related to:

* Green Technology
  Renewable Energy
  Automotive Design
  Energy and Power Systems

* System Engineering
  Autonomous and Intelligent Manufacturing
  Mechanical System and Innovative Design
  Power Electronics and Drives Optoelectronics
  Radio Frequency and Microwave Engineering
  Broadband and Multimedia Communication
  Intelligent Systems
  Computer Vision and Robotic (Covisbot)

* Emerging System
  Design and Concurrent Engineering
  Advanced Manufacturing Process
  Competitive Manufacturing Engineering Materials
  Structural Mechanics and Advanced Materials
  Computer Engineering Embedded Systems
  Electronics Instrumentation Consumer Electronics
  Visualization and Immersive Technology

* Human-Interaction Technology
  Networking and Soft Computing
  Data and Knowledge Engineering

FOREWORD

MINISTER OF ENERGY, GREEN TECHNOLOGY AND WATER MALAYSIA

Salam Sejahtera and Salam 1Malaysia,

I would like to appraise UTeM for organizing this International Conference on Engineering and ICT 2012 with the theme "Green Technology for Sustainable Development". This conference is in line with Malaysia's National Green Technology Policy as the nation strives to embrace green technology practices in moving forward the green agenda.

Nowadays there is much news in the media on environmental destruction and calamity which are related to global warming such as sea level increase, greenhouse gases release and natural resources decrease due to rapid development and urbanization. In human civilization, the balance in every aspect including natural conservation is a very important element and should be handled effectively and collectively.

The National Green Technology Policy, launched by YAB Prime Minister, Dato' Sri Mohd Najib Tun Razak on 24th July 2009 is a blue print which decides on the direction of implementation and development of green technology in this country. It is a comprehensive policy built on four core pillars namely energy, the environment, the economy and the society. This policy also serves as the basis for all Malaysians to enjoy an improved quality of life, by ensuring that the objectives of our national development policies will continue to be balanced with environmental consideration.

The ministry of Energy, Green Technology and Water with the cooperation of Malaysian Green Technology Corporation (Greentech Malaysia), have launched various programs as a catalyst in developing sustainable green technology. Various direct or indirect financial incentives are also provided to encourage the private companies to embrace and adopt green technology in product manufacturing and services. Application of green technology which is environmentally friendly is a smart initiative which does not only reduce the emission of dangerous substance to the environment but also preserve natural resources and help to save the energy.

I believe the gathering of researches from all over the world will be definitely beneficial to local researches in the area of green technology. The cooperation and networking between the overseas and local researches will lead to better technology and innovation sharing. As such, I would like to encourage all participants in this two days conference to make full use of their time in acquiring more knowledge in the area of green technology. Meanwhile, for foreign delegates and participants, do enjoy your stay in Malaysia.

Thank you

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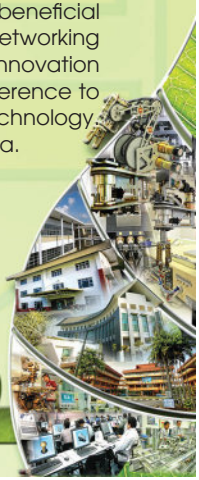
YB DATO' SRI PETER CHIN FAH KUI
MINISTER OF ENERGY, GREEN TECHNOLOGY AND WATER MALAYSIA



FOREWORD BY THE CHIEF MINISTER OF MELAKA

Bismilahirrahmanirrahim

Assalammualaikum Warahmatullahi Wabarakatuh,
Salam Sejahtera and Salam 1Malaysia

Global environmental issues, such as climate change and deforestation have emerged as new challenges to people throughout the world. Many countries aim to become a low-carbon society through green technologies and green industries which enhance eco-efficiency while minimizing the adverse environmental impacts. The Melaka state government has decided to embrace the same objective and has put substantial effort in achieving the first Green Technology City in Malaysia. We always encourage and support all government agencies, private sectors, educational institutions, researchers and the communities in applying green technology approaches and practices in order to realize the target.

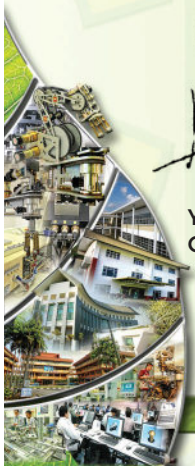
The 3rd International Conference on Engineering and ICT 2012, with its theme - Green Technology for Sustainable Development holds a vital role in sparking the flame of seeking wisdom, sharing thoughts and opinions, as well as exploring and discovering new doors to knowledge that we have never experienced before. The Melaka state government is highly proud to be a part of this conference that promotes better understanding of engineering technology and ICT and strive for quality researches towards achieving world class standard.

I wish all participants a fruitful and memorable experience at ICEI 2012 and hope you will take the opportunity to visit many historical and interesting places in Melaka.

"Melaka Maju Negeriku Sayang
Negeri Bandar Teknologi Hijau"

Thank you.

Y.A.B. DATUK SERI HJ. MOHD ALI BIN MOHD RUSTAM
CHIEF MINISTER OF MELAKA



FOREWORD BY THE VICE CHANCELLOR

Assalamualaikum and Salam 1 Malaysia,

The organization of the 3rd International Conference on Engineering and ICT or ICEI 2012 is a testament of the University commitment and contributions in propelling the nations towards sustainable development which is in line with the Malaysian Green Technology Policy 2009. I believe the scientific community could play a leading role by seeking knowledge sharing in addressing various issues to advance the state of the art of these evergreen engineering and ICT fields.

The aim of ICEI 2012 is to foster a broad range of sustainable collaboration among leading researchers, experts, educators, practitioners so as to promote new opportunities for enhanced partnership between academics and industry. The increasing demand for innovative research ideas, design, architecture and solutions in handling intriguing engineering and ICT problems advocates the provision of rigorous study among various distinct communities.

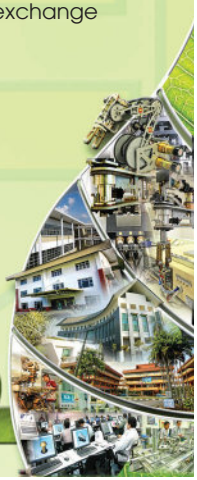
Green technology is crucial in reducing negative impacts of human development to the environment. Global environment issues such as global warming and pollution are challenges that need to be handled efficiently and collectively for the benefits of the future generation. Sustainable development is the main objective of green technology that must be considered in research and new development of new products and services. Given" Green Technology for Sustainable Development" as a theme, ICEI 2012 is a perfect and excellent platform for academicians, engineers and industrial practitioners in broad range of sustainable collaborations to share their knowledge of innovation, creativity and latest approaches in the green technology area.

I would like to take this opportunity to convey my special thanks to those who are involved in organizing ICEI 2012, especially to the Faculty of Mechanical Engineering for successfully organizing event.

Congratulations and welcome to all guests and presenters from both local and overseas to ICEI 2012. I encourage all participants to take this opportunity to gain and exchange knowledge as well as discuss new ideas during this conference.

Thank you

PROF. DATUK DR. AHMAD YUSUF HASSAN
VICE CHANCELLOR
UNIVERSITI TEKNIKAL MALAYSIA MELAKA



FOREWORD BY THE CHAIRMAN OF ICEI 2012

Assalamu'alaikum wrt. wbt, and Salam Sejahtera,

It is my great pleasure to welcome all of our distinguished keynote, plenary and invited speakers and also participants to the 3rd International Conference on Engineering & ICT (ICEI 2012) organized by the Faculty of Mechanical Engineering (FKM) and Universiti Teknikal Malaysia Melaka (UTeM). Your participations in the conference are valuable to the faculty and UTeM.

This conference provides a platform for researchers, academicians and practitioners to seal advancement of engineering and information technology through knowledge sharing and discussion related to current practices, innovations and trends. This is a continuation of the 1stICEI 2007 and 2nd ICEI 2010 which were successfully organized by Universiti Teknikal Malaysia Melaka on November 2007 and February 2010 respectively.

The conference will cover a broad range of topics on the application and usage of technology in engineering, information and communication technology. These include Green Technology, Systems Engineering, Emerging Technology and Human Technology Interaction. The response for this conference was overwhelming. The technical committee received more than 170 papers from local and international organizations. It is hoped that this conference will catalyze and increase academic and research collaborations between institution involved, internationally and locally. I sincerely hope that this will spur futher advancement of scientific research and fruitful collaborations between organizations.

I would like to congratulate all the speakers and participants for their participation in this conference. On behalf of the organizing committee, I would like to express our sincere appreciation to the Ministry of Energy, Green Technology & Water (KeTTHA), Ministry of Higher Education (KPT), and Melaka State Government for all the cooperation and all of the sponsors of this event for their generous contributions. Finally, to all the 3rd ICEI 2012 committees, congratulation for the job well done. May Allah's blessing be upon you.
Thank you.

Prof. Dr. Md. Razali Ayob
Chairman
3rd ICEI 2012

PROFILE OF KEYNOTE AND INVITED SPEAKERS

DR. NAZILY MOHD NOOR

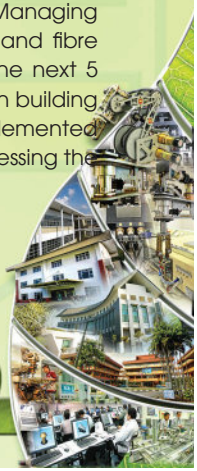
Nazily Mohd Noor, born in Pulai Chondong, Machang, Kelantan, Malaysia on January 1st, 1965. Attended Sultan Ismail College, Kota Bharu and after graduating, attended University Technology Malaysia in Kuala Lumpur and obtained a Degree in Engineering in 1990. He furthered his post graduate at Loughborough University, UK and holds a Doctorate degree in Electronic Engineering.

Dr.Nazily joined Black & Decker, Malaysia after graduating from UTM as Product Quality Engineer and becoming their Sr. Quality Assurance Engineer and assumed the Manager of Quality Assurance for the company shortly. Dr. Nazily led the transfer of numerous product lines manufactured in the USA to their new Malaysian manufacturing facility and managed new their product introduction teams during his watch. He lead quality teams in setting up new Quality Departments and Standards for all of Black and Decker's new manufacturing facilities in China, Mexico and India. He was instrumental in managing Cost Reduction Teams (CRT) which focused on leaning the process flow, improvement of product quality and cost reductions for Black and Decker, Malaysia.

In 1995, Intel Malaysia recruited Nazily as their Supplier Quality Manager. Dr. Nazily was responsible for the transfer of new product lines from Intel Oregon plant and Ireland to Intel's Kulim facility. Dr. Nazily became the Technical Advisor for PCB suppliers and helped qualify new Intel suppliers located in USA, China, Taiwan, Hong Kong and Japan on new Intel PCB design.

For his next career challenge, Dr. Nazily assumed the post of General Manager, Precision Turning & Engineering (JV company between Japan and Malaysia) with employees over 1200. He spend the next 3 years implementing Lean engineering, productivity improvements, operational efficiencies, cost savings, strategic procurement, business development and diversified their customers base, increasing the revenue and turned a money losing venture PBIT from –ve to a profitable organization.

Recruited by Volex Malaysia, a UK based company in 1999 becoming their Managing Director. Volex is the world largest producer of electrical harnesses, medical and fibre optics cables for telecommunication/data cable with 1300 employees. For the next 5 years, Dr. Nazily utilized his operational management experience and his ability in building "win-win" key stakeholder relationships through his personal leadership, implemented numerous lean initiatives, resulting to cost improvements and savings, while addressing the productivity, quality issues and increased sales by 3 folds.



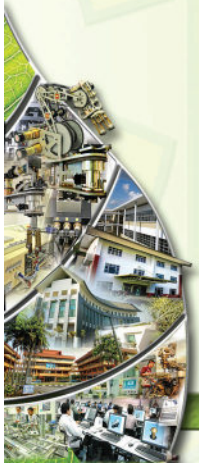
Having successfully turnaround various companies, in 2005/2006 Nazily was named "Top 200 Bumi CEOs in Malaysia" by Berita Publication while at the helm of Asian Composite a JV company. Again, Dr. Nazily implemented management changes that are strategic, tempered and focused. ACM prospered financially from a negative PBIT before he joined to profit the year he left.

Dr. Nazily appointed CEO of Pradonet Corporation, an OEM and ODM service provider of products with 3D modelling, mechanical design, industrial graphic design, electronic design and contract manufacturing. He also strengthens the R&D department for this highly technological driven company to keep it on the cutting edge.

Last year, Dr. Nazily joined Management Institute of Malaysia (MIM) as their CEO with specific mandates. As a corporate "turn-around" specialist" the mandate was achieved within several months and the highest in 45 years of its establishment.

In 2011, Dr. Nazily wrote another chapter of his career, as CEO of Malaysia Green Technology Corporation, responsible to facilitate the realisation of the National Green Technology agenda in Malaysia. Dr. Nazily has been described as focused, passionate, tenacious, and competitive with big picture focus, strategist, sincere, hard-working and dynamic, with his own brand of leadership and vision to lead in a multi-cultural environment. His proven track record of turning companies around and leading multimillion dollar technology companies and project even through severe economic downturns has been exemplanary.

In the social and professional circles, currently Dr. Nazily is an Adjunct Professor with University Putra Malaysia (UPM) and was an Adjunct Fellow with Universiti Utara Malaysia (UUM) Kedah for 3 years. Also, Chairman of MUAFAKAT/PIBG MRSM-PDRM Kulim, Kedah and a freelance speaker for local educational institution such as UITM, Polytechnics and UNIMAS. In 2010, he was accorded the Fellows of Malaysian Institute Management and serve as Operational Advisor. He is also a Board member of PNS Academy. Dr. Nazily is married and has a daughter.



PROF. DR. ESAH HAMZAH

Dr Esah Hamzah is a Professor in Metallurgy in the Faculty of Mechanical Engineering, Universiti Teknologi Malaysia. She has over 25 years of experience in teaching the undergraduate and postgraduate courses related to metallurgy and materials engineering. She has also supervised both masters and PhD students and has served as examiners for MSc and PhD theses both in UTM and other universities in Malaysia. Dr Esah obtained her BSc degree from the University of Wales at Swansea, UK and MSc and PhD in Metallurgy from the University of Manchester Institute of Science and Technology (U.M.I.S.T.) UK. She has held various administrative positions at the Universiti Teknologi Malaysia, ranging from head of laboratory, head of panel, chairman of various committees, Head of Department (1999-2005) and Deputy Dean (Academics) of the Faculty of Mechanical Engineering (2005-2010). She has been actively involved in research namely in the areas of phase transformation and mechanical behavior of metals, metal failure, corrosion and coating. She has been awarded many research grants from the University and the Malaysian Government. She has also presented and published more than 100 papers in the national and international conferences and journals. One of the papers won the "Best Paper" award at an International conference in 2007. She is also a contributor to the University's Best Publication Award won by the Faculty of Mechanical Engineering in 2001, 2002, 2003, 2007 and 2008. She has also received Special Remuneration for Excellent Service for the year 1993 and the University Excellence Award in 2000, 2003 and 2007. Dr Esah is an active Council Member and Fellow member of the Institute of Materials Malaysia (IMM).

INHIBITION OF BIOFILM FORMATION BY ENVIRONMENTALLY FRIENDLY CONDUCTIVE POLYMERS

E.Hamzah1,a*, A. Abdolahi2,b and Z.Ibrahim3,c

1,2 Faculty of Mechanical Engineering, Universiti Teknologi Malaysia, Johor bahru, Malaysia. aEmail: esah@fkm.utm.my, bEmail: aahmad7@live.utm.my

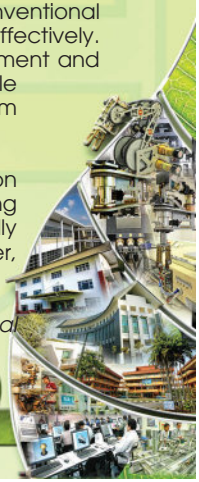
3 Faculty of bioscience and bioengineering Universiti Teknologi Malaysia, Johor bahru, Malaysia. cEmail: zaharah@fbb.utm.my

ABSTRACTS

Biofilm formation on the metal surface is one of the most problems encounter to the environment, industry and human life. Biofilms could contaminate the environment, medical equipments and enhance the metal corrosion. Different approaches have been applied to inhibit biofilm formation on the metal surface. Coatings have gained more attention due to their high effectiveness, low price and ease of application. The conventional coatings are based on heavy metals which could inhibit biofilm formation effectively. However, disadvantage of these coatings is that they are toxic to the environment and have carcinogenic effects on human. Thus there has been need to find a suitable replacement coatings to be environmentally friendly and effective to inhibit biofilm formation.

This study aims to introduce a novel environmentally friendly coatings based on conductive polymers which are effective to inhibit biofilm formation. The following concepts are discussed in this paper sequentially: biofilm formation, Microbially influenced corrosion, antibacterial surface design strategy, conductive polymer, using conductive polymers to inhibit biofilm formation.

Keywords—*Biofilm formation; Microbially influenced corrosion; Antibacteria strategies; Conductive polymer.*



PROF. DR. MOHD ALAUDDIN MOHD ALI

Mohd Alauddin Mohd Ali is a Professor with the Department of Electrical Electronic and Systems Engineering, Faculty of Engineering and Built Environment, Universiti Kebangsaan Malaysia (UKM), Bangi, Malaysia. He was also head of the department and deputy dean of the faculty for the periods 1995-1997 and 1997-2002 respectively. He is currently the Director of the Institute of Space Science, UKM. He received the B.Eng. (Electrical), B.Sc. (Mathematics) and M.Eng.Sc. (Electrical) degrees from the University of Tasmania, Hobart, Australia in 1978, 1979 and 1984 respectively. His PhD degree was from the University of Nottingham, Nottingham, England in 1994. He worked in the area of microelectronics for his Masters degree and medical electronics for his PhD. His research interests include biomedical signal processing, instrumentation, integrated circuit design and testability, and ionospheric studies.

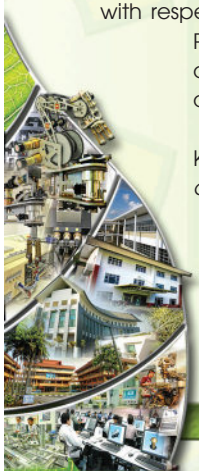
PHOTOPLETHYSMOGRAPHY-BASED MEDICAL INSTRUMENTATION RESEARCH

Mohd Alauddin Mohd Ali
Institute of Space Science and
Department of Electrical, Electronic and Systems Engineering,
Universiti Kebangsaan Malaysia, Bangi, Malaysia
mama@eng.ukm.my

Abstract

Photoplethysmography (PPG) is used to detect blood volume changes in the peripheral vessels at different human body locations, usually on the fingers. The behavior of these changes may provide information on the characteristics of the vascular system. This paper describes the use of PPG in medical instrumentation under development for the assessment of vascular risk, endothelial dysfunction and other risks associated with the cardiovascular system. Challenges faced in the development, prototyping and clinical trials stages are discussed. Results from PPG recordings show vascular risk predictive probability close to 1 when differentiating the risk and without risk groups. Similarly, significant difference was achieved when using PPG-AC values to classify these groups with respect to their endothelial function. Correlations of parameters derived from the PPG signals to risks such as dyslipidemia, diabetes and erectile dysfunction are also being identified. These results open a number of other possible applications of PPG in the development of medical instrumentation.

Keywords— *Photoplethysmography, cardiovascular diseases, endothelial dysfunction, health index, medical instrumentation.*



PROF. DR. ANDRÉ BONTEMPS

Emeritus Professor at Université Joseph Fourier (UJF) – Grenoble - France, André BONTEMPS is a member of the National (France) Pedagogical Commission of Thermal Engineering. He was also head of department of Thermal Engineering, co-founder and head of the University Institute for Professionalisation, Université Joseph Fourier. He graduated with 2 thesis of Doctorate from Université de Grenoble (1977 and 1970). He works on Thermal Engineering, especially heat transfer and energy. He is author for 128 papers in various conferences, 58 publications in journal refereed and 5 book chapters. He contributed actively for international education development as visiting professor and also advisory panel for curriculum development in Tunisia, Algeria, Vietnam, Turkey and Hungary.

ABSTRACTS

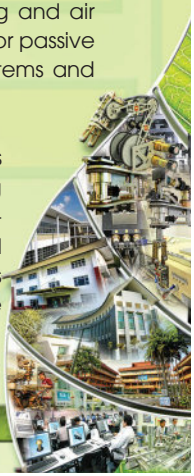
Green buildings: Can the use of Phase Change Materials improve energy savings and comfort in buildings?

André Bontemps, Laurent Royon

These last years have seen a dramatic change in peoples' views regarding climate change and energy consumption. Today, it is accepted that climate change is closely linked to human activities and that human activities create an irrepressible need for energy. At the present time, our energy needs are essentially covered by fossil fuels which directly participate in GHG (Green House Gases) production. So we have to reduce the use of fossil fuels not only to limit GHG emissions but also to cut down our dependency on the supplying countries. Increasing energy efficiency is one of the main strategies to achieve this goal in particular in the building sector. As shown by the World Building Council for Sustainable Development (WBCSB), the building sector represents 40 % of primary energy use and if we include the energy consumed in manufacturing steel, cement, aluminium and glass, this figure increases to more than 50%.

Energy consumption aims to create an indoor climate allowing us to feel comfortable. It is linked to the building envelope quality and to devices of heating, cooling and air conditioning. Reducing energy consumption can be achieved by either active or passive ways. Active ways include use of cooling and heating devices, regulating systems and using renewable energies. This communication will focus on passive ways.

One way to reduce energy consumption is to use large thermal storage devices especially in climates where daily temperature variations require both heating and cooling in the same 24 hour period. It is the case in many desert or semi-desert regions where a very large range of daily temperature can be observed between night and day for given seasons. For tropical countries the set of issues is different but thermal storage can also be considered. Buildings designed to make use of thermal storage include features which increase thermal mass.



These may be used for storage only, or may serve both as storage and as structural elements. A building significant thermal capacity should contribute in stabilizing the large daily temperature fluctuation and should increase the lag time between the external and the internal temperature peak. Massive construction materials, such as stone, have long been used for this purpose. However, light thermal storage would be more attractive to consumers. In this objective, Phase Change Materials (PCMs) can be used for thermal storage. Ideally, such materials should be incorporated inside building components but this incorporation had limited success because it is difficult to incorporate these materials into existing building substances. The utilization of Phase Change Materials in active and passive cooling/heating of buildings has been a main topic in research for the last three decades and in this lecture a review will be made in paying particular attention to works carried out in our laboratories.

The following points will be developed:

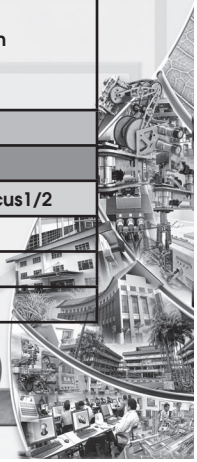
- choice of PCMs
- incorporation of PCMs in the building light envelope
- use of traditional materials
  - bricks
  - slabs

- experimental characterization
  - building components
  - test cells
- modelling
- future prospects

CONFERENCE PROGRAM AND SCHEDULE

DAY 1 4 APRIL 2012 WEDNESDAY	8:00	Registration
	8:45	Welcome Speech by Prof. Dr. Razali Md Ayob Chairman of ICEI 2012
	9:00	**Keynote Speaker 1** **Title: Green Technology in Malaysia: Prospects, Challenges and Implementation.** ***Presenter: Dr. Nazily Mohd Noor***
	9:45	**Invited Speaker 1** **Title: Inhibition of Biofilm Formation by Environmentally Friendly Conductive Polymers.** ***Presenter: Prof. Dr. Esah Hamzah***
	10:30	Tea/Coffee Break
	10:40 - 12:30	**Parallel Session 1**
		Room: Jasmine 1, Jasmine 2, Tiara 1/2, Tiara 3/4 , Hibiscus1/2
	12:30	Lunch
	14:00-15:30	**Parallel Session 2**
	15:30	**Room: Jasmine 1, Jasmine 2, Tiara 1/2, Tiara 3/4 , Hibiscus1/2**
	15:40-17:30	Tea/Coffee Break
		Parallel Session 3
		Room: Jasmine 1, Jasmine 2, Tiara 1/2, Tiara 3/4 , Hibiscus1/2
	19:45	Conference Dinner / Opening Ceremony End of Day 1

DAY 2 5 APRIL 2012 WEDNESDAY	8:45 -10:45	**Parallel Session 4**
	10:45	**Room: Jasmine 1, Jasmine 2, Tiara 1/2, Tiara 3/4 , Hibiscus1/2**
	11:00	**Keynote Speaker 2** **Title: Green buildings: Can the use of Phase Change Materials improve energy savings and comfort in buildings?** ***Presenter: Prof. Dr. Andree Bontemps***
	11:45	**Invited Speaker 2** **Title:Photoplethysmography-Based Medical Instrumentation Research.** ***Presenter: Prof. Dr. Mohd Alauddin Mohd Ali***
	12:30	Lunch
	14:00 - 15:30	**Parallel Session 5**
		Room: Jasmine 1, Jasmine 2, Tiara 1/2, Tiara 3/4 , Hibiscus1/2
	15:30	Closing Ceremony
	16:30	Best Paper Award
	16:40	End of Conference/ Afternoon Tea



The Opening Ceremony of ICEI 2012

Date: 4 April 2012
Venue: Ballroom Mahkota Hotel

Time	Event
7.45 pm	Arrival of Guests
8.00 pm	Arrival of Y. Bhg. Prof. Datuk Dr. Ahmad Yusoff Hassan, Vice Chancellor, Universiti Teknikal Malaysia Melaka Arrival of Y. Bhg. Datuk Ir. Dr. Hj. Ahmad Zaidee Laidin Chairman of The University Board of Directors
8.05 pm	Arrival of Y.B. Dato' Seri Peter Chin Fah Kui, Minister of Energy, Green Technology & Water (KeTTHA), Malaysia
8.10 pm	'Negaraku' and 'UTeM Terbilang'
8.15 pm	Doa Recitation
8.20 pm	Speech by Y. Bhg. Prof. Datuk Dr. Ahmad Yusoff Hassan, Vice Chancellor, Universiti Teknikal Malaysia Melaka
8.30 pm	Officiating Speech by Y.B. Dato' Seri Peter Chin Fah Kui, Minister, Ministry of Energy, Green Technology & Water (KeTTHA), Malaysia
8.45 pm	Dinner
10.10 pm	End of Dinner

Closing Ceremony of ICEI 2012

Date: 5 April 2012
Venue: Ballroom Mahkota Hotel

Time	Event
3.30 pm	Arrival of Guests
3.40 pm	Arrival of Y. Bhg. Prof. Datuk Dr. Ahmad Yusoff Hassan, Vice Chancellor, Universiti Teknikal Malaysia Melaka. Arrival of Y. Bhg. Datuk Ir. Dr. Hj. Ahmad Zaidee Laidin Chairman of The University Board of Directors
3.45 pm	Arrival of Y.A.B. Datuk Seri Haji Mohd. Ali Mohd Rustam, Chief Minister of Melaka.
3.50 pm	'Negaraku', 'Melaka Maju Jaya' and 'UTeM Terbilang'
3.55 pm	Doa Recitation
4.00 pm	Speech by Y. Bhg. Prof. Datuk Dr. Ahmad Yusoff Hassan, Vice Chancellor, Universiti Teknikal Malaysia Melaka.
4.15 pm	Closing Speech by Y.A.B. Datuk Seri Haji Mohd. Ali Mohd Rustam, Chief Minister of Melaka.
4.30 pm	Best Paper Award
4.40 pm	End of ICEI 2012 Afternoon Tea/Coffee

PARALLEL SESSION 1A

Track: Emerging Technology
Sub track: Advanced Manufacturing Process

Date : 4 April 2012
Time : 10.40 am - 12.30 pm
Venue : Jasmine 1
Session Chairman : Dr. Ahmad Kamely Bin Mohamad

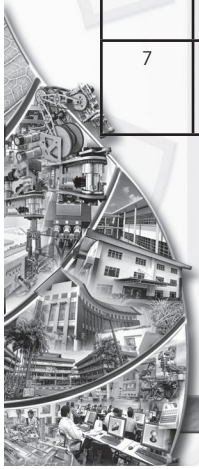
No	Time	Title/Author	Ref. No
1	10.40am – 10.55am	**The Effectiveness And Impacts Of One Piece Flow Manufacturing Technique Into Manufacturing Industries** *Mohd Norzaimi Che Ani*	ET301
2	10.55am – 11.10am	**Forming Analysis Of Self-Reinforced Polypropylene Based Composite-Aluminium Hybrid Structures** *S. DharMalingam and S. Kalyanasundaram*	ET302
3	11.10am – 11.25am	**Sensitivity Analysis For The Economic Design Of A Synthetic Chart** *Wai Chung Yeong and Michael B.C. Khoo*	ET303
4	11.25am – 11.40am	**WEDM: Influence of Parameters in Machining Stainless Steel 316L** *Aniza Alias, Norliana Mohd Abbas and Bulan Abdullah*	ET305
5	11.40am – 11.55am	**Significant Process Parameters In Injection Molding Process For Plastic And Metal Materials** *Zaliha Wahid, Norhamidi Muhamad and Akmal Hilmi Mohd Mashudi*	ET309
6	11.55am – 12.10pm	**Develop Process Control System Through Poka-Yoke During DFMEA Stage For SME Industry** *Abd Rahman Soufhwee, Hambali Arep@Ariff and Nurul Syuhada Che Hussin*	ET310
7	12.10pm – 12.25pm	**Roundness Evaluation Of Cold Forged Pin Head** *A.B. Abdullah, S.M. Sapuan, Z. Samad and N.A. Aziz*	ET311

PARALLEL SESSION 1B

Track: Human-Interaction Technology
Sub track: Data & Knowledge Engineering, Networking & Soft computing, Ergonomics

Date : 4 April 2012
Time : 10.40 am - 12.30 pm
Venue : Jasmine 2
Session Chairman : Associate Professor Norhaziah binti Md Salleh

No	Time	Title/Author	Ref. No
1	10.40am – 10.55am	**CMARGA: Pruning Decision Tree using Genetic Algorithm In Classification Based On Multiple Class-Association Rules** *Han-Chern Tong, Yun-Huoy Choo and Azah Kamilah Muda*	HT101
2	10.55am – 11.10am	**Halal Computer Systems Validation Quality Assurance, Risk Assessment And Regulatory Compliance For The Pharmaceutical And Healthcare Industry** *Raja Rina Raja Ikram , Mohd Khanapi Abd Ghani and Abd Samad Hasan Basari*	HT103
3	11.10am – 11.25am	**Knowledge Management: Tools And Technologies** *Ajit Pal Singh*	HT105
4	11.25am – 11.40am	**Behavioral Analysis for Scanning Internet Worm** *Mohammad M. Rasheed, Osman Ghazali and Rahmat Budiarto*	HT201
5	11.40am – 11.55am	**Classification Of Traditional Pakistani Musical Instrument Using A Novel Soft Set Theory Based Algorithm** Saima Anwar Lashari , Rosziati Ibrahim and Norhalina Senan	HT202
6	11.55am – 12.10pm	**Optimal Mean Value Estimation Via Markovian Approach** *Abd. Samad Hasan Basari, Hazlina Razali, Burairah Hussin,Siti Azirah Asmai, Nuzulha Khilwani Ibrahim and Abdul Samad Shibghatullah*	HT204
7	12.10pm – 12.25pm	**A Study Of The Non-Auditory Effects Of Noise On Workers In A Sheet Metal Manufacturing Industry** *Rosniza Rabilah and Ismail N. Ahmad*	HT301



PARALLEL SESSION 1C

Track: Emerging Technology
Sub track: Computer Engineering and Consumer Electronics

Date : 4 April 2012
Time : 10.40 am - 12.30 pm
Venue : Tiara 3/4
Session Chairman : Associate Professor Tan Kim See

No	Time	Title/Author	Ref. No
1	10.40am – 10.55am	**Development Of An ARM-Based Application System** *Mohd. N. Zarina, Salim S. Irwan, Mohamad Y. Norhidayah, Ali N. Alisa and Mohd. S. Muzalifah*	ET402
2	10.55am – 11.10am	**The Design Of A Handphone-Based Computer Controller Via Android Technology** *Stephanie Bosede Ajiroba, Siew-Chin Chong and Chin-Poo Lee*	ET403
3	11.10am – 11.25am	**Designing UTeMRISCII Processor For Multiply-Accumulate Operation** *Nur Raihana Samsudin, Sani Irwan Md Salim, Ahmad Jamal Salim and Soo Yewguan*	ET404
4	11.25am – 11.40am	**Effect Of Functional Endoscopic Sinus Surgery To The Flow Behavior In Nasal** *Nur Hazwani Mokhtar, Al-Muttaqin Md Jahan, Nona Merry M. Mitan, Kahar Osman, Mohammed Rafiq Abdul Kadir, Wan Ahmad Kamil Wan Abdullah and Juhara Haron*	ET405
5	11.40am – 11.55am	**The Effect Of Total Length On Interrupted Microchannel Performance** *Mohd Irwan Mohd Azmi, Fudhail Abdul Munir, Nadlene Razali, Mohd Nur Azmi Nordin and Teo Swee Hong*	ET406
6	11.55am – 12.10pm	**FORGETMENOT (FMN) : An Android Application For Alerting USB Users** *Zamani Md Sani, Aminurrashid Noordin and Mohd Rahim Ab Rahman*	ET604
7	12.10pm – 12.25pm	**New Sensor Placement For Vehicle Mobility In Multiple Traffic Light Intersection** *S.K. Subramaniam, M. Esro, S.S.S. Ranjit, V.R. Gannapath and Tan Swee Tiang*	ET605

PARALLEL SESSION 1D

Track: Emerging Technology
Sub track: Structural Mechanics and Advanced Materials

Date : 4 April 2012
Time : 10.40 am - 12.30 pm
Venue : Hibiscus 1/2
Session Chairman : Associate Professor Dr. Ir. Abdul Talib bin Din

No	Time	Title/Author	Ref. No
1	10.40am – 10.55am	**Insertion Of A Micro-Perforated Panel To Improve Sound Transmission Loss Of A Double-Leaf Partition** *A.Y. Ismail, A. Putra and Md. R. Ayob*	ET101
2	10.55am – 11.10am	**Numerical Studies Of Alporas Foam-Filled Round Aluminum 2024-T4 Alloy Under Transverse Loading** *Akbar Othman, Mohd Nahar Ahmad, Mohd Fikri Mohd Soffian and Azrol Jailani*	ET103
3	11.10am – 11.25am	**Electrical And Mechanical Performance Of Zirconia-Nickel Functionally Graded Materials** *M. S. EL-Wazery, A. R. EL-Desouky, O. A. Hamed , A. A. Hassan and N. A. Mansour*	ET102
4	11.25am – 11.40am	**Tensile And Hardness Properties Of Kenaf-Pp/Pla Composite Filled Nanoclay** *M.N. Azmi, S.A. Rafeq, R. Nadlene, M.A.M. Irwan and A.M. Aishah*	ET122
5	11.40am – 11.55am	**Finite Element Simulation Of Off-Axis Crushing Performance Of Polyurethane Foam Aluminum Alloy Tubes** *Akbar Othman, Mohd Fikri Mohd Soffian, Azrol Jailani and Mohd Nahar Ahmad*	ET104
6	11.55am – 12.10pm	**Effects Of Carbon Black As Second Filler On The Properties Of Composite Graphite Polypropylene** *Mohd Zulkefli Selamat, Mohd Ahadlin Daud and Jaafar Sahari*	ET123
7	12.10pm – 12.25pm	**Spray Paint Activity Related With Volatile Organic Compounds (VOCS): A Review** *N.H. Hasan, M.R. Said and A.M. Leman*	ET116

PARALLEL SESSION 1E

Track: System Engineering, Emerging Technology
Sub track: Optoelectronic, Consumer Electronics, Computer Vision & Robotic

Date : 4 April 2012
Time : 10.40 am - 12.30 pm
Venue : Tiara 1/2
Session Chairman : Dr. Gan Chin Kim

No	Time	Title/Author	Ref. No
1	10.40am – 10.55am	**Development of Low Cost Portable Anti-Theft Device (PATD)** *Mohd Firdaus Mohd Ab. Halim, Khalil Azha Mohd Annuar, Aminurrashid Noordin, Suziana Ahmad, Mohamad Riduwan Md Nawawi*	ET608
2	10.55am – 11.10am	**EDFA In WDM For 1545 NM To 1552 NM C-BAND** *Irda H. And Zaiton A.M.*	SE601
3	11.10am – 11.25am	**Hexagon-Diamond Grid Modelling Motion Vector tracking Using Block-Based Technique** *Ranjit S. S. S., Anas S. A., Subramaniam S. K. and Tan C. F.*	SE505
4	11.25am – 11.40am	**Protein-Inspired Design Of Robotic Arms** *Nabila Lau and Alan Oxley*	SE503
5	11.40am – 11.55am	**Developmet Of A Quadruped Crawling Robot Prototype** *A.Noordin, M.A.Salim, M. R. Sapiee, S. Sabikan, M.H.C. Hasan, Z. Md. Sani and M.H. Othman*	SE504
6	11.55am – 12.10pm	**Collision Avoidance Path Planning Algorithm For Multi-Manipulators Based On Minimum Distance Technique** *Liyana `Adilla Burhanuddin and Md. Nazrul Islam*	SE502
7	12.10pm – 12.25pm	**Surveillance Video Pixel Analysis Via Block-Based Pixel Substraction Technique** *Ranjit S. S. S., Anas S. A.,C. F. Tan, S. K. Subramaniam and Hashim N. M. Z.*	SE506

PARALLEL SESSION 2A

Track: Green Technology
Sub track: Green Manufacturing

Date : 4 April 2012
Time : 2.00 pm - 3.30 pm
Venue : Jasmine 1
Session Chairman : Dr. Lukman Sukarma

No	Time	Title/Author	Ref. No
1	2.00pm – 2.15pm	**A Review Of Applications Of Multi Criteria Decision Making In Green Supplier Selection** *A.R. Afshar, R. M. Yusuff and A. R. Derayatifar*	GT306
2	2.15pm – 2.30pm	**Casting Of Sago Starch-Nanocomposites Film** *I. Norazah, A. Zuraida, A.R. Nur Humairah, M. Nabielah Majdi, M. Nazariah and M.R. Nur Suraya*	GT307
3	2.30pm – 2.45pm	**Motivations For Alliance With External Agents To Promote Environmental Innovation** *Mohammad Yarahmadi, Raja Zuraidah Rasi and Nor Ratna Masrom*	GT308
4	2.45pm – 3.00pm	**On Metaheuristic Algorithms Applications In Green Supply Chain** *Abdolhossein Sadrnia, Napsiah Ismail,Norzima Zulkifli, M.K.A. Ariffin and Mehrdad Nikbakht*	GT309
5	3.00pm – 3.15pm	**Green Technology Of Pyramidal Microwave Absorber Using Rice Husk And Rubber Tire Dust** *F. Malek, H. Nornikman, B. H. Ahmad, A. R. Othman and M. Z. A. Abdul Aziz*	GT310
6	3.15pm – 3.30pm	**A Prediction Of Welding Process Control Variables By Prediction Of Weld Bead Geometry Using Factorial Design Approach** *S. Thiruchitrambalam, S.Hemavathi and Sunil Pandey*	GT311

PARALLEL SESSION 2B

Track: System Engineering
Sub track: Mechanical System

Date : 4 April 2012
Time : 2.00 pm - 3.30 pm
Venue : Jasmine 2
Session Chairman : Associate Professor Dr T Joseph Sahaya Anand

No	Time	Title/Author	Ref. No
1	2.00pm – 2.15pm	**Modelling And Simulation Of Vehicle Steering Control On Steer By Wire System Using Fuzzy Logic And PID Control Tuned By Practical Swarm Optimization (PSO)** *Fachrudin, Imam Robandi And Nyoman Sutantra*	SE302
2	2.15pm – 2.30pm	**Design Of Formula Varsity Race Car Suspension Upright** *Khalis S. , Muhd Ridzuan M , Mohd Afzanizam M.R., Syahibudil Ikhwan A. K. Mohd Azli S. and Mohd Adrinata S.*	SE303
3	2.30pm – 2.45pm	**Analysis Of Dynamic Interaction Between Flexible Body Of Overhead Contact Wire And Active Control Pantograph Considering Vertical Body Vibration** *Mohd Azman Abdullah, Rustamreen Jenal, Yohei Michitsuji and Masao Nagai*	SE304
4	2.45pm – 3.00pm	**Development Of IIUM Circular Planform Unmanned Aerial Vehicle (IIUM-CPUAV)** *Ashraf Ali Omar, Nur Azam Abdullah and Ahmad Zaahin Simat @ Mohd Akhir*	SE306
5	3.00pm – 3.15pm	**Design Of A Space Frame Chassis For UTeM Formula Varsity Race Car** *Muhammad Hafizullah A., Muhd Ridzuan M., Mohd Afzanizam M.R., Mohd Zaid A., Mohd Azli S. and Mohd Adrinata M.S.*	SE307
6	3.15pm – 3.30pm	**Design And Characterization Of Magnetorheological Brake** *Ahmad Zaifazlin Zainordin, Mohd Azman Abdullah, Khisbullah Hudha and Nur Rashid Mat Nuri*	SE308

PARALLEL SESSION 2C

Track: Green Technology
Sub track: Renewable Energy

Date : 4 April 2012
Time : 2.00 pm - 3.30 pm
Venue : Tiara 3/4
Session Chairman : Dr. Mohd Yusoff bin Sulaiman

No	Time	Title/Author	Ref. No
1	2.00pm – 2.15pm	**A Study On Domestic Box Type Solar Cooker** *M.M. Taha, M.Q. Zainal Abidin and R. Zulkifli*	GT114
2	2.15pm – 2.30pm	**Influence Of Hub To Tip Ratio And Number Of Runner Blades On The Propeller Turbine Under Low Head And Low Flow Rate Condition** *Masjuri Musa @ Othman, Juhari Abd. Razak, Kamaruzzaman Sopian, Mohd Zakaria Mohammad Nasir and Wan Mohd Farid Wan Mohamad*	GT115
3	2.30pm – 2.45pm	**Increase Productivity Energy Consumption In Green Construction Industry** *Hooman Abadi and Kamarudin Mohd Nor*	GT116
4	2.45pm – 3.00pm	**A Futuristic View Of Renewable Energy In Malaysia** *Hamidreza Jaliliannosrati, Alireza Zarei and Amin Talebian Kiakalaieh*	GT117
5	3.00pm – 3.15pm	**Modelling Of Biodiesel Production Through Transesterification Process Using Artificial Neural Network** *Liew Weng Hui, Zahira Yaakob and Siti Rozaimah Sheikh Abdullah*	GT121
6	3.15pm – 3.30pm	**The Study Of Soil Heat Transfer Characteristics For Development Of Cost-Saving Air Conditioning System Using Earth Cool Dehumidification Method** *Zairul Fazura Mohd Zaidi and Abdul Talib Bin Din*	GT122

PARALLEL SESSION 2D

Track: Emerging Technology
Sub track: Structural Mechanics and Advanced Materials

Date : 4 April 2012
Time : 2.00 pm - 3.30 pm
Venue : Hibiscus 1/2
Session Chairman : Dr Azma Putra

No	Time	Title/Author	Ref. No
1	2.00pm – 2.15pm	**Axial Crushes Of Multiple Corners Cross-Section Cotton Fiber Composite Under Dynamic Loading** *Akbar Othman, Azrol Jailani, Mohd Fikri Mohd Soffian and Mohd Nahar Ahmad*	ET108
2	2.15pm – 2.30pm	**Connection Behavior Of Light Weight Steel Section** *A. Bayan, S. Sariffuddin and O. Hanim*	ET109
3	2.30pm – 2.45pm	**Effects Of Viscoelasticity On The Flow Past A Circular Cylinder** *M. Norouzi, M.M. Shahmardan, M. J. Maghrebi and S.R. Varedi*	ET112
4	2.45pm – 3.00pm	**Fatigue Crack Detection Using Nonlinear Acoustic Analysis Of Vibro-Acoustic Modulation** *Ruztamreen Jenal, Mohd Azman Abdullah and Wieslaw J. Staszewski*	ET113
5	3.00pm – 3.15pm	**The Characteristics Of Load Versus Displacement Of Paper Honeycomb: An Experimental Investigation** *Mohd Khairir Ismail and Md Radzai Said*	ET115
6	3.15pm – 3.30pm	**Finite Element Analysis Modeling Of Elliptical Conical Aluminum 2024-T4 Alloy Polyurethane Foam-Filled Section** *Akbar Othman, Mohd Fikri Mohd Soffian, Mohd Nahar Ahmad and Azrol Jailani*	ET107

PARALLEL SESSION 2E

Track: Green Technology
Sub track: Energy and Power System

Date : 4 April 2012
Time : 2.00 pm - 3.30 pm
Venue : Tiara 1/2
Session Chairman : Dr. Abdul Samad Shibghatullah

No	Time	Title/Author	Ref. No
1	2.00pm – 2.15pm	**Evaluating The Effectiveness Of Energy Efficient And Eco-Leveling ICT Infrastructures For Environmental Sustainability** *Mosharrof Hussain Masud, Noreha Abdul Malik and Md. Khaled Shukran*	GT201
2	2.15pm – 2.30pm	**Characterization Of A Structure-Borne Source Using The Reception Plate Method** *Noor Fariza, Azma Putra, Hairul Bakri and Roszaidi Ramlan*	GT202
3	2.30pm – 2.45pm	**Detection Of High Impedance Fault On Power Distribution System Using Probabilistic Neural Network** *Adnan H. Tawafan, Marizan Sulaiman and Zulkifilie Ibrahim*	GT203
4	2.45pm – 3.00pm	**Single Cylinder Four Stroke Engine Improvement: An Analytical And Simulation Approach** *Liew Kia Wai, Sim Ting Yee and Teoh Yew Heng*	GT205
5	3.00pm – 3.15pm	**Modelling And Simulation Of Microturbine For A Distribution System Network With Passive Filter** *M.S. Laili, Z.N. Zakaria and N.A.M. Wi*	GT206
6	3.15pm – 3.30pm	**Energy Efficiency Program In The Buildings of FKE, UTeM** *Zuraidah Yahya and Azhar Ahmad*	GT207

PARALLEL SESSION 3A

Track: Emerging Technology
Sub track: Engineering Materials

Date : 4 April 2012
Time : 3.30 pm - 5.30 pm
Venue : Jasmine 1
Session Chairman : Dr Mohd Asyadi 'Azam bin Mohd Abid

No	Time	Title/Author	Ref. No
1	3.40pm – 3.55pm	**Study On Steel Corrosion In Sediment Of Near Shore Simulated Environment** *N. Yahaya, N. M. Noor and A.M.A. Budiea*	ET202
2	3.55pm – 4.10pm	**Determination Of The Flow Curve Of Necking Tensile Specimen For Linear Hardening** *R. Nadlene, A. Öchsner , M.A.M. Irwan, S.N. Liana and M.N. Azmi*	ET214
3	4.10pm – 4.25pm	**Microstructure Transformation Of Advanced Heat Resistant Alloy Grade 91 At Different Cooling Rates** *Ng Guat Peng, Badrol Ahmad, Mohd Razali Muhamad, Mohd Ahadlin Mohd Daud*	ET210
4	4.25pm – 4.40pm	**Effect Of Pozzolans On Properties Of Expansive Black Cotton Soil And Non-Expansive Red Earth Soil** *S.M. Prasanna Kumar*	ET216
5	4.40pm – 4.55pm	**Impact Properties Of Polymer Composite With Ppnanoclay/Pp And Oil Palm Empty Fruit Bunch Reinforcement (OPEFB)** *Noorrul Wahida Abdul Razak and Anizah kalam*	ET209
6	4.55pm – 5.10pm	**A Study On The Effect Of Different Martensite Volume Fraction To The Mechanical Properties Of Dual Phase Steel** *R. Nadlene, M.A.M. Irwan , K.A. Akmar, S.N. Liana and M.N. Azmi*	ET215
7	5.10pm– 5.25pm	**Effect Of Heat Treatment On Microstructure And Mechanical Properties Of AZ61 Magnesium Alloys** *Mohd Ahadlin Mohd Daud , Abdul Talib Din and Mohd Zulkefli Selamat*	ET213

PARALLEL SESSION 3B

Track: Emerging Technology
Sub track: Competitive Manufacturing and Advanced Manufacturing Process

Date : 4 April 2012
Time : 3.30 pm - 5.30 pm
Venue : Jasmine 2
Session Chairman : Dr. Zuhriah binti Ebrahim

No	Time	Title/Author	Ref. No
1	3.40pm – 3.55pm	**Preliminary Monitoring Of Particulate Matters (PM2.5) In Automotive Plants** *N. Azreen P. and A.M. Leman*	ET314
2	3.55pm – 4.10pm	**The Role Of Cross-Functional Teamwork In Developing Creativity: A Review** *P. K. Ng, K. S. Jee and N. I. Anuar*	ET312
3	4.10pm – 4.25pm	**Optimising The Contribution Of Human Resources For Continuous Improvement Toward Achieving Excellence In Manufacturing** *Lukman Sukarma*	ET304
4	4.25pm – 4.40pm	**Effects Of Heat Input On Mechanical And Metallurgical Properties Of Metal Inert Gas Welded 1.6 Mm Thick Galvanized Steel Sheet** *M.I. Rafiqul , M. Ishak and M. M. Rahman*	ET308
5	4.40pm – 4.55pm	**Progressive Freeze Concentration Of Dairy Wastewater: Effect Of Flowrate And Circulation Time** *Noor Naimah Mohamed Nor, Norshafika Yahya, Shafirah Samsuri, Mohd Azam Ariffin, Mohd Aizuddin Said and Mazura Jusoh.*	ET307
6	4.55pm – 5.10pm	**Enhancing Creativity Through Teamwork, Continuous Improvement And CAD: A Review** *P. K. Ng, K. S. Jee and N. I. Anuar*	ET313
7	5.10pm - 5.25pm	**Effect of Initial Concentration and Coolant Temperature on Progressive Freeze Concentration of Polypeptone** *Nurul Ainii Amran, Farah Hanim Ab.Hamid, Nor Zanariah Safiei, Saifullah Mohamad Radzuan, Shariff Ali Ibrahim and Mazura Jusoh*	ET306

PARALLEL SESSION 3C

Track: Emerging Technology
Sub track: Design & Concurrent Engineering and Embedded System

Date : 4 April 2012
Time : 3.30 pm - 5.30 pm
Venue : Tiara 3/4
Session Chairman : Dr. Shajahan bin Maidin

No	Time	Title/Author	Ref. No
1	3.40pm – 3.55pm	**Real-Time Object Detection Methods For Android Smartphone** *Nurul Atiqah Ismail, Khairul Muzzammil Saipullah, Ammar Anuar, Nuraishah Sarimin and Yewguan Soo*	ET502
2	3.55pm – 4.10pm	**Single Phase Power Outage Alert System Via SMS** *S.K. Subramaniam, M. Esro, S.S.S. Ranjit and V.R. Gannapathy*	ET503
3	4.10pm – 4.25pm	**Electric Field Meter (EFM) Circuits Suitable For Lightning Risk Alert** *Z.N. Zakaria, Z.A. Kamaruzzaman, M.S. Laili and S.N. Md Arshad@Hashim*	ET901
4	4.25pm – 4.40pm	**E-Waste Impact Reduction Through Analysis And Redistribution Of Disassembly** *Sharifah Nur Hidayah Syed Salleh and Yusri b Yusof*	ET902
5	4.40pm – 4.55pm	**Design And Fabrication Of A Lab Scale Roller Mill For Further Decreasing Solid Powder Particle Size : The Scooping Effect On Product** *Ang Kiang Long and Wan Khairuddin Wan Ali*	ET903
6	4.55pm – 5.10pm	**Development Of Conceptual Design Of Car Housing Side Mirror Using Integrated Approach** *Hambali, A., Faiz, R., Tajul, A.A., Baharuddin, A.B. and Hidayah, N. A*	ET904
7	5.10pm– 5.25pm	**Development Of Concept Generation Framework Using Expert System** *Fuaad. M.F, Dan. M.M.P, Razali, M.M. and Hambali. A*	ET905

PARALLEL SESSION 3D

Track: Emerging Technology
Sub track: Structural Mechanics and Advanced Materials

Date : 4 April 2012
Time : 3.30 pm - 5.30 pm
Venue : Hibiscus 1/2
Session Chairman : Dr. Mohd Juzaila bin Abd. Latif

No	Time	Title/Author	Ref. No
1	3.40pm – 3.55pm	**Computer Simulation Of Lateral Collapse Of Square Cotton Fiber Propylene Filled With Polystyrene Foam** *Akbar Othman, Azrol Jailani, Mohd Nahar Ahma and Mohd Fikri Mohd Soffian*	ET105
2	3.55pm – 4.10pm	**Dynamic Axial Crushing Of Empty Hexagonal Tube** *Md. Radzai Said*	ET120
3	4.10pm – 4.25pm	**Structural And Optical Properties Studies Of Nanostructured ZnO Deposited By Electrodeposition Method** *A.S. Rodzi, M.N. Berhan and M. Rusop*	ET119
4	4.25pm – 4.40pm	**A Preliminary Study Of Lower Side Beam Structure On Longitudinal Bridge Model** *M.A. Salim, A. Noordin and M.R. Mansor*	ET118
5	4.40pm – 4.55pm	**The Influence Of The Hexagonal Honeycomb Cores Parameters Configuration To Mean Out-Of-Plane** *Alif Zulfakar Pokaad and Md Radzai bin Said*	ET121
6	4.55pm – 5.10pm	**Numerical Modeling Of Foam-Filled Double Cell Titanium Alloy Tube Under Dynamic Loading** *Akbar Othman, Mohd Nahar Ahmad, Azrol Jailani and Mohd Fikri Mohd Soffian*	ET106
7	5.10pm – 5.25pm	**The Effects Of Carbon Black On The Properties Of Graphite-Polypropylene Composite For Bipolar Plate** *Mohd Shakir Ahmad, Mohd Zulkefli Selamat and Mohd Ahadlin Daud*	ET117

PARALLEL SESSION 3E

Track: System Engineering
Sub track: RF & Microwave, Intelligent System

Date : 4 April 2012
Time : 3.30 pm - 5.30 pm
Venue : Tiara 1/2
Session Chairman : Associate Professor Dr Ahmad Jamal Bin Salim

No	Time	Title/Author	Ref. No
1	3.40pm – 3.55pm	**The Cascode And Cascaded Techniques LNA At 5.8 GHz Using T-Matching Network For WiMAX Applications** *Abu Bakar Ibrahim, Abdul Rani Othman, Mohd Nor Husain, Mohammad Syahrir Johal and Jsam Hamidon*	SE410
2	3.55pm – 4.10pm	**Design PI Controller Using Fuzzy System Optimized by ICA For High Performance Induction Motor Drive** *Agus Siswanto and Imam Robandi*	SE201
3	4.10pm – 4.25pm	**Shortest Path Routing Approach Towards RFID Tag Placement Optimization For Blind Indoor Navigation** *S.M. Wong and C. E. Tan*	SE205
4	4.25pm – 4.40pm	**Output Feedbeck Fuzzy Controller Design of Power System Stabilizer For Single Machine Infinite Bus System** *Tamaji and Imam Robandi*	SE206
5	4.40pm – 4.55pm	**Solving Knight's Tour Problem Using Firefly Algorithm** *M. Muzafar Ismail, Amar Faiz Zainal Abidin, Sigit Widiyanto, M.H Misran, Maizatul Alice, Nur Anis Nordin, Ezreen Farina Shair, Seri Mastura Mustaza and M.N. Shah Zainudin*	SE207
6	4.55pm – 5.10pm	**Orientation Tracking With MEMS Inertial Sensors** *N.S.N Anwar, A.M. Kassim, M.F Miskon and M.R. Yaacob*	SE208
7	5.10pm – 5.25pm	**Vision Based Lane Detection For Automatic Steering Support System** *N. Tamaldin and A. Dwijotomo*	SE209

PARALLEL SESSION 4A

Track: System Engineering
Sub track: Mechanical System

Date : 5 April 2012
Time : 8.45 am - 10.45 am
Venue : Jasmine 1
Session Chairman : Dr. Hamzah bin Sakidin

No	Time	Title/Author	Ref. No
1	8.45am – 9.00am	**Concentration Measurements Of Bubbles In A Vertical Water Column Using An Optical Tomography System** *Sallehuddin Ibrahim, Mohd Amri Md Yunus and Robert Garnett Green*	ET601
2	9.00am – 9.15am	**Development Of A Low Cost Wireless Inertial Measurement Unit** *Zhengyu Yu, Xiaoying Kong and Tich Phuoc Tran*	ET602
3	9.15am – 9.30am	**Development Of A Magnetic Levitation System** *Nik Syahrim Nik Anwar, Khairul Ridza Ramli and Mohd Najib Ali Mokhtar*	ET603
4	9.30am – 9.45am	**Recycle Folded Cacsode OTA With Current Control Circuit** *Nordiana Mukahar and Siti Aishah Che Kar*	ET802
5	9.45am – 10.00am	**Overview: Process Parameters For Hydrothermal Synthesis Of Hydroxyapatite** *Fatimah, M., Shaaban, A., Toibah, A R. and Seliman, S.*	ET201
6	10.00am – 10.15am	**Preliminary Study Sodium Silicate – Borax Mixtures As Flux Addition In Ceramic Surface Enamel Formulation for Carbon Steel** *Mohammad `Izzat Mohd Radzi*	ET217
7	10.15am – 10.30am	**Employment Of Swirling Flow Technique To Reduce Turbulenence Of Molten Metal In Thin Section Casting Of (Al-7Si-0.3Mg) Alloy** *Zaid Ali Subhi, Rosle Ahmed, Sulaiman Hasan and Badrul Omar*	ET218
8	10.30am – 10.45 am	**A Theoretical Model Of Pitting Corrosion Using A General Purpose Finite Element Package** *Suhaila Salleh and Nicholas P.C. Stevens*	ET219

PARALLEL SESSION 4B

Track: System Engineering
Sub track: Mechanical System

Date : 5 April 2012
Time : 8.45 am - 10.45 am
Venue : Jasmine 2
Session Chairman : Dr. Zamberi bin Jamaludin

No	Time	Title/Author	Ref. No
1	8.45am – 9.00am	**Design of Proportional-Integral-Derivative Wall Follower Robot** *I. Hidayah, M.Z. Hilwa ,W.H. Ahmas, A. Razali and N.I. Tusiman*	SE310
2	9.00am – 9.15am	**Modelling and Validation of Six-Bar Rack And Pinion Steering Linkage System** *Mohd Zakaria Mohammad Nasir, Mohd Zubir Amir, Khisbullah Hudha, Mohd Azman Abdullah, Muhammad Zahir Hassan and Masjuri Musa@Othman*	SE311
3	9.15am – 9.30am	**Motion Synthesis of Planar Four Linkage Movement For Part Flipping Application** *A.M.M. Najib, N.S.N. Anwar, M.N. Muhammad, M.A. Akiah and S.H. Yahaya*	SE312
4	9.30am – 9.45am	**Bus Accidents Prevention With An Integrated Steering** *V.K. Kher, Chee Fai Tan and Ranjit Singh Al Sarban Singh*	SE313
5	9.45am – 10.00am	**Half Car Active Suspension System** *Amat A. Basari, Saifullah Salam, Khairul A.A. Aziz and Redzuan A. Manap*	SE314
6	10.00am – 10.15am	**Design And Fabrication For Semi-Automatic Gear Shifter For Formula Varsity Race Car** *Ammar Alfaiz M.A., Muhd Ridzuan M., Syahibudil Ikhwan A.K., Mohd Azli S. And Mohd Afzanizam M.R.*	SE315
7	10.15am – 10.30am	**Development of PD Controller For Comparison Stability Study In Multiple Difference Disturbances** *M.A Nur Huda, H.A Kasdirin and A.G Mohd Ruddin*	SE316
8	10.30am – 10.45 am	**Design And Development Of Microcontroller Based Localised Air Heater** *M.Z.Hilwa, W.L.Fu and I.Hidayah*	SE309

PARALLEL SESSION 4C

Track: Green Technology
Sub track: Renewable Energy

Date : 5 April 2012
Time : 8.45 am - 10.45 am
Venue : Tiara 3/4
Session Chairman : Dr. Nona Merry Merpati Mitan

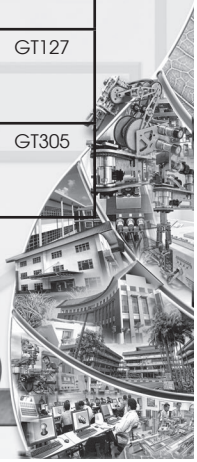
No	Time	Title/Author	Ref. No
1	8.45am – 9.00am	**Short Review On Common Methods Of Biodiesel Production** *Alireza Zarei, Hamidreza Jaliliannosraty and Amin Talebian Kiakalaieh*	GT103
2	9.00am – 9.15am	**The Prospect Of Renewable Energy Resource Utilization To Supoort The Development In Southeast Sulawesi** *Ridway Balaka, Aditya Rachman and Abdul Johar*	GT109
3	9.15am – 9.30am	**Catalytic Steam Gasification Of Waste Palm Tree Trunk Derived Bio-Char** *Nor Azizi, Young-Kwang Kim, Jin Miyawaki, Isao Mochida and Seong-Ho Yoon*	GT108
4	9.30am – 9.45am	**The Effect Of Heterogeneous Catalysts In Biodiesel Production: A Short Review** *Amin T. Kiakalaieh, Nor A.S. Amin, Hamidreza Jaliliannosrati and Alireza Zarei*	GT106
5	9.45am – 10.00am	**Impact Assessment Of PY On Low-Voltage Distribution Network** *Kee Swee Yen and Gan Chin Kim*	GT111
6	10.00am – 10.15am	**Monthly Average Daily Global Solar Radiation In Sarawak, Malaysia** *S.Y. Wong and A. Chai*	GT112
7	10.15am – 10.30am	**Experimental And Numerical Simulation On Biogas Flame Propagation Characteristic In Spark Ignition Premixed Combustion** *Willyanto Anggono, ING Wardana, M. Pourkashanian, K.J. Hughes, M. Lawes, Slamet Wahyudi, Nurkholis Hamidi and Akihiro Hayakawa*	GT113
8	10.30am – 10.45 am	**Prediction Of Condensation Water Rate In The Liquid Desiccant Dehumidifier Using Artificial Neural Network** *Abdulrahman Th. Mohammad, Sohif Mat, M. Y. Sulaiman, Kamaruzzaman Sopian and Abduljalil A. Al-abidi*	GT123

PARALLEL SESSION 4D

Track: Green Technology
Sub track: Energy Harvesting, Energy Conservation

Date : 5 April 2012
Time : 8.45 am - 10.45 am
Venue : Hibiscus 1/2
Session Chairman : Associate Professor Juhari bin Ab Razak

No	Time	Title/Author	Ref. No
1	8.45am – 9.00am	**Energy Conservation In Office Buildings Case Study At PT-ABC, Surabaya-Indonesia** *Ali Musyafa', Bambang L.Widjiantoro and Imam Robandi*	GT101
2	9.00am – 9.15am	**Solar Insolation Forecast Using Artificial Neural Network For Malaysian Weather** *H.G. Chua, B.C. Kok and H.H. Goh*	GT102
3	9.15am – 9.30am	**A Study on Higher Engine Efficiency Through Motorcycle Waste Heat Recovery Exhaust Pipe** *M. F. Sukri and M. R. C. Nordin*	GT118
4	9.30am – 9.45am	**Waste Heat Recovery From The Exhaust Of Natural Aspirated Engine** *Safarudin Gazali Herawan, Abdul Hakim Rohhaizan and Ahmad Faris Ismail*	GT119
5	9.45am – 10.00am	**Modelling The Effect Of Vibration On The Sound Absorption Performance Of Green Sound Absorber Using Wave Propagation Technique** *M. Sajidin Py, Azma Putra, Norliana Salleh and Hady Efendy*	ET110
6	10.00am – 10.15am	**Experimentally Investigation The Performance Of Turbo-Generator In Gasoline** *Abdul Hakim Rohhaizan, Safarudin Gazali Herawan and Md Razali Ayob*	GT120
7	10.15am – 10.30am	**Characterization And Performance Of Green Hydraulic Fluid** *M.A. Zakaria, A.F. Ayob, S. Syahrullail and W.B. Wan Nik*	GT127
8	10.30am – 10.45 am	**Design Of a Urea Granulator With Energy Optimization** *Chee Fai Tan, Eng Ling Jong, Wei Pin Keng, Azizah Shaaban and V.K. Kher*	GT305

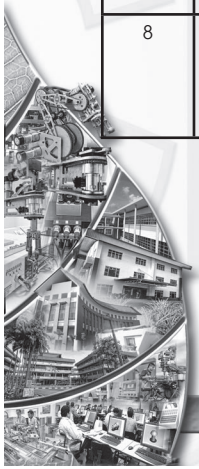


PARALLEL SESSION 4E

Track: System Engineering
Sub track: RF & Microwave

Date : 5 April 2012
Time : 8.45 am - 10.45 am
Venue : Tiara 1/2
Session Chairman : Associate Professor Muhammad Syahrir bin Johal

No	Time	Title/Author	Ref. No
1	8.45am – 9.00am	**Design Of Frequency Selective Limiting Circuit** *N.H. Ali, Z. Zakaria and R. Phudpong*	SE402
2	9.00am – 9.15am	**Design Of Low-Loss TEM Coaxial Cavity Bandpass Filter** *Z. Zakaria and A. Sabah*	SE404
3	9.15am – 9.30am	**Analysis And Dynamic Spectrum Sensing For Cognitive radio System** *M.H Mohamad, M.Ismail, N.Sarimin, F. Radzi and F. Azhar*	SE408
4	9.30am – 9.45am	**A Review Of Edge Couple Split Ring Resonator (EC-SRR) Structure On Patch Antenna** *H. Nornikman, B. H. Ahmad, A. R. Othman and M. Z. A. Abdul Aziz*	SE406
5	9.45am – 10.00am	**An Approach On Optimal Location, Sizing And Switch Type Of Pole Top Capacitor Bank In LV Network** *Nguyen Ba Hoai, Mau Teng Au, Ali Askar Sher Mohamad and Khaled Saleh Banawair*	GT208
6	10.00am – 10.15am	**Performance Of Low Noise Amplifier With Different Matching Techniques For GPS Application** *M. H. Misran, A. Salleh, M.A. Meor Said and M. Muzafar Ismail*	SE407
7	10.15am – 10.30am	**Synthesis Of Microwave Filter With Dissipative Element** *Z. Zakaria, F.Y. Kong, Y. Dasril and M. A. Meor Said*	SE405
8	10.30am – 10.45 am	**Performance Of Power Amplifier With Different Matching Techniques For GPS Application** *M.A. Meor Said, M.H. Misran, A. Salleh, M. Muzafar Ismail*	SE409



PARALLEL SESSION 5A

Track: Green Technology
Sub track: Green Manufacturing, Renewable Energy

Date : 5 April 2012
Time : 2.00 pm - 3.45 pm
Venue : Jasmine 1
Session Chairman : Dr. S. Thiru Chitrambalam

No	Time	Title/Author	Ref. No
1	2.00pm – 2.15pm	**The Effect Of Binder On The Acoustical Performance Of The Paddy Straw 'Green' Sound Absorber** *Yasseer Abdullah, Azma Putra, Hady Efendy, W.M. Farid and M.R. Ayob*	GT302
2	2.15pm – 2.30pm	**Superabsorbent Polymer Hydrogel From Sago Starch: The Effect Of Crosslinker Content On Water Absorbency** *O. Nurizan, A. Zuraida and N. Norhuda Hidayah*	GT303
3	2.30pm – 2.45pm	*The Redesign Of Stabilizer Product Base On Design For Environment Concept* *Kristiana Asih Damayanti, Yeany Yus and Thedy Yogasara*	GT304
4	2.45pm – 3.00pm	**Life Cycle Assessment Of A Marine Current Turbine** *A. Rashedi, I. Sridhar and K.J. Tseng*	GT124
5	3.00pm – 3.15pm	**Energy And Exergy Analysis Of A Two Pass Hybrid-Type (PV/T) Solar Air Heater** *M. Srinivas and S. Jayaraj*	GT125
6	3.15pm – 3.30pm	**An Experimental Study Of Diesel Engine Fuelled With Emulsion Fuel** *H M. Herzwan, Agung Sudrajad, A A. Adam and Aminuddin Ayob*	GT126
7	3.30pm – 3.45pm	**Emission Characteristic Of Alkaline-Catalyst Biodiesel** *Mahanum M. Zamberi, Md Razali Ayob and Nona Merry M. Mitan*	GT128

PARALLEL SESSION 5B

Track: System Engineering
Sub track: Mechanical System, Power Electric & Drives

Date : 5 April 2012
Time : 2.00 pm - 3.30 pm
Venue : Jasmine 2
Session Chairman : Dr. Auzani bin Jidin

No	Time	Title/Author	Ref. No
1	2.00pm – 2.15pm	**Design And Manufacturing Of Formula Varsity Race Car Pedal System** *Mohd Zaini J., Muhd Ridzuan M., Syahibudil Ikhwan A. K., M. A. M. Rosli and Mohd Azli S.*	SE317
2	2.15pm – 2.30pm	**Sensors Configuration For Small Scale Autonomous Ground Vehicle** *Vimal Rau Aparow, Muhammad Zahir Hassan, Khisbullah Hudha and Fauzi Ahmad*	SE318
3	2.30pm – 2.45pm	**Monitoring Of Mechanical Ventilation And Air Conditioning (MVAC) Ducting For Indoor Air Quality (IAQ) Improvement** *A.A.M. Damanhuri and A.M. Leman*	SE319
4	2.45pm – 3.00pm	**Design And Development Of Optimum Power Output For Tidal Energy System Application** *Noor Hidayah M. Yunus, M. Sidek, Fadhil M.Y., P.D. Abd.Aziz and F.Z. Hamidon*	SE702
5	3.00pm – 3.15pm	**Generation Of Constant Current Source For A Current Source Inverter** *S.Pradeepa, K. Uma Rao and Ravishankar Deekshit*	SE704
6	3.15pm – 3.30pm	**Magnetic Levitation Training Kit For Teaching Basic Electrical Control System Courses** *Mohd Firdaus Mohd Ab. Halim, Muhammad Sharil Yahaya, Zulkifli Ibrahim, Mohd Farriz Hj Md Basar, Mohd Razali Sapiee, Suziana Ahmad, Che Wan Mohd Faizal Che Wan Mohd Zalani, Fadzilah Salim, Aminurrashid Noordin and Norliana Ibrahim*	SE706

PARALLEL SESSION 5C

Track: Green Technology
Sub track: Renewable Energy, Transformer Diagnostic

Date : 5 April 2012
Time : 2.00 pm - 3.45 pm
Venue : Tiara 3/4
Session Chairman : Associate Professor Dr Ismadi Bugis

No	Time	Title/Author	Ref. No
1	2.00pm – 2.15pm	**Diagnosis Of OLTC Using DGA And Static Winding Resistance Test** *M.S.A Khiar, Y.H.M. Thayoob, Y.Z.Y Ghazali, S.A Ghani and I.S Chairul*	GT401
2	2.15pm – 2.30pm	**Mechanical Condition Assessment Of TNB In-Service Distribution Transformers Using Sweep Frequency Analysis (SFRA)** *S.A. Ghani, Y.H. Md Thayoob, Y.Z. Yang Ghazali, I.S. Chairul and M.S. Ahmad Khiar*	GT402
3	2.30pm – 2.45pm	**Analysis of Kraft Paper Insulation's Life For 15MVA Power Distribution Transformer In TENAGA NASIONAL BERHAD** *I.S. Chairul, Y.H. Md Thayoob, Y.Z. Yang Ghazali, M.S. Ahmad Khiar and S.A. Ghani*	GT403
4	2.45pm – 3.00pm	**Analytical Study Of Signal To Noise Ratio Using Green Light Technology For Wireless Communication** *Luqman Al-Hakim Azizan, Mohammad Syuhaimi Ab-Rahman and Mazen Radhe Hassan*	GT209
5	3.00pm – 3.15pm	**Boundary Layer Heating To Reduce Dragon The Plane** *Ahmad Amiruddin Sabarudin, Ewe Tek Bee, Lim Yook Yarth, Lau Shih Ee, Mohamad Noor Hisyam Bujang and Juhari Ab. Razak*	GT210
6	3.15pm – 3.30pm	**Study On The Load Distribution By A Charge Controller Of A Passive Solar Greenhouse** *M.R. Yaacob, W.S. Yuan and M.Y. Lada*	GT211
7	3.30pm – 3.45pm	**Investigation Of Engine Performance And Emission Level Of SI Engine Running With Different Ron Fuel Grades** *N. Tamaldin, M. A. Dzulkifli and R. Mamat*	GT212

PARALLEL SESSION 5D

Track: Green Technology, Emerging Technology
Sub track: Automotive Design, Acoustics & Vibration

Date : 5 April 2012
Time : 2.00 pm - 3.30 pm
Venue : Hibiscus 1/2
Session Chairman : Profesor Dr. Md Radzai bin Said

No	Time	Title/Author	Ref. No
1	2.00pm – 2.15pm	**Analysis Of Vibration Level Of A Perforated Panel Using Finite Element Method** **Wai C. Mun, Azma Putra and Ahmad Rivai**	ET701
2	2.15pm – 2.30pm	**Nanofluid As Coolant In Automotive Cooling System– Heat Transfer Characteristics Of Car Radiator Using CU-Based Nanofluid** *S.A. Fadhilah, S. Abdul Rafeq, B. Hairul, Nur Hazwani Mokhtar and Nona Merry M. Mitan*	GT501
3	2.30pm – 2.45pm	**Proposal For Hybrid Passive Cooling System Of Batteries In Electric Vehicle** *N. Tamaldin and M.F. Abdollah*	GT502
4	2.45pm – 3.00pm	**Thermal Analysis Of A Brake Disc Rotor For Personal Electric Vehicle** *Muhammad Zahir Hassan, Fudhail Abdul Munir, Mohd Rody Mohd Zin and Mohd Irwan Mohd Azmi*	GT503
5	3.00pm – 3.15pm	**Performance Enhancement Of Single Cylinder Spark Ignition Fueled By LPG** *Mohd Yusoff S., Iskandar Meran and Md Razali A.*	GT504
6	3.15pm – 3.30pm	**2D Turbulance Simulation Models On Forward-Backward Facing Step** *N.H. Zakaria, M.Z.M. Rody and F.A. Munir*	GT505

PARALLEL SESSION 5E

Track: System Engineering, Emerging Technology
Sub track: Consumer Electronic, Broadband & Multimedia

Date : 5 April 2012
Time : 2.00 pm - 3.45 pm
Venue : Tiara 1/2
Session Chairman : Dr. Azmi bin Awang Md Isa

No	Time	Title/Author	Ref. No
1	2.00pm – 2.15pm	**Controlling Mobile Robot Via Personal Digital Assistance (PDA)** *R.A. Ramlee, S.K. Subramaniam, R.S.S. Singh and M. Esro*	ET606
2	2.15pm – 2.30pm	**Comparison Of Peak-To-Peak Average Power Ratio In MC-CDMA And SC-FDMA Techniques In Wireless Communication Systems** *M.F. Ghanim, M.F.L. Abdullah and A.Z. Yonis*	SE108
3	2.30pm – 2.45pm	**Designing Secured Stream CIPHER Algorithm For GSM Communication** *Nur Hafiza Zakaria, Kamaruzzaman Seman and Ismail Abdullah*	SE109
4	2.45pm – 3.00pm	**Video Conferencing And Streaming In E-Learning Portal Over WIMAX: QOS Evaluation** *Irma Syarlina Hj Che Ilias and Nur Zaimah Ahmad*	SE106
5	3.00pm – 3.15pm	**Enhanced Multiple Antenna Technologies On LTE And LTE-Advanced** *A.Z. Yonis, M.F.L. Abdullah and M.F. Ghanim*	SE107
6	3.15pm – 3.30pm	**Smart Home System For Disabled People Via Wireless Bluetooth** *R.A. Ramlee, S.K. Subramaniam, R.S.S. Singh and D.H.Z. Tang*	ET607
7	3.30pm – 3.45pm	**A Practical Analysis Of Multi-Hop Wireless Network Deployment In UTeM Campus** *Fakrulradzi Idris, Mohd Zul Azri Mohd Nizam, Mohamad Faris Rahmat, Ho Peng Hou and Lim Kim Chuan*	SE102

PARALLEL SESSIONS TIMETABLE AND VENUE

	4 April 2012			5 April 2012	
Room	10.40 am – 12.30 pm	14.00pm – 15.30 pm	15.40pm – 17.30pm	8.45pm – 10.45pm	14.00pm – 15.30pm
1	1A	2A	3A	4A	5A
2	1B	2B	3B	4B	5B
3	1C	2C	3C	4C	5C
4	1D	2D	3D	4D	5D
5	1E	2E	3E	4E	5E

The 3rd International Conference on Engineering and ICT (ICEI) 2012

Cluster 1

EMERGING TECHNOLOGY

PAPER ID : ET 101

INSERTION OF A MICRO-PERFORATED PANEL TO IMPROVE SOUND TRANSMISSION LOSS OF A DOUBLE-LEAF PARTITION

A.Y. Ismail *, A. Putra, Md. R. Ayob
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***Abstract*—Over decades a double-leaf partition in engineering structures has been widely applied for its advantages i.e. in terms of the mechanical strength and toughness as well as its lightweight property. For noise control application, the double-leaf has also been known to be an effective noise barrier. Unfortunately at resonance frequency, the sound transmission loss (TL) reduces significantly due to the coupling between the panels and the air between them. This paper investigates the effect of a micro-perforated panel (MPP) inserted inside a double-leaf partition to improve the TL performance at the troublesome resonance frequency of a conventional double-leaf structure. It is found that the TL improves at the resonance if the MPP is located closer to the solid panel. The mathematical model is derived for normal incidence of acoustic loading.**

Keywords—Double-leaf, partition, micro-perforated panel, transmission loss.

PAPER ID : ET 102

ELECTRICAL AND MECHANICAL PERFORMANCE OF ZIRCONIA-NICKEL FUNCTIONALLY GRADED MATERIALS

M. S. EL-Wazery[1,a], A. R. EL-Desouky[2,b], O. A. Hamed[3,c] ,
A. A. Hassan[4,d] , N. A. Mansour[5,e]
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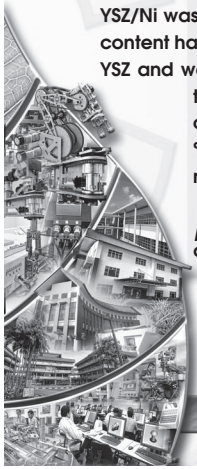
[4,5] Nuclear Research Center, Atomic Energy Authority Cairo, Egypt

***Abstract*—In the present work, six-layered (Zirconia/Nickel) functionally graded materials were fabricated via powder metallurgy technique. The microstructure, fracture surface and the elemental analysis of the prepared components were studied, and its linear shrinkage, electrical conductivity, fracture toughness and Vickers hardness were evaluated. The results show that the linear shrinkage of the non-graded composites was reduced with the nickel content. The electrical conductivity of the YSZ/Ni was strongly depended on its nickel content. The electrical conductivity as a function of nickel content has a typical 'S' shape curve. Vickers's hardness of YSZ/Ni was lower than that of pure ceramic YSZ and was reduced by decreasing the density of the layer of YSZ/Ni FGM, which was attributed to the variation of the matrix phase from the ceramic to the metal. Also, the fracture toughness obtained by the non-graded composite increases with an increase in nickel content from 0 % to 50% Ni. The functionally graded materials exhibited a high fracture toughness (31 MPa m1/2) compared to the non-graded composite.**

***Keywords*—functionally graded materials (FGM), powder metallurgy technique, electrical conductivity**



PAPER ID : ET 103

NUMERICAL STUDIES OF ALPORAS FOAM-FILLED ROUND ALUMINUM 2024-T4 ALLOY UNDER TRANSVERSE LOADING

Akbar Othman[1,a], Mohd Nahar Ahmad[2,b,*], Mohd Fikri Mohd Soffian[3,c], Azrol Jailani[4,d]
[1,2,3,4] Mechanical Engineering Department, Port Dickson Polytechnic, Malaysia. [a]Email: akbar47083@gmail.com, [b]Email: mnahar@polipd.edu.my, [c]Email: fikri@polipd.edu.my, [d]Email: azrol@polipd.edu.my

***Abstract*—Aluminum columns are used in a wide variety of automotive and aerospace applications and especially as crash absorber elements. In automotive application, metallic thin-walled structures absorb impact energy in a plasticity deformation. Thereby, they bring the passenger compartment to rest without subjecting the occupant to high decelerations. A numerical study is presented in this paper to investigate and determine the energy absorption of alporas foam-filled on round hollow Aluminum 2024T Alloy subjected to transverse loading. The failure mode of the filled-tube structures has been successfully simulated. The predicted compressive load-displacement value is in a good agreement with experimental results from reference literature. The energy absorption capability of the metallic structure due to plastic deformation in a crushing process is evaluated by comparison with the tube structure without filler. The results indicate that the energy absorption of a filler material of tube structure is superior to the tube without filler. The influences of the friction and the geometric parameters of the structure on the energy absorption have also been investigated.**

***Keywords*—ABAQUS Explicit 6.10; Aluminum 2024-T4 alloy; Transverse loading; Energy absorption; Alporas foam**

PAPER ID : ET 104

FINITE ELEMENT SIMULATION OF OFF-AXIS CRUSHING PERFORMANCE OF POLYURETHANE FOAM ALUMINUM ALLOY TUBES

Akbar Othman[1,a], Mohd Fikri Mohd Soffian[2,b,*], Azrol Jailani[3,c], Mohd Nahar Ahmad[4,d]
[1,2,3,4] Mechanical Engineering Department, Port Dickson Polytechnic, Malaysia. aEmail: akbar47083@gmail.com, [b]Email: fikri@polipd.edu.my, [c]Email: azrol@polipd.edu.my, [d]Email: mnahar@polipd.edu.my

Abstract—In this paper, we describe a numerically investigation on the dynamic impact axially and obliquely crush performance of tapered cross-section tubes, containing straight (square), single taper, double taper, triple taper and fourth taper (square frusta) aluminum alloy 6061 polyurethane foam-filled thin-walled tubes. Polymeric foam-filled thin-walled tubes were tested numerically. The off-axis angle of dynamic impact loading in frontal crash was examined on angle of 0, 5, 10, 15 and 20 degree. The numerical analysis was validated with existing experimentally from reference literature to ensure that the data results were sufficiently accuracies. Finite element simulation using ABAQUS explicit was carried out to examine the effects of variable cross-section on the tube's energy absorption capability. Results showed that the tube's energy absorption capability was affected significantly by varying of off-axis angle, velocity-impact and wall-thickness. It is found that as the filling foam into thin-walled tube increases the amount of absorbed energy than the empty tubes.

***Keywords*—Finite element modeling; ABAQUS; Metallic structure; Off-Axis loading; Energy absorption; Foam filled**

PAPER ID : ET 105

COMPUTER SIMULATION OF LATERAL COLLAPSE OF SQUARE COTTON FIBER PROPYLENE FILLED WITH POLYSTYRENE FOAM

Akbar Othman[1,a], Azrol Jailani[2,b*], Mohd Nahar Ahmad[3,c], Mohd Fikri Mohd Soffian[4,d]
[1,2,3,4] Mechanical Engineering Department, Port Dickson Polytechnic, Malaysia. aEmail: akbar47083@gmail.com, [b]Email: azrol@polipd.edu.my, [c]Email: mnahar@polipd.edu.my, [d]Email: fikri@polipd.edu.my

***Abstract*—Composite materials are widely used in a broad range of automotive and aerospace applications and especially as crash absorber elements. A numerical study is presented in this paper to determine and investigate the lateral collapse of polystyrene foam-filled on square hollow cross-section cotton fiber propylene composite structure subjected to transverse loading. Cross-sectional shape of square composite profile with variation of wall-thickness and foam filler material were studied and examined. The validation finite element modeling was carried out with experimental analysis technique to ensure that the data results from numerical analysis. The predicted compressive load displacement is in a good agreement with experimental results from reference literature. The energy absorption capability of the composite structure due to failure deformation in a crushing process is evaluated by comparison with the tube structure without filler. The results indicate that the energy absorption of a cellular material filled of tube structure is superior to the tube without filler. The influences of the friction and the geometric parameters of the structure on the energy absorption have also been investigated.**

***Keywords*—LS-DYNA; Cotton fiber propylene; Transverse loading; Energy absorption; Polystyrene foam**

PAPER ID : ET 106

NUMERICAL MODELING OF FOAM-FILLED DOUBLE CELL TITANIUM ALLOY TUBE UNDER DYNAMIC LOADING

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***Abstract*—In this paper, the numerical studies of dynamic axial loading of thin-walled metallic titanium alloy extrusion double cell polyurethane foam-filled square sections were studied and investigated. Nonlinear dynamic simulations were performed on empty as well on foam-filled modeling. The dynamics non-linear finite element code ABAQUS standard and explicit were used to simulate the buckling and crushing of columns. The influence of filler material on energy absorption and behavior of double cell thin-walled square metallic titanium alloy extrusion were examined. Three main collapse modes were identified for the crushed model, such as compound diamond asymmetric, concertina axisymmetric and mixed mode fold formations. Three different arrangement of double-cell inner column were examined and investigated. Filling the polyurethane foams into tubular double cell played important factor positively influencing the energy absorption capability. Results showed that the tubular energy absorption capability was affected significantly by varying of velocity impact and wall-thickness as well as arrangement inner tube cross-section. It is also found that as the filling polymeric foam into thin-walled tube increases the amount of absorbed energy than the empty columns.**

***Keywords*—Finite element modeling; ABAQUS; Double cell; Axial loading; energy absorption; foam filled**

PAPER ID : ET 107

FINITE ELEMENT ANALYSIS MODELING OF ELLIPTICAL CONICAL ALUMINUM 2024-T4 ALLOY POLYURETHANE FOAM-FILLED SECTION

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***Abstract*—In this paper, finite element simulation of elliptical conical unfilled and foam filled subjected to compressive loading is studied in detail. Validation of finite element analysis packages PAM-CRASH 2G version 2005 was compared with existing results from experimental analysis has been done by previous investigation to ensure that the numerical analysis is sufficiently accuracies. On the other hand, proper thin-walled extruded aluminum alloy as well as polymeric foam material offers vast potential for optimally tailoring a design to meet crashworthiness performance requirements. The energy absorption characteristics of thin-walled extruded 2024-T4 alloy and polymeric foam with variable cross-section in term of vertex angle and wall-thickness are numerically studied. From the results data that achieved from numerical analysis, the load versus deformation curves and analysis dynamic energy absorption versus deformation were plotted and calculated using MathWorks MATLAB Simulink commercial software's package version R2010a. Results showed that the tube's energy absorption capability was affected significantly by varying of velocity-impact and wall-thickness as well as vertex angle of conical cross-section. It is also found that as the filling polymeric foam into thin-walled tube increases the amount of absorbed energy than the empty tubes.**

***Keywords*—Finite element modeling; ABAQUS; Elliptical conical; Axial loading; energy absorption; foam filled**

PAPER ID : ET 108

AXIAL CRUSHES OF MULTIPLE CORNERS CROSS-SECTION COTTON FIBER COMPOSITE UNDER DYNAMIC LOADING

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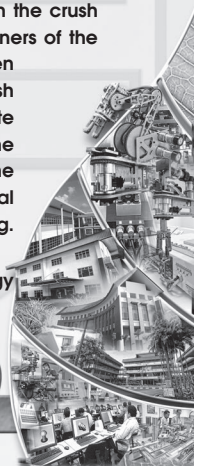
***Abstract*—Crushing behaviors of composite structures with various regular multiple corners cross-sections are investigated numerically under axial dynamic using the finite element analysis program code of LS-DYNA version 3.71. The effects of wall thickness and velocity rate of impact on the crush behavior are also studied in details. Progressive damage increases as the number of corners of the cross-section increases. Cross-sectional shape with five than above corners have been studied and examined. The effect of number of multiple corners on enhancement in crush strength becomes more prominent as the initial wall thickness decreases. The validation finite element modeling was carried out with experimental analysis technique to ensure that the data results from numerical analysis will sufficiently accuracies. The results showed that the dynamic absorbed energy will be affected by the introducing number of corners of structural shape cross-section composite profile and wall-thickness as well as velocity impact of loading.**

***Keywords*—Finite element modeling; LS-DYNA; Metallic structure; Off-Axis loading; Energy absorption; Foam filled**



PAPER ID : ET 109

CONNECTION BEHAVIOR OF LIGHT WEIGHT STEEL SECTION

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***Abstract*—This paper presents an experimental research on bolted moment connections between single cold-formed channels connected back-to-back at the joints. A total of five column base connection tests and beam-column sub frame test with different connection configurations were conducted to study the performance of the connections in term of strength and stiffness. Two modes of failure were recognized from the tests; 1) Mode BFcsw: Bearing failure in section web around bolt hole. 2) Mode FFcs: Flexural failure of connected section. Among all the tests, the moment resistance of bolted moment connections with four bolts per member found to be more than 85 % of the moment capacities of the connected members. Consequently, it can be concluded that the use of cold-formed steel sections connected back-to-back at the joints allows simple and effective connection to be formed between cold-formed steel sections leading to improved buildability.**

***Keywords*— Cold-formed steel; Bolted moment connections; Laboratory tests; Column base; Beam column.**

PAPER ID : ET 110

MODELLING THE EFFECT OF VIBRATION ON THE SOUND ABSORPTION PERFORMANCE OF GREEN SOUND ABSORBER USING WAVE PROPAGATION TECHNIQUE

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***Abstract*—Natural fibers (NF) have been known to have good acoustic performance and can potentially substitute the classical synthetic absorber materials which give negative impact for the environment. Commonly, the sound absorption model available for porous acoustic panel ignores the vibration of the panel. In this paper, the effect of the vibration on the sound absorption of the NF panel backed with a solid panel and air layer is modeled using wave propagation method. It is shown that the model can be adjusted into the case of an absorber panel backed with air layer and rigid surface by increasing the impedance of the solid panel.**

***Keywords*—Microperforated Panel, Absorption Coefficient, Wave Propagation, Natural Waste Material, Fiber.**

PAPER ID : ET 112

EFFECTS OF VISCOELASTICITY ON THE FLOW PAST A CIRCULAR CYLINDER

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***Abstract*—The flow of the Giesekus fluid past a circular cylinder is simulated by a parallelized finite volume method (FVM), using unstructured meshes. The numerical procedure is based on the semi-implicit method for pressure-linked equations revised (SIMPLER) algorithm. Also, second order finite volume method in both spatial and temporal discretization is used to enhance the numerical accuracy. The results for the viscoelastic flow are compared with those for a Newtonian flow. Frequency of the vortex shedding is shown to be attenuated by elasticity of the fluid, while the recirculation region behind the cylinder is elongated before reaching the critical Reynolds number. These results are in agreement with recent experimental and numerical observations. As a further result, drag reduction phenomenon was attributed to the increasing pressure distribution on the rear of the cylinder because of the shear thinning behavior of viscoelastic fluid and normal stresses due to elasticity.**

Keywords—Numerical method; Viscoelastic flow; Giesekus; Circular cylinder.

PAPER ID : ET 113

FATIGUE CRACK DETECTION USING NONLINEAR ACOUSTIC – ANALYSIS OF VIBRO-ACOUSTIC MODULATION

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***Abstract*—Nonlinear vibro-acoustic is a highly reliable and sensitive method for damage detection. It is a method based on propagation of high frequency acoustic waves in solid structures with low-frequency excitation. Interaction of the acoustic wave with material or geometry properties changes caused wave distortion effects. The causes called nonlinear acoustic effects are amplified with the low frequency excitation. Nonlinear acoustic-acoustic modulations are investigated for fatigue crack detection. The focus is on vibro-acoustic wave modulations used for crack detection in aluminium. Experimental works are performed to investigate the effect of crack characteristics, i.e. crack lengths and crack modes, on vibro-acoustic effects intensity. Nonlinear acoustic tests are performed for the uncracked and cracked aluminium plates. The analyses results show that there are many nonlinear phenomena (i.e. hysteresis and classical 1st order perturbation) involved in the vibro-acoustic wave modulations. The nonlinear modulations produced by the low-frequency modal excitation and high-frequency ultrasonic excitation can be used effectively for fatigue crack detection.**

***Keywords*—nonlinear vibro-acoustic, wave modulation, modal excitation, fatigue crack detection.**

PAPER ID : ET 115

THE CHARACTERISTICS OF LOAD VERSUS DISPLACEMENT OF PAPER HONEYCOMB: AN EXPERIMENTAL INVESTIGATION

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***Abstract*—The influence of paper honeycomb core on the energy absorption capability was studied. Simple mechanism for compression test was constructed. Maximum stress and deformation of each specimen were compared with the results from analyses of static compression stress-strain curves. The specimen under axial loading showed three zones. Zone 1 is the initial elastic state and the followed by the plateau region in zone 2. Zone 3 shows a monotonically stiffening region, associated with densification of the material. The locking strain is defined by intersection of two lines and the locking strain in experimental is 9 mm. Therefore, the value of locking strain each paper honeycomb stress-strain curves are used to define area under the curve to obtain energy absorption and mean load. The theoretical mean load used in metal honeycomb is adapted and compared with experimental results.**

***Keywords*—Paper honeycomb, quasi-static axial loading**

PAPER ID : ET 116

SPRAY PAINT ACTIVITY RELATED WITH VOLATILE ORGANIC COMPOUNDS (VOCS): A LITERATURE REVIEW

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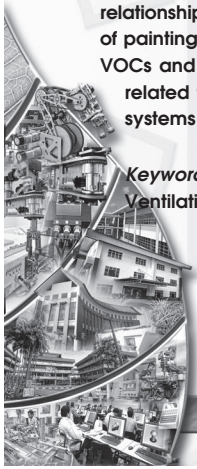
***Abstract*—Currently, Industrial workers are exposed to contaminants and affect on occupational health at workplace. Spray painting activity is related with inhalation of Volatile Organic Compounds (VOCs) exposure. This paper highlight issues from the review of every angle of painting activities and the relationship to VOCs. Painting activity can be divided into three (3) elements. (This includes the effect of painting activity, assessments and managing). Furthermore, worker exposure, effect and control of VOCs and a need of ventilation system will be discussed. The spray-painting activity is significantly related to VOCs exposure and will lead to occupational health diseases and sufficient ventilation systems should be applied.**

***Keywords*—Volatile Organic Compounds, Occupational Safety and Health, Spray Paint Activity, Ventilation, Green Technology.**



PAPER ID : ET 117

THE EFFECTS OF CARBON BLACK ON THE PROPERTIES OF GRAPHITE-POLYPROPYLENE COMPOSITE FOR BIPOLAR PLATE

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***Abstract*—The performance of Polymer Electrolyte Membrane Fuel Cell (PEMFC) depends on the properties of bipolar plates. In PEMFC, bipolar plates have multi-functional and the key component in a PEMFC stack. There are strong relationships between materials used to produce bipolar plate with their final properties. The selection of suitable material to be produced as bipolar plate is the main process to maintain high electrical conductivity, good mechanical properties and low manufacturing cost. The current material used is graphite and polymeric as binder to produce bipolar plate has shwon the drawback in their final properties such as electrical conductivity and mechanical properties. In order to overcome this drawback, this research focus is given to the used of Graphite (G) as main filler, Carbon Black (CB) as second filler and Polypropylene (PP) as the binder.The weight percentage ratios of multi-conductive fillers (hybrid) G and CB to PP have been vary to 70:30, 75:25 and 80:20 for study. The weights percentages of CB varied from about 5wt.% up to 30wt.% from the total weight percentage of filler. The mixed multi-filler G/CB/PP has been shaped through compression moulding to form 25 mm diameter x 6 mm thick disc.The effect of CB content on properties of electrical conductivity and bulk density is observed. The result shows the electrical conductivity is increasing as CB content increased for all composition. The best electrical conductivity is shown at 25 wt% of carbon black in the 80:20 compositions. While for bulk density, the result shown the decreasing as the carbon black content is increased.**

***Keywords*—Instructions; PEMFC, Graphite, Carbon Black, Composite Bipolar Plate, Electrical Conductivity.**

PAPER ID : ET 118

A PRELIMINARY STUDY OF LOWER SIDE BEAM STRUCTURE ON LONGITUDINAL BRIDGE MODEL

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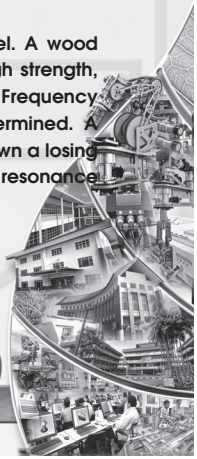
***Abstract*—This paper investigated the vibration level on lower side bridge structure model. A wood material is selected as a raw material of Model Bridge. The selection is based on the high strength, high quality and low cost. Laboratory test is conducted to measure the vibration level using Frequency Response Function (FRF). Then, the vibration level of lower side beam structure is determined. A maximum interface mobility and minimum phase angle was finding in this testing and it shown a losing damping value at the starting point of excitation. The mobility is very responsive at the anti resonance frequencies and acts as a dynamic absorber to reduce an impact.**

***Keywords*—Vibration, lower side, frequency response**



PAPER ID : ET 119

STRUCTURAL AND OPTICAL PROPERTIES STUDIES OF NANOSTRUCTURED ZnO DEPOSITED BY ELECTRODEPOSITION METHOD

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***Abstract*—Nanostructured of Zinc Oxide (ZnO) thin films were deposited by electrodeposition method onto the conductive substrate template used known as indium tin oxide (ITO). The deposition process was carried out at controlled temperature of 95C and applied voltages of -1.2V with different times at 5min, 15 min and 30 min. The structural and crystallization properties of the nanorods in were characterized using field emission scanning electron microscopy (FESEM) and x-ray diffractometer (XRD). The optical properties were studied using UV-Vis spectrometer and photoluminescence (PL). The FESEM results showed that nanostructured ZnO nanorods diameter large size when increased times while XRD results was possesses c-axis oriented hexagonal wurtizite ZnO. UV-Vis spectrometer reveal that at 5 min deposition process show high transmission (>80%) in UV-NIR region. Clearly ZnO nanostructures were obtained by increasing time, the photoluminescence study at low temperature exhibit the optical properties as wurtizite ZnO. The PL analysis and discussion were existence of 370 nm and 580 nm in the emission bands.**

***Keywords*—Nanostructured ZnO; Electrodeposition method; Structural properties; Optical properties.**

PAPER ID : ET 120

DYNAMIC AXIAL CRUSHING OF EMPTY HEXAGONAL TUBE

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***Abstrac*—The experimental result of empty hexagonal tube subjected to dynamic loading is reported and compared with the previous reseachers. The type and final mode of deformation is also studied and compared with FEA. Good agreement is obtained between FEA and experiments for both mean load and plastic fold length. The dynamic mean load is about 1.5 times that of the quasi-static value.**

***Keywords*—dynamic, axial crushing, energy absorbers, hexagonal tubes.**

PAPER ID : ET 121

THE INFLUENCE OF HEXAGONAL HONEYCOMB CORES PARAMETERS CONFIGURATION TO MEAN OUT-OF-PLANE DYNAMIC STRESSES SUBJECTED TO IMPACT LOADINGS-REVIEWED

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***Abstract*—Honeycomb structures are used in various industrial products for their high weight/strength ratio, in which the honeycomb core is commonly sandwiched between flat plates. Further, the honeycomb structure can be used as a shock absorber in impacted objects such as an air-dropped container and a crashed vehicle body. In this paper, review of works by previous researcher will be discussed in terms of the relation between parameter configuration of hexagonal honeycomb cores and mean out-of-plane dynamic stresses subjected to impact loading. Many researchers did the simulation as the method to find this relation by providing the empirical formulas on mean out-of-plane dynamic stresses of hexagonal honeycomb cores. Besides that, this paper has analyzed the limitations of works by previous researcher as the directions for the future works of our research.**

***Keywords*—Double-walled hexagonal honeycomb cores, out-of-plane impact properties, mean out-of-plane dynamic stresses.**

PAPER ID : ET 122

TENSILE AND HARDNESS PROPERTIES OF KENAF-PP/PLA COMPOSITE FILLED NANOCLAY

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***Abstract*—Different amount of nanoclay will be added to the binder of Kenaf fiber composite material in order to investigate the effect of nanoclay loading in the conventional polymer based composite material. The samples were prepared by using the internal mixing technique with constant composition of PP and PLA as the matrix constituent and 40wt% of kenaf fiber. Then, the nanoclay was added into the mixture with different amount, 1wt%, 3 wt% and 5 wt% respectively. Tensile test, hardness test and liquid immersion test were carried out for each sample. Result for tensile test shows increasing of nanoclay loading in the composite cause the decreasing tensile properties. However, 1wt% of nanoclay amount in the composite increases the Young Modulus about 15%. This is supported by the hardness test and liquid immersion test results where the sample with 1wt% of nanoclay shows better result compared to the other specimens.**

***Keywords*—kenaf bast fiber; nanoclay; bio-composites**

PAPER ID : ET 123

EFFECTS OF CARBON BLACK AS SECOND FILLER ON THE PROPERTIES OF COMPOSITE GRAPHITE – POLYPROPYLENE

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***Abstract*—Over the past decade, rapid progress has been made in the understanding and development of multi filler Conductive Polymer Composites (CPC) as bipolar plate. In the present work on CPC, focus is given to graphite (G) as main filler, carbon black (CB) as second filler and polypropylene (PP) was use as the binder. The 80:20 weight percentage ratios of multi-conductive fillers G and CB to PP have been selected for study. The types of G was used is syntactic (4012) and the weights percentages of CB varied from about 5wt.% up to 30wt.% from total weight percentage of filler have been selected. The mixed multi-filler of G/CB/PP composite have been shaped through compression molding to form 25 mm diameter x 6 mm thick disc. The effects of CB contents on properties of the disc on electrical conductivity, microstructure, bulk density and hardness were observed. The results shows CB contents have significant effects on the properties of disc. The higher electrical conductivity for G/CB/PP composite with content of 25wt. % CB has increased conductivity about 80 % compared to G/PP samples.**

***Keywords*—Graphite; Carbon Black; Microstructure; Conductivity.**

PAPER ID : ET 201

OVERVIEW: PROCESS PARAMETERS FOR HYDROTHERMAL SYNTHESIS OF HYDROXYAPATITE

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***Abstract*—Hydroxyapatite is the most interesting subject to be studied especially for its suitability as an alternative to human bone and has become a biomaterial ceramic that resembles the composition of our bone minerals and are able to respond biologically. The preferred synthesis method is Hydrothermal which produces HA nano-sized particles with customized morphology and desired crystallinity by varying the process parameters. The morphology and the crystallinity of the synthetic powder particles influence the mechanical properties of manufactured products. This paper reviews the variable factors in hydrothermal method which includes type and concentration of starting material, temperature, time, pressure and pH conditions and presence of additives.**

***Keywords*—Hydroxyapatite; Hydrothermal Synthesis; Process Parameters; Morphology; Crystallinity.**

PAPER ID : ET 202

STUDY ON STEEL CORROSION IN SEDIMENT OF NEAR SHORE SIMULATED ENVIRONMENT

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***Abstract*—Materials corrode at any time in any environments. Marine sediment is one of those environments could cause severe corrosion to the structures buried in it. Incident in oil/gas pipelines that carries hazards materials has the potential to cause economic loss and environmental pollution. Success in identifying elements contributing to corrosion of pipeline in marine environment would be helpful for the development of better protection and monitoring systems of this steel structure in future. Focusing on the behaviour of steel located near shore environment, the objective of this study is to determine the effect of sediment in influencing the corrosion rate of steel. Simulation experiments on steel coupons buried in sediment with different characteristics has been employed to investigate the corrosion of steel. Weight loss technique has been used in determining the corrosion rate of the steel specimens in the sediment. It was found that the corrosion rate at sea sediment simulated site has shown higher level than the one in the river sediment probably due to salinity level and the components of the sediment. Although corrosion rate was higher in sea sediment, yet the corrosion rate of steel specimens at river sediment was significant as well.**

***Keywords*—Simulation experiments; X70 steel; Sediment; Corrosion.**

PAPER ID : ET 209

IMPACT PROPERTIES OF POLYMER COMPOSITE WITH PPNANOCLAY/POLYPROPYLENE AND OIL PALM EMPTY FRUIT BUNCH (OPEFB) REINFORCEMENT

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***Abstract*—Natural fibres have recently become attractive to researchers in term of industries needed and education as an alternative reinforcement for fibre reinforced polymer (FRP) composite due to the environmental issue. In this study, an attempt to prepared polymer composites from the thermoplastic PPnanoclay/PP and oil palm empty fruit bunch fibres (OPEFB) was carried out. The aim of the present work is to establish the significance and data requirement in order to introduce the usage of OPEFB fibre as filler in polymer composite, and to study the mechanical and physical properties of this composite in terms of fracture mechanism. Thus, in this study the oil palm empty fruit bunch fibre was used as a filler and PPnanoclay/ PP composite as the matrix material. Izod impact test were use to assess the effect of each parameter with several numbers of OPEFB sizes (180µm, 250µm, 300µm, and 355µm). The fracture surface morphology of the impact testing samples of the composites was performed by scanning electron microscopy (SEM). The impact properties were obtained higher impact strength at 355µm treated for notched sample while 180µm for un-notched sample.**

***Keywords*—oil palm empty fruit bunch (OPEFB), natural fibre:impact properties, polymer composite.**

PAPER ID : ET 210

MICROSTRUCTURE TRANSFORMATION OF ADVANCED HEAT RESISTANT ALLOY GRADE 91 AT DIFFERENT COOLING RATES

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***Abstract*—P91 alloy is one of the advanced heat resistant steels used in the construction of modern power boilers. During welding process and post weld heat treatment, P91 alloy is unintentionally overheated due to certain unforeseen circumstances, causing detrimental changes to the alloy's property. The present work investigates the effect of overheating on the alloy microstructure and creep behavior. A number of laboratory aged specimens were produced for metallographic analysis and creep rupture test. The P91 specimens were heated up to several peak temperatures in excess of temperature corresponding to Ac1. The metallographic results of two peak temperatures, 9000C and 10000C, with a rapid cooling rate and a slow cooling rate, are presented. The fast cooling rate for both temperatures produced an untempered martensitic microstructure, whereas the slow cooling rate produced an over-tempered microstructure with ferrite phase and coarse carbides. Both untempered and over-tempered microstructure gave a poor hardness property and low creep life.**

***Keywords*—Creep; Martensite; Temper; Microstructure.**

PAPER ID : ET 213

EFFECT OF HEAT TREATMENT ON MICROSTRUCTURE AND MECHANICAL PROPERTIES OF AZ61 MAGNESIUM ALLOYS

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***Abstract*—Magnesium alloys have been increasingly considered as an attractive material in the transportation industry. Extruded magnesium alloys have been found in the center of interest combining their lightweight, surface quality with the wide range of possible achievable geometries. In this study, the AZ61 alloy has been chosen for investigation as one of the most common commercial magnesium wrought alloys. The microstructure change and Mg17Al12 precipitate in the alloy had been investigated and its influence on hardness had been studied. After primary microstructure characterization and mechanical testing in the as-extruded condition the specimens have been subjected to heat treatment to the temperature 400oC for one hour followed by quenching in the water. Specimens treated were found to have a coarse grain, homogeneous structure with a substantial increase in grain size. Then the specimens are aged at temperature 200oC for half and two hours followed by quench in the water. Optical observations reveal Mg17Al12 precipitations grow in the form of needle shape within the grain after two hour aging. The hardness and mechanical properties of the AZ61 magnesium alloy is also found to increase owing to secondary hardening by precipitation strengthening.**

***Keywords*—AZ61 magnesium alloy, heat treatment, Mg17Al12 precipitation, aging.**

PAPER ID : ET 214

DETERMINATION OF THE FLOW CURVE OF NECKING TENSILE SPECIMEN FOR LINEAR HARDENING

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Abstract—The objective of this study is to determine the flow curve of necking specimens for linear hardening by using finite element analysis and to validate the approximation formulae of equivalent plastic strain and stress introduced by Bridgman and Davindekov-Spiridonova. These approximation values and their several assumptions are then compared with the FE simulation results which can be considered as close to the exact solution. Results obtained indicate that the error connected with the application of the simple formulae can be estimated as 10 % in comparison with the numerical simulations, which was considered as the reference solution. The Davidenkov-Spiridonova approximation formula provide better results compared to the Bridgman formula.

Keywords—flow curve; necking; Bridgman approximation formula; Davidenkov-Spiridonova approximation formula

PAPER ID : ET 215

A STUDY ON THE EFFECT OF DIFFERENT MARTENSITE VOLUME FRACTION TO THE MECHANICAL PROPERTIES OF DUAL PHASE STEEL

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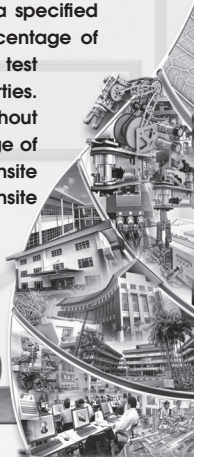
Abstract—This research was done to evaluate the behavior of the mechanical properties based on the presence of martensite in a dual phase steel. 20 samples of dual phase steels were prepared by annealing process. The low carbon steels specimens were heated for 25 minutes in a specified temperature ranging from 7200C to 8400C followed by rapid cooling in water. The percentage of martensite content increment depended on the heating temperature. Hardness test, tensile test and compression test were carried out on the samples to check the mechanical properties. The hardness, compressibility and tensile strength was compared to low carbon steel (without heat treatment) The results obtained show that the hardness will increase as the percentage of martensite in dual phase steel increased. In addition to that higher percentage of martensite makes the samples harden ad higher strength . It can be conclude that high content of martensite in dual phase steel can improve the hardness and strength of the material

Keywords—dual phase steel, tensile test, compression test, hardness test.



PAPER ID : ET 216

EFFECT OF POZZOLANS ON PROPERTIES OF EXPANSIVE BLACK COTTON SOIL AND NON-EXPANSIVE RED EARTH SOIL

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***Abstract*—Study brings out the effect of Siliceous and Aluminous compounds available in amorphous form present in waste of thermal power plant after burning coal, when different doses are mixed with expansive and non-expansive soils, the two extreme end Geotechnical properties, for soil stabilization purpose. Fly ashes produced after burning coal exhibit different proportion of compounds which can produce cementitious products called pozzolans, interact with soils to attain stabilized status. The waste product Fly ash in thermal power plant, some of them are pozzolanic in nature and some may not have that property which depends on chemical composition. Use of Fly ash for soil stabilization attributes to the chemical composition and physical characteristics of Fly ash, which favour pozzolanic reactions. The major chemical compounds present in Fly ash contribute active role in chemical reactions with constituents of soil are calcium Ca + and Silica Si - ions. The optimum binder combination varies with type of soil and binder pozzolanic reactivity. The pozzolanic reactivity assessed on the rate at which the strength imparting phases are produced due to chemical reactions between soil ingredients and binder. In this work Geotechnical Engineering properties of two extreme types of soils, expansive one – Black cotton soil (BC Soil) and non-expansive type – Red Earth (RE) are stabilized using pozzolanic Fly ash – Nyveli Lignite Fly (NFA) ash and non-pozzolanic Fly ash – Raichur Fly ash (RFA) mixed at different doses along with supplementing additives like Lime and Cement. Addition of calcium component to soil and non-pozzolanic Fly ash mix in the form of cement is used to exploit chemical compounds formation due to silica component present in non-pozzolanic Fly ash. Similarly addition of Lime to pozzolanic Nyveli Fly ash to stabilize both soils is used. The Geotechnical engineering properties like stabilization, Compressive strength, Compaction character for both soils have been studied in this work. The maximum dry density of the BC soil increased from 13.6 to 15.2 kN/m3 for addition of 40% NFA. For Red earth MDD changed from 14.6 to 17.8 kN/m3 for NFA addition. Pozzolanic Fly ash has shown considerable improvement in compressive strength from 310kPa to 1393kPa for B C soil and from 590kPa to 2342kPa for Red Earth, for addition of 30% of Fly ash, NFA. Addition of 3% cement to non-pozzolanic Fly ash, RFA (30%) in case of B C soil has shown strength increase in four folds reaching 1317 kPa for 28 days curing period.**

***Keywords*—Pozzolanic Reactivity, Fly ash, Stabilization, Red Earth, Black Cotton Soil, pozzolana, Geotechnical Properties, calcium Ca + and Silica Si – ions**

PAPER ID : ET 217

PRELIMINARY STUDY SODIUM SILICATE – BORAX MIXTURES AS FLUX ADDITION IN CERAMIC SURFACE ENAMEL FORMULATION FOR CARBON STEEL

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***Abstract*—The purpose of this project is to develop slip from triaxial ceramic content such as kaolin, quartz, glass frits while sodium silicate and borax as fluxes. Carbon steel resembling the internal pipeline as the substrate in this research. Several steps of pretreatment to substrate to ensure bonding between substrate and coating become better. Nineteen slurry paste slip were formulated and enameled onto the substrate by the process of natural drying, oven drying and firing. Thickness and weight were measured to study the drying and firing shrinkage. XRD and SEM/EDS test to study the morphology, structure and element.**

***Keywords*—Additives; Deflocculant; Surface treatment**

PAPER ID : ET 218

EMPLOYMENT OF SWIRLING FLOW TECHNIQUE TO REDUCE TURBULENENCE OF MOLTEN METAL IN THIN SECTION CASTING OF (Al- 7Si-0.3Mg) ALLOY

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***Abstract*—Modern advances in understanding of filling process during casting have indicated that metal flow conditions play key roles in controlling the quality of the casting. Inappropriate filling of castings typically cause surface oxide films to be folded into the bulk liquid or broken due to a higher liquid metal kinematic energy, resulting in called (entrainment defects)(1,2). These folded oxide film defects are entrained in aluminium alloy casting and significantly affect both static and fatigue reliabilities (3). In this investigation, new ingate design is used to control the velocity of molten metal flow of thin section cast. The velocity maintained to be below the critical velocity and not allowing generation of bifilm or bubbles defects to appear because of the swirling of the molten metal flow before deliver to the cavity. The experimental work carried out by using (LM25 (Al–Si 7.15%) alloy). New design of non-symmetrical overlapping sand mold used in this study. The effect of two different designs of ingate on the reliability of cast (LM25 (Al–Si 7.15%) alloy) has been quantified by using Weibull analysis. The products tested in three points bending test. The 'virtual' experiment carried out by (ADESTEFAN v.10, Casting Simulation Package).**

***Keywords*—Gravity Casting, Swirling flow; entrainment defects; numerical modeling**

Paper ID : ET 219

A THEORETICAL MODEL OF PITTING CORROSION USING A GENERAL PURPOSE FINITE ELEMENT PACKAGE

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***Abstract*—Pitting corrosion is one of the most destructive types of metal loss. This paper presents the mathematical model of the propagation of pitting corrosion using a commercial finite element program. In view of the chemical and electrochemical reactions inside a single pit in steel, a two dimensional model that allows the prediction of pit evolution is developed. The results are discussed in comparison to Pourbaix diagram of iron and also discussed in the light of results obtained from published work reported in literature.**

***Keywords*—Pitting corrosion; Model; Steel; Simulation.**

Paper ID : ET 301

THE EFFECTIVENESS AND IMPACTS OF ONE PIECE FLOW MANUFACTURING TECHNIQUE INTO MANUFACTURING INDUSTRIES

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***Abstract*—One-piece flow means that parts are moved through operations from step to step with no work-in-process (WIP) in between either one piece at a time or a small batch at a time. This system works best in combination with a cellular layout in which all necessary equipment is located within a cell in the sequence in which it is used. The paper presents a case study on a newly constructed cellular manufacturing system with one piece flow technique adopted by an electronic assembly factory as the final assembly process. The aim of the research is to study the effectiveness of the one piece flow activities in term of productivity, quality and impacts the result into organization those are apply one piece flow as a their technique in manufacturing process. The results from this paper are the batch production system gives more problems into industries comparing with one piece flow technique. The main problem such as high inventory in production area which is needs more space and extra manpower to handle the inventory. As a mention in seven types of wastes, inventory is a larger enemy in modern production because it gives high impacts into company's budget. By running one piece flow technique the company manage to minimize the space, reduce number of employee and at the same time will reduce the operating cost. In overall, the purpose of this paper is to study the effectiveness of the one piece flow concept in manufacturing industry in term of productivity, improvement process and cost reduction. Productivity will increase because reducing the number of inventory; control the work in progress (WIP) in between the work station and increase the morale and quality awareness of employee. Improvement process in term of reducing number of reject rate because in batch production, if found the reject; one batch will go for the rescreening of will be reject. Comparing to the one piece flow, if found the reject; only one piece will reject and not affect the whole batch. Indirectly, these activities will improve the effective cost in manufacturing process.**

***Keywords*—one piece flow, Just in time (JIT) and work in progress (WIP)**

Paper ID : ET 302

FORMING ANALYSIS OF SELF-REINFORCED POLYPROPYLENE BASED COMPOSITE-ALUMINIUM HYBRID STRUCTURES

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Abstract—This study investigates the formability of hybrid structures made of self reinforced polypropylene and aluminium also known as Fibre-Metal Laminates (FML). Comparisons between FML and monolithic aluminium revealed that FML possess better formability characteristics than monolithic aluminium. Moreover FML gives a 27% weight reduction compared to monolithic aluminium. Comparison between FML and monolithic aluminium surface strain results show FML system having a more uniform strain distribution further enhancing the quality of the final part using this class of material. Furthermore the work required to form FML is 30% less than for monolithic aluminium. The experimental results obtained in the present study shows FML systems have the potential to be adapted to high volume production technique of stamp forming.

Keywords—Fibre-Metal Laminate; forming; thermoplastic; surface strain measurement.

PAPER ID : ET 303

SENSITIVITY ANALYSIS FOR THE ECONOMIC DESIGN OF A SYNTHETIC CHART

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Abstract—Control charts play an important role in the monitoring of production processes. Economic factors are important in determining the optimal design parameters of a control chart, thus this paper performs a sensitivity analysis for the economic design of a synthetic chart. The synthetic chart integrates the and CRL charts. Sensitivity analysis is done on the input parameters to identify the parameters which have a significant impact on the cost and choice of the optimal design parameters. The input parameters which have a significant effect on the cost are the average occurrence rate of the assignable cause, the size of the shift, the quality cost per hour when the process is in-control and out-of-control, and the cost per unit sampled. Some of the input parameters affect the choice of the optimal design parameters. The optimal design parameters refer to the optimal frequency of sampling, sample size, and when to signal an out-of-control condition. The study is done based on numerical examples and simulations over a wide range of possible values.

Keywords—Control charts; Economic design; Optimal design parameters; Sensitivity analysis; Synthetic chart.

Paper ID : ET 304

OPTIMISING THE CONTRIBUTION OF HUMAN RESOURCES FOR CONTINUOUS IMPROVEMENT TOWARDS ACHIEVING EXCELLENCE IN MANUFACTURING

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Abstract—As continuation of the author's previous articles, this paper is aimed at providing guidance for manufacturing companies to have proper allocation of resources which will lead to optimum condition of improved performance. Two issues are discussed: (1) Manufacturing Technology Optimisation Model; and (2) Selection of Practices to Accelerate Performance Improvement. The first provides insights toward the crucial role of human resources in improving company performance. At least three lessons can be learnt from the Optimisation Model: (1) companies should focus first on improving their capability in effectiveness before pursuing efficiency and adaptability; (2) the achievement of the above can be accelerated by providing employees with on-the-job training on certain practices; and (3) only after companies have excellent capability in effectiveness, should they continue to increase the efficiency. By applying the Practical Integrated Production System developed by the present author, the second provides guidance to select the appropriate practices leading to optimum condition of improved company performance. It is found that changing budget allocation from the 'normal' to the 'accelerated' scenario can increase manufacturing performance due to improved management of people from 10% to 16% or k=1.6.

Keywords—Total Quality Management; Just-in-Time Manufacturing; Total Productive Maintenance; Competitive Manufacturing, World Class Manufacturing.

PAPER ID : ET 305

WEDM: INFLUENCE OF PARAMETERS IN MACHINING STAINLESS STEEL 316L

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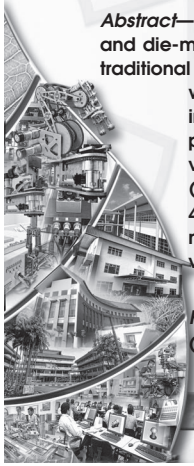

***Abstract*—Wire electrical discharge machining (WEDM) technology has been used widely in tool and die-making industry, automotive, medical and practically any conductive materials. It is a non-traditional machining process which used the continuously circulating wire as electrode and cuts the workpiece along a programmed path. Deionized water act as dielectric fluid was directly injected around the workpiece and wire electrode. The studies investigated significant parameters that influence the performance of WEDM on Stainless Steel 316L. The machining variables were wire speed (Ws), wire tension (Wt), open voltage (Vo) and machine feed rate (Rf). Machining with high parameter setting (Ws = 10 m/min, Wt = 1.8kg, Vo = 90 volts, Rf = 4mm/min) give the best result on the finish product in terms of kerf width, sparking gap and material removal rate (MRR). Whilst, with this parameter (Ws = 10 m/min, Wt = 1.8kg, Vo = 90 volts, Rf = 2 mm/min) smoother surface roughness (SR) can be achieved.**

***Keywords*—Wire Electrical Discharge Machining (WEDM), Kerf Width, Material Removal Rate (MRR), Surface Roughness (SR), Stainless Steels 316L.**

Paper ID : ET 306

EFFECT OF INITIAL CONCENTRATION AND COOLANT TEMPERATURE ON PROGRESSIVE FREEZE CONCENTRATION OF POLYPEPTONE

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***Abstract*—Dairy industry effluent releases large quantity of wastewater which needs to be treated before being disposed off. The selection of the wastewater treatment method is very important to provide high efficiency with reasonable cost. One of the suggested treatments is by concentrating the wastewater through Progressive Freeze Concentration (PFC). PFC provides easier ice-solution separation process so that it is more preferable in this study. This research focuses on the effect of coolant temperature and initial concentration on freeze treatment of simulated dairy wastewater. The efficiency was evaluated based on effective partition constant (K) and BOD removal.**

***Keywords*—Dairy Industry, Wastewater, Freeze Concentration, Progressive Freeze Concentration, Ice Crystal.**

PAPER ID : ET 307

PROGRESSIVE FREEZE CONCENTRATION OF DAIRY WASTEWATER: EFFECT OF FLOWRATE AND CIRCULATION TIME

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***Abstract*—Treatment of dairy wastewater through Progressive Freeze Concentration (PFC) was carried out in this study. Polypeptone solution of 2-8 mg/mL was used as simulated dairy wastewater. Effect of circulation flowrate and circulation time was investigated to evaluate the performance of PFC by using stainless steel and aluminium crystallizer. Effective partition constant, K was used to determine the system's efficiency, while the water quality was evaluated through COD removal and turbidity.**

***Keywords*—Progressive Freeze Concentration; Dairy wastewater; Circulation flowrate; Circulation time; Crystallisation.**

PAPER ID : ET 308

EFFECTS OF HEAT INPUT ON MECHANICAL AND METALLURGICAL PROPERTIES OF METAL INERT GAS WELDED 1.6 mm THICK GALVANIZED STEEL SHEET

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Abstract **—It is usually a lot easier and less expensive to galvanize steel before it is welded into useful products. Galvanizing afterwards is almost impossible. In this research work, Galvanized Steel, GS was welded by using the ER 308L stainless steel filler material. This work was done to find out an alternative way of welding and investigate the effects of heat input on the mechanical properties of butt welded joints of GS. A 13.7 kW maximum capacity MIG welding machine was used to join 1.6 mm thick sheet of GS with V groove and no gap between mm. Heat inputs was gradually increased from 21.06 to 25.07 joules/mm in this study. The result shows almost macro defects free welding and with increasing heat input the ultimate tensile strength and welding efficiency decrease. The Vickers hardness also decreases at HAZ with increasing heat input and for each individual specimen; hardness was lowest in heat affected zone, HAZ intermediate in base metal, BM and maximum in WZ. The fracture for all specimens was in the HAZ while testing in the universal testing machine. The microstructure at BM was small and fine comparing to HAZ.**

Keywords**—GS, HAZ, WZ, Heat input, Ultimate tensile strength.**

PAPER ID : ET 309

SIGNIFICANT PROCESS PARAMETERS IN INJECTION MOLDING PROCESS FOR PLASTIC AND METAL MATERIALS

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Abstract**—Injection molding has been emerged as a promising manufacturing process because of several advantages. Conventional injection molding was dominated by plastic as raw material, but for better engineering properties feasibility, injection molding with metal powder as raw material has been given special attention and known as Metal Injection Molding (MIM). However, because of different rheology, parameters for both processes must be treated accordingly. In this paper, significant process parameter is justified for both processes. Simulation using Moldflow software is conducted with various process settings. In this paper, it is proven that melt-temperature is significant in PIM but failed to show that filling time is an important parameter in MIM.**

Keywords**—plastic injection molding; metal injection molding; simulation.**

PAPER ID : ET 310

DEVELOP PROCESS CONTROL SYSTEM THROUGH "POKA-YOKE" DURING DFMEA STAGE FOR SME INDUSTRY

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***Abstract*—Poka Yoke is useful during the DFMEA (Design Failure Mode Effect Analysis) which will function as the detection approaches of the failure during mass production. It is not possible to eliminate all the mistakes that people make. People are not mistake proof but the organization can avoid this human error from reaching to the customer by using this method. Mistakes can be stopped as soon as they happen at least. Poka Yoke is a very simple method in the nature. For those company strive for Zero Defect, this study will be useful for them. In this case, a SME industry has been choosing to apply and analyze the Poka Yoke effectiveness.**

***Keywords*—FMEA, DFMEA, Poka- Yoke. RPN**

PAPER ID : ET 311

ROUNDNESS EVALUATION OF COLD FORGED PIN HEAD

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***Abstract*—Roundness is one of the criteria taken into account in precision forging. It become critical as the part need to be assembled with others part. In-accuracy may affect the overall performance of the assembly. In this study roundness of a cold forged pin head was measured. Pin head is a circular feature that has been designed to ensure accurate mating between the blade and the propeller. From the result, it is found that the roundness error of the pin head is low and overall is within the acceptable limit.**

***Keywords*—roundness, cold embossing**

PAPER ID : ET 312

THE ROLE OF CROSS-FUNCTIONAL TEAMWORK IN DEVELOPING CREATIVITY: A REVIEW

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***Abstract*—This review aims to investigate the role of cross-functional teamwork in developing creativity, with a special emphasis on new product development or NPD. In this study, findings from the literature review are used to develop a conceptual relation on how cross-functional teamwork influences creative product development. The findings reveal that cross-functional teamwork can be associated with creativity in NPD in four different elements which are flexible leadership, cross-functional creativity, cross-functional knowledge sharing and collaborative creativity. The findings also show that cross-functional creativity and collaborative creativity appear to exhibit a stronger role in the development of creativity for new product development. The findings concerning the conceptual development of this study are also far from being conclusive and will require adequate empirical study to be further authenticated. This review creates a theoretical relevance for managers and leaders involved in new product development to work together on flexible leadership strategies, tactics, innovation and improvements to encourage an organized and creative environment for their project teams. Managers can also use the findings in this review as guidelines to create more platforms that can harness collaborative and cross-functional activities such as coffee klatches, technical sharings and team building activities.**

***Keywords*—Knowledge management; Product development; Teams.**

PAPER ID : ET 313

ENHANCING CREATIVITY THROUGH TEAMWORK, CONTINUOUS IMPROVEMENT AND CAD: A REVIEW

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***Abstract*—This review aims to examine how creativity can potentially be enhanced through teamwork, continuous improvement and computer-aided design (CAD), with a special emphasis on new product development or NPD. Findings from the literature review are used to conceptually relate creativity with teamwork, continuous improvement and CAD. The findings reveal that teamwork and CAD are exceptionally important in developing creativity since the interaction between the two concepts tend to cultivate knowledge sharing practices among employees. With the nurturing of knowledge sharing elements, the possibility of enhancing creativity through knowledge creation may be stronger than usual. The awareness of potential knowledge sharing benefits needs to be fostered among the employees (both current team members and potential future team members).**

***Keywords*—Creativity; Teamwork; Product development.**

PAPER ID : ET 314

PRELIMINARY MONITORING OF PARTICULATE MATTERS (PM2.5) IN AUTOMOTIVE PLANTS

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***Abstract*—Indoor Air Quality (IAQ) became public concern recently. Air pollution has become the major global concern regarding to the harmful health effect, increased morbidity, and mortality especially for fine particulate air pollutant. A preliminary measurement was conducted in one of the selected automotive assembly plant in Malaysia. Series of direct reading measurement for area sampling of particulate matter PM2.5, toxic gases and temperature were also conducted at the same time. A questionnaires pilot test was administrated in purposed to determine the health symptoms and the awareness of workers to Occupational safety and Health Management in that plants. The results of the study show that the concentration PM2.5 is low, same with the other toxic gases. Result of the questionnaires analysis shows that the workers are satisfied with their health status. Also, they used and aware about PPE that had been supplied and also with the medical facility. Before they started their work, they had been brief about safety talk and not concern about the safety and health committee. This preliminary study had successfully identified the improvement suggestion and alteration towards the actual measurement that will be conduct in the next stages.**

***Keywords*—Indoor air quality (IAQ), Health respiratory Symptom, Particulate Matters (PM2.5)**

PAPER ID : ET 402

DEVELOPMENT OF AN ARM-BASED APPLICATION SYSTEM

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***Abstract*—The aim of this paper is to expose the development process and software involved in realizing an ARM-based application system. The application system consists of a cruise algorithm intended to be used in an autonomous robot prototype, which is developed with the help of Flowcode software that utilizes flowcharts as its design entry. The flowchart is then configured to be tested for real-world application over E-blocks board integrated with an ARM-based microcontroller chip from Atmel, AT91SAM7S128. It is hoped that the development process shared in this paper may be benefitted for researchers who wishes to start developing an ARM-based system for further study or other purpose in one way or another.**

***Keywords*—ARM-based processor; AT91SAM7S128; E-blocks; Flowcode.**

PAPER ID : ET 403

THE DESIGN OF A HANDPHONE-BASED COMPUTER CONTROLLER VIA ANDROID TECHNOLOGY

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***Abstract*—The evolution of mobile devices, especially in these modern days, has drastically changed the face of business. A mobile phone device is often expected to offer computer-like functionality. These days, most mobile phone users find it stressful to do some tasks using their computers. Most individuals prefer to change positions while sitting, stretching, and also feeling a bit more comfortable when browsing through their computers. It can be very impractical to be confined to the keyboard and mouse while sitting 5 or 10 feet from the computer. This is an application that turns the hand phone into a wireless keyboard and mouse with a touch-pad, using the wireless network. This prototype is proven to be able to perform most of the actions a normal computer keyboard and mouse can perform.**

***Keyword*—Touchpad; keypad; multi-scrolling; pinch gesture.**

PAPER ID : ET 404

DESIGNING UTEMRISCII PROCESSOR FOR MULTIPLY-ACCUMULATE OPERATION

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***Abstract*—The emergence of soft-core processor has provided a new alternative in processor design methodologies. Together with the advancement of Field Programmable Gate Array (FPGA) architecture, soft-core processor offers a lot of potential in reconfigurability features and is beneficial in digital signal processing (DSP) system development. This paper covers the design methodology of Reduce Instruction Set Computer (RISC)-based processor core in FPGA platform. The processor core, called UTeMRISCII, is essentially a synthesizable microcontroller written in Verilog HDL with an 8-bit data path and a 12-bit wide instruction. Multiply Accumulate (MAC) functionality is embedded in the processor core to perform fundamental DSP operations by extending the instruction set with customize instruction. In order to validate the processor's new instruction, the associated assembly language program is run through simulation in a CPU simulator. The processor design is then synthesized, placed and routed and implemented in the FPGA chip. The new instruction operation could be verified by conducting tests in executing MAC function in a test program. With its reconfigurable features and customized instruction in an application-specific processor, this all-inclusive design methodology covers hardware/software partitioning that would reflect the advantages in implementing soft-core processor in FPGA for fundamental DSP applications.**

***Keywords*—Reconfigurable; RISC; Multiply-accumulate.**

PAPER ID : ET 405

EFFECT OF FUNCTIONAL ENDOSCOPIC SINUS SURGERY TO THE FLOW BEHAVIOR IN NASAL DURING RESTING BREATHING CONDITION

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***Abstract*—Functional endoscopic sinus surgery is a surgery to remove uncinate process in order to restore sufficient sinus ventilation and drainage in nasal. However, there were a few cases with side effects such as facial pain, reduction in sense of smell and sinusitis reoccurrence of infection. In this study, the effect of uncinate process removal is investigated. Images of the model were done through computational technique and then the flow was simulated to predict the effect of the removal. Inhalation processes with resting breathing condition were modeled. The results show that smooth flow was observed at nasal area which indicates successful surgical process. However for post FESS model the result shows that the possibilities of sinusitis reoccurrence of infection were high. Finally, velocity profile in the olfactory area show non-favorable flow condition for effective smell senses.**

***Keywords*—Nasal; Paranasal Sinuses; FESS; Flow behavior; 3D actual model.**

PAPER ID : ET 406

THE EFFECT OF TOTAL LENGTH ON INTERRUPTED MICROCHANNEL PERFORMANCE

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***Abstract*—The effect of total length on interrupted microchannel performance was studied by simulation using FLUENT software. The investigated effects were pressure drop and platinum film temperature. The flow in the microchannel was laminar and single phase. Water was used as the working fluid and the interrupted microchannel was made from silicon. A thin platinum film plate was deposited to provide uniform heat flux. The width and thickness of the heat sink was 7 mm and 0.525 mm respectively. The total length effect on the microchannels were compared between 6 (reference), 5 and 7 independent zones. From the result, improvement on heat dissipation may be achieved by increasing the microchannel length at the expense of increase in pressure drop. Therefore, increasing the platinum film surface area only while maintaining the number of zones on the microchannel may provide a more optimum condition.**

***Keywords*—interrupted microchannel; FLUENT; total length**

PAPER ID : ET 502

ANALYSIS OF REAL-TIME OBJECT DETECTION METHODS FOR ANDROID SMARTPHONE

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***Abstract*—This paper presents the analysis of real-time object detection method for embedded system, especially the Android smartphone. As we all know, object detection algorithm is a complicated algorithm that consumes high performance hardware to execute the algorithm in real time. However due to the development of embedded hardware and object detection algorithm, current embedded device may be able to execute the object detection algorithm in real-time. In this study, we analyze the best object detection algorithm with respect to efficiency, quality and robustness of the object detection. A lot of object detection algorithms have been compared such as Scale Invariant Feature Transform (SIFT), Speeded-Up Feature Transform (SuRF), Center Surrounded Extrema (CenSurE), Good Features To Track (GFTT), Maximally-Stable Extremal Region Extractor (MSER), Oriented Binary Robust Independent Elementary Features (ORB), and Features from Accelerated Segment Test (FAST) on the GalaxyS Android smartphone. The results show that FAST algorithm has the best combination of speed and object detection performance.**

***Keywords*—Android; computer vision; embedded hardware; mobile application; OpenCV.**

PAPER ID : ET 503

SINGLE PHASE POWER OUTAGE ALERT SYSTEM VIA SMS

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***Abstract*—The greatest resources found for mankind is electricity. Electricity is a basic utility for everyone around the globe regardless of location and usage. The utilization of electricity is crucial in industries which so lie depends on electricity when come to production. But in practical power failure is a very common scenario in buildings. The power interruption from the service provider is a minimal scenario comparing to the faulty power failures in Malaysia. In most cases this is due to the ELCB (earth leakage circuit breaker) or RCD (residual-current device) which is an automatically-operated electrical switch are used to disconnect electricity supply when there is a fault within the electrical path. It is a written standard in Malaysia to install a circuit breaker which is designed to protect an electrical circuit from damage caused by overload, short circuit and earth high impedance shock. However, the electric trip cannot be noticed unless the circuit breaker is detected at tripped position. In a large area such as industries, public facilities, remotely operated stations and not to be notified when there is a power failure. In assisting such scenario using wireless technology the Power Outage Alert System via SMS (POAS) is designed to alert the user on the event of power failure is detected. The medium used to alert the user is via short messaging system (SMS). The POAS distribution board is an intelligent real-time system which is not only capable of alerting the users on a typical power failure, but going a step advance by alerting the user on the specific fault of their distribution board. The POAS is able to identify the type of power failure and the faulty component in a distribution board. The POAS helps many individual or private users in ensuring continues power supply to industries and any electrical based application which**

requires instant alert system for power failure to the users regardless of time and location in the shortest time possible. With the implementation of POAS, it will help many possible users to reduce any damages due to electricity failure to their electrical appliances.

Keywords—Power failure, short messaging system, microcontroller, electrical distribution board, electrical, component monitoring.

PAPER ID : ET 601

CONCENTRATION MEASUREMENTS OF BUBBLES IN A VERTICAL WATER COLUMN USING AN OPTICAL TOMOGRAPHY SYSTEM

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Abstract—An optical tomography system can be used to determine the spatial distribution of materials with varying optical density in a volume by non-intrusive means. This paper presents results of concentration measurements of gas bubbles in a water column using an optical tomography system. A hydraulic flow rig generated vertical air-water two-phase flows with controllable bubble flow rate. Two approaches are investigated. The first aims to obtain an average gas concentration at the measurement section, the second aims to obtain a gas distribution profile by using tomographic imaging. A hybrid back-projection algorithm is used to calculate concentration profiles from measured sensor values to provide a tomographic image of the measurement cross-section. The algorithm combines the characteristic of an optical sensor as a hard field sensor and the linear back projection algorithm.

Keywords—Bubbles;Concentration; Optic; Tomography.

PAPER ID : ET 602

DEVELOPMENT OF A LOW COST WIRELESS INERTIAL MEASUREMENT UNIT

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Abstract—This paper presents a development process of a wireless inertial measurement unit (IMU). A wireless communication configuration is designed for this unit. Low cost micro-electro-mechanical-systems (MEMS) accelerometers are used in hardware prototyping. Wireless measurement errors are modeled as a black box and calibrated at the remote processor end. A multi-position testing approach is designed in wireless IMU error modeling. A gyro-free inertial navigation system (INS) is prototyped using this wireless IMU. Gyro-free INS experiments present the improved accuracy level by using the error modeling in this work.

Keywords—accelerometer, inertial measurement unit, wireless communication, error modeling, gyro-free INS

PAPER ID : ET 603

DEVELOPMENT OF A MAGNETIC LEVITATION SYSTEM

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***Abstract*—Most of mechatronic students find it hard to cope and understand with the subject control system engineering and how to apply the knowledge in real life. To solve this problem, an educational kit is to be designed. The main idea is to build a kit that will integrate the knowledge of control system engineering with electric and electronic circuit design subjects. Magnetic levitation system is chosen to be the educational kit as the system applies all three subjects that are mentioned above and it is suitable for laboratory experiment and classroom demonstration. The system is a magnetic ball suspension system which is used to levitate a ball in the air by electromagnetic force produced by the electromagnetic field with the help of actuator and sensor. From this educational kit, the students will learn in details about the three important elements in mechatronic engineering, how to control a system, how to choose the right circuit design to make sure the design functions well and how to integrate the circuit and the control system elements.**

***Keywords*—Magnetic levitation system, control system, system modeling, compensator.**

PAPER ID : ET 604

FORGETMENOT (FMN) AN ANDROID APPLICATION FOR ALERTING USB USERS

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***Abstract*—Universal Serial Bus (USB) devices had evolved and had been very important to the computing world nowadays. Globally more than 20 million USB sticks are lost every year mainly for data storage. Other than that, it involves communication devices to the USB such as wireless presenter and mouse or the data storage in thumb drive and external hard disk drive. Losing any of these devices due to the forgotten issue while working publicly in the lab or cyber café could result to cost issue for replacement or risk in exposing high volume of sensitive data to unknown people. Although there are softwares to guarantee the security of the losing data, it is not enough to recover the data or to replace the losing devices. ForgetMeNot (FMN) is an application for Android OS smartphone, using Bluetooth connection, will alarm the user when accidentally leaving the USB devices. It can be used for all the USB devices as long as the USB devices are embedded with the Bluetooth module. With the lower cost of Bluetooth modules, it is an advantage to the USB devices producer, to embed their USB devices with Bluetooth module to give options to user enabling the FMN to avoid missing USB devices.**

***Keywords*—Universal Serial Bus (USB) devices; Losing devices; ForgetMeNot (FMN); Bluetooth connection**

PAPER ID : ET 605

NEW SENSOR PLACEMENT FOR VEHICLE MOBILITY IN MULTIPLE TRAFFIC LIGHT INTERSECTION

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***Abstract*—Around the world, traffic lights are well known device in ensuring smoothness and safe traffic flow in a certain road intersection. The traffic light system is believed to be the best practices in ensuring the smooth traffic flow operation which is automated now days. The conventional traffic light system still has its limitation to effectively control the traffic flow in and out of a certain intersection even though it is still the best practices around the world regardless of many measurable factors. The traffic light system requires human intervention during peak and rush hours especially in urban routes. One of the contributing factors to inefficiency of traffic lights system is it's measurability of vehicles in and out of a road intersection. The enhancement of vehicle detection could be visualized with a new placement of sensors which has better measurability of vehicles. The proposed sensor placements will increase and improve the smoothness of traffic flow within the available resources by creating intelligence to the conventional controllers. The new traffic control model or algorithm would be intelligence within the controller and react to every change on sensor detection in ensuring better traffic control without human interventions at all time. Such intelligence would result in less waiting time with improved safety features for vehicles. This paper highlights a new approach for betterments in traffic flow in a certain traffic light intersection.**

***Keywords*—Programmable Logic Controller (PLC); Traffic light; Multiple junction; Vehicles.**

PAPER ID : ET 606

CONTROLLING MOBILE ROBOT VIA PERSONAL DIGITAL ASSISTANCE (PDA)

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***Abstract*—In this project, we present the robot controlling using Bluetooth via PDA. The robot is controlled using PIC16877A microcontroller. The paper presents a complete integrated control architecture and communication for this mobile robot. The microcontroller (PIC) programming used C language, while for Graphic User Interface (GUI) in PDA is developed using VB.net and C language in order to make the operator can control the robot easily. Experimental trials for this project had been carried out successfully, to prove the PDA can be linked using Bluetooth communication for controlling mobile robot.**

***Keywords*—PDA, Bluetooth, PAN, Mobile robot, wireless communication.**

PAPER ID : ET 607

SMART HOME SYSTEM FOR DISABLED PEOPLE VIA WIRELESS BLUETOOTH

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***Abstract*—Advancement in wireless technology nowadays has allowed the creation of various remote control systems, one of which is the famous Smart Home concept. The concept to automate homes encapsulates the capability to monitor and control our home appliances and surrounding electronics. This technology is now achievable via wireless Internet and Bluetooth connections; enabling any user-interface device capable of being a universal controller for the home. This paper will discuss the reviews of past and current systems and explain the integration of applying Bluetooth technology to control home appliances using a microcontroller. The main components involved in this system is the main control board containing the microcontroller and the user interface which can be installed on Windows operating system for both computer and mobile phone. The system will utilize Bluetooth technology to control appliances in-house while using wireless technology for monitoring purposes via an IP camera. Additional concept of controlling the home appliances through electronic mail will also be integrated into the system to allow user control of the system from any location with Internet connection.**

***Keywords*—Smart home, Universal controller, Home automation**

PAPER ID : ET 608

DEVELOPMENT OF LOW COST PORTABLE ANTI-THEFT DEVICE (PATD)

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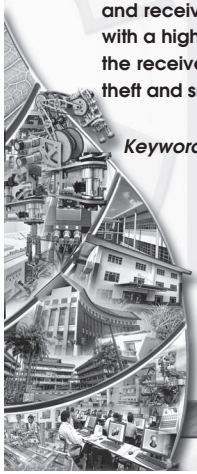
***Abstract*—This paper discussed about the development of low cost Portable Anti-Theft Device (PATD) that able to reduce the issue in snatch-theft, property lost due to leaving it behind, misplace and to monitor the children movement in public area. This device consists of two parts that are the transmitter and receiver controlling circuit which communicate by RFID technology application. It also equipped with a high volume triggering alarm system that activates when the range between the transmitter and the receiver circuits reach a specific distance. It is hope that with this PATD can reduced the issues of theft and snatching crime as well as preventing from loss, injuries and missing.**

***Keywords*—Anti-Lost; RFID controller; RFID receiver.**



PAPER ID : ET 701

ANALYSIS OF VIBRATION LEVEL OF A PERFORATED PANEL USING FINITE ELEMENT METHOD

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***Abstract*—Introduction of perforation into plat-like structures is commonly found as one of practical noise control mechanisms to reduce the sound radiation. However, introduction of holes into the panel reduces its stiffness and hence increases its vibration. Since the discussion and also the analytical model to quantify this effect is lacking, this paper investigates the dynamics of a perforated panel by using Finite Element Method (FEM). It is found that the size and number of holes determine the frequency range of which the level of vibration increases due to perforation.**

***Keywords*—Mobility; Plate; Perforate; Hole.**

PAPER ID : ET 802

RECYCLE FOLDED CASCODE OTA WITH CURRENT CONTROL CIRCUIT

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***Abstract*—This paper presents an improved architecture of recycle folded cascade OTA with current control circuit that achieves improved DC gain and settling time without sacrificing power and area. This is achieved by exploiting and using idle device in the signal path and separates the AC and DC path, which results in an enhanced transconductance, output resistance, gain, settling time and power dissipation. A recycle folded cascade amplifier architecture was implemented in 90 nm CMOS process with 1 V power supply. Simulation results shows that the proposed structure significantly increase the DC gain bandwidth compared to the recycle folded cascade OTA and consume very low power dissipation. Theoretical analysis and LTSpice simulations prove the performance of the new OTA.**

***Keywords*—Operational transconductance amplifie; OTA; transconductance; settling time, DC gain.**

PAPER ID : ET 901

PROCESSING CIRCUITS OF AN EARLY LIGHTNING WARNING SYSTEM SUITABLE FOR LIGHTNING RISK ALERT

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***Abstract*—This paper presents an early lightning warning system which is design based on the electrostatic field changes and electromagnetic waves radiation in the event of lightning discharge. Electric Field Mill (EFM) processing circuit is used to detect the electrostatic field changes whereas Radio Frequency Detector (RF-Detector) processing circuit is used to detect the electromagnetic waves radiation during the activities of lightning discharge. The EFM and RF-Detector circuit are designed using PSpice while the processing unit is performed in MATLAB Simulink. Output voltages will be produced from the EFM and RF-Detector processing circuit and the fusion of these two voltage readings will generate lightning threat assessment. The incoming lightning threat assessment is displayed based on LED colour coding where RED colour represents high risk, YELLOW colour represents medium risk and GREEN colour represents low risk.**

***Keywords*—electrostatic field, electromagnetic waves radiation, field mill, RF-detector, lightning risk alert.**

PAPER ID : ET 902

E-WASTE IMPACT REDUCTION THROUGH ANALYSIS AND REDISTRIBUTION OF DISASSEMBLY

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***Abstract*—The rapid change in industrialization generates huge amount of wastes and this signaled the need for a new way of product recycling management. Most of manufacturers not consider the potential of recycling in the designing and manufacture products. The design framework is an effective tool to enhance and simplify environmental benign design. While specific standards in design factors for waste recycling in Malaysia are not available and standard for recyclable materials and products are not well addressed in the waste minimization plan or strategy. Thus, crucial needed to ensure the sustainability of the product in the industry and improving the design of the product based on the considerations of designing for disassembly the recyclability potential and impact to the environmental in engineering aspects or factors.This research will do the case study in improving the design in considering the disassembly, environmental and recycling potential factors by DFM and DFA software.**

***Keywords*—Disassembly, E-waste, Legislation, Recycling, Recycling Standards**

PAPER ID : ET 903

DESIGN AND FABRICATION OF A LAB SCALE ROLLER MILL FOR FURTHER DECREASING SOLID POWDER PARTICLE SIZE: THE EFFECT OF SCOOPING ON PRODUCT

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***Abstract*—A lab scale horizontal roller mill was designed and fabricated for further reducing particle size. The effect of scooping on final product is investigated in this paper. Commercial CAD drawing software is used in the roller mill design process and Tungsten inert gas (TIG) welding method is used for the assembly process. Two aluminum rollers were used to study the horizontal rolling effect on test subject. Coarse grain sugar is used in the grinding process and particle size distribution was analyzed with standard sieving process. A pair of scoops is used to investigate the effect of scooping on the final product, with other manufacturing parameters remain constant. It was found that the scooping effect can significantly increased the roller mill performance in term of achieving more desired particle size.**

***Keywords*—Roller mill; TIG; scooping effect; particle size; powder.**

PAPER ID : ET 904

DEVELOPMENT OF CONCEPTUAL DESIGN OF CAR HOUSING SIDE MIRROR USING INTEGRATED APPROACH

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***Abstract*—This paper presents the development of automotive car housing side mirror using integrated approach. The car housing side mirror was chosen to illustrate the application of integrated approach. Various product development stages were conducted which initially from market investigation to concept development stage. Conceptual design stage is a main design stage which is analytical hierarchy process (AHP) was selected as a decision making method to determine the most appropriate design concept. Finite Element Analysis (FEA) was employed to analysis design based on static analysis for determining the strength and performance of the design. The result shows design concept 3 (DC-3) is the preferred choice since it has the highest value among the five alternatives with a value of 0.4701 (47%).**

***Keywords*—Car housing side mirror, integrated approach and finite element analysis (FEA)**

PAPER ID : ET 905

DEVELOPMENT OF CONCEPT GENERATION FRAMEWORK USING EXPERT SYSTEM

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***Abstract*—Generating idea in product development process is very important. Various methods have been developed to assist designers to generate idea in the literature. One of these methods that can be employed is an expert system. Expert system as a tool to create idea concepts generation is discussed in this paper. Concept generation is a main design activity that employed to develop creativity and innovative solutions to meet the product specifications (PS). If the concept is poor, it can never be compensated for in later stages. Concept generation cannot be addressed by conventional CAD techniques, but suits the use of expert systems techniques drawn from the field of artificial intelligent. To overcome these limitations, this paper proposed a framework which could provide some basic steps in the knowledge-based system tools required, starting from knowledge acquisition to user interface in order to assist design teams to perform their design activities more effectively and efficiently.**

***Keywords*—Product design and development; idea concept generation; knowledge-based; expert system.**

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Cluster 2

SYSTEM ENGINEERING

PAPER ID : SE 102

A PRACTICAL ANALYSIS OF MULTI-HOP WIRELESS NETWORK DEPLOYMENT IN UTEM CAMPUS

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***Abstract*—This paper presents a practical analysis of multi-hop wireless network testbed in Universiti Teknikcal Malaysia Melaka (UTeM). While using the testbed to provide additional WiFi coverage around the cafeteria area in UTeM Industrial Campus, real-time measurements of various key parameters are carried out. This paper also provides some technical details of the testbed implementation as well as performance evaluation of network coverage, signal strength and channel profile. The potential of applying dynamic channel assignment technique is also discussed.**

***Keywords*— Testbed; Multihop; Network Performance.**

PAPER ID : SE 106

VIDEO CONFERENCING AND STREAMING IN E-LEARNING PORTAL OVER WIMAX: QOS EVALUATION

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***Abstract*—ICT and e-learning platforms provide an alternative channel for improving the quality of education and extending its reach to broader audiences. In blended learning environment, videos or animations can easily be embedded to enhance the learning features. Video conferencing and streaming are a real time streaming multimedia that provides set of interactive telecommunication technologies. It allows two or more locations to interact via two-way video and audio transmission simultaneously. There are various wireless network technologies used to exchange the information such as cellular wireless network, Wi-Fi and WiMAX. Currently, cellular wireless network and Wi-Fi have been used in supporting the e-learning platform but with limited coverage and data rates. In other hand, WiMAX provide better coverage and higher data rate. However, providing guaranteed QoS for real-time streaming multimedia in wireless network is one of challenging task. In this paper, we present QoS of video conferencing and streaming in e-learning portal using WiMAX technology. Results show that the proposed study is useful to be part of blended learning features.**

***Keyword*—Video Conferencing;Video Streaming; E-learning Portal; WiMAX; QoS.**

PAPER ID : SE 107

ENHANCED MULTIPLE ANTENNA TECHNOLOGIES ON LTE AND LTE-ADVANCED

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***Abstract*—Long Term Evolution (LTE) Release 8 supports multiple input / output antenna schemes in both downlink and uplink direction. In downlink direction up to four transmit antennas may be used whereas the maximum number of code words is two irrespective of the number of antennas. Spatial division multiplexing (SDM) of multiple modulation symbol streams to both a single user equipment (UE) using the same time-frequency resource, also referred to as Single-User MIMO (SU-MIMO) and to different UEs using the same time-frequency resource, also referred to as MU-MIMO are supported. In uplink direction only MU-MIMO is used, i.e. there is only one modulated symbol stream per UE to be received by the eNodeB, whereas multiple UEs may transmit on the same time-frequency resource. Considering the defined UE capability classes' one can expect two antenna operation in downlink and one antenna operation in uplink to be the standard case for initial LTE deployment. As a summary, the LTE-Advanced enhancements that have been evaluated throughout the respective study item phase within 3GPP. The different features deliver varying performance gains and will have certain impacts on the system complexity and cost. Higher order MIMO schemes up to 8x8 will for example significantly improve peak data rates and spectral efficiency.**

***Keywords*—LTE; LTE-A; SU-MIMO; MU-MIMO.**

PAPER ID : SE 108

COMPARISON OF PEAK-TO-AVERAGE POWER RATIO IN MC-CDMA AND SC-FDMA TECHNIQUES IN WIRELESS COMMUNICATION SYSTEMS

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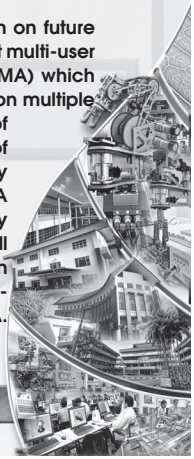
***Abstract*—Evolving mobile internet and multimedia services are driving a surge of research on future wireless communication systems, which have to be highly spectral efficient in order to support multi-user access and high data rates. Therefore, multi-carrier code division multiple access (MC-CDMA) which is formed by combining orthogonal frequency division multiplexing (OFDM) with code division multiple access (CDMA) became a significant research topic. One of the most important factors of the wireless communications is the peak to average power ratio (PAPR), the low value of PAPR means less power is needed so long battery life, for this reason nowadays is strongly oriented to reduce the value of PAPR by different methods. The main component of MC-CDMA is orthogonal frequency division multiplexing (OFDM), while the single carrier frequency division multiple access (SC-FDMA) has similar performance and essentially the same overall complexity as those of OFDM. Hence, SC-FDMA is characterized by low PAPR while it is high in MC-CDMA which represents the main disadvantage of MC-CDMA, a study of PAPR in SC-FDMA and MC-CDMA is provided in this paper to show the paths to reduce PAPR in MC-CDMA.**

***Keywords*—MC-CDMA; SC-FDMA; PAPR.**



PAPER ID : SE 109

DESIGNING SECURED STREAM CIPHER ALGORITHM FOR GSM COMMUNICATION

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***Abstract*—Global System for Mobile Communication (GSM) is standard set developed by the European Telecommunications Standards Institute to describe technologies for second generation digital cellular networks. GSM was created with a moderate level of service security. Communications between the subscriber and the base station can be encrypted. GSM uses several cryptographic algorithms for information security. The A5/1 and A5/2 stream ciphers are used for ensuring over the air privacy. However, in this research it will focus only on A5/1 stream cipher algorithm. A5/1 was developed earlier than A5/2 and it is a stronger algorithm used within Europe and United States. However, serious weaknesses have been found in A5 algorithms. A5/1 is based around a combination of three linear feedback shift registers. There is a set of statistical tests to determine the security level that can be provided by various algorithms. The perfect system is the one that gives the best statistical results. Simulation on six proposed models performed on PC using java language. The generated key of the algorithms are analyzed to see whether the generated key is random or not. Verification of algorithms are analyzed using five statistical tests which are frequency test, runs test, serial test, longest runs of one test and linear complexity test. Data analysis of the simulation was done using NIST statistical test suite. After all the tests and analysis, the algorithms designed had fulfilled the characteristics for a good stream cipher algorithms.**

***Keywords*—Keystream; Linear Feedback Shift Register; Clocking, Cryptanalysis.**

PAPER ID : SE 201

DESIGN PI CONTROLLER USING FUZZY SYSTEM OPTIMIZED BY ICA FOR HIGH PERFORMANCE INDUCTION MOTOR DRIVE

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***Abstract*—The present paper proposes a successful application of an optimal fuzzy gain scheduling of PI controller is adopted to speed control of an induction motor. The developed hybrid fuzzy control law consists of proportional-integral (PI) control at steady state, PI-type fuzzy logic controller (FLC) at transient state, after a small load between steady and transient state, so fuzzy self-tuning for their coefficient to good high performance condition. In the first part, of this paper an intelligent agent based on PI Controller design to perform input motor. Fuzzy rules are utilized on-line to adapt the PI controller parameters based on the error and its first time derivative. In the second part, an fuzzy logic control is the lack of design techniques, for this purpose we propose an optimization technique of the fuzzy logic adapter parameters using Imperialist Competitive Algorithm (ICA). The effectiveness of the complete proposed control scheme is verified by numerical simulation. ICA has been used as an optimization algorithm to tune the parameters of the controller. All steps simulated by MATLAB resulted in notable performance.**

***Keywords*—Induction Motor, Fuzzy System, PI Controller, ICA.**

PAPER ID : SE 205

SHORTEST PATH ROUTING APPROACH TOWARDS RFID TAG PLACEMENT OPTIMIZATION FOR BLIND INDOOR NAVIGATION

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***Abstract*—Radio Frequency Identification (RFID) has been appeared as the prominent technology in creating smart indoor environment especially navigation systems for the blind due to its cost effectiveness and outstanding performance in terms of detection accuracy under indoor environment. However, when an implementer wanted to create a RFID-based environment especially for a large scale building, where placing RFID tags all over the building can be very challenging especially for the role of the placed tags to be more meaningful and cost effective. The lack of optimization in tag placement and planning not only will prolong the deployment time, but also will cause wastage of tags, increase deployment cost and also increase the risk in dragging down the overall performance of the indoor navigation system in guiding the blind. A good tag placement optimization scheme should achieve the goal of optimization in both the deployment process efficiency and also the resources usage. Hence, this paper proposed a tag placement optimization scheme which utilizes the shortest path routing approach in generating the resource optimized paths to achieve more efficient tag placement deployment for navigation within large building for the visually impaired (VI) and the blind person.**

***Keywords*—RFID tag placement; blind indoor navigation; optimized path for the blind; optimized resource.**

PAPER ID : SE 206

OUTPUT FEEDBECK FUZZY CONTROLLER DESIGN OF POWER SYSTEM STABILIZER FOR SINGLE MACHINE INFINITE BUS SYSTEM

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***Abstract*—The Single Machine Infinite Bus (SMIB) is a non linear model of power system generation. The instability of SMIB is avoided by using the Power system stabilizer (PSS). The PSS is used to damp the mechanic electro oscillation in electricity power system. There are some methods of PSS control design are adaptive control, robust control, fuzzy controller and so on. Here, we design the PSS controller by using the output feedback fuzzy controller. At the first time, we build the Takagi-Sugeno fuzzy model, the second step is determining the output feedback controller based on the Ruth-Hurwitz criteria, and finally we do simulation to see the performance of PSS.**

***Keywords*—SMIB, PSS, fuzzy controller, output feedback.**

PAPER ID : SE 207

SOLVING KNIGHT'S TOUR PROBLEM USING FIREFLY ALGORITHM

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***Abstract*—The knight's tour problem is an ancient puzzle where the objective of the puzzle is to find out how to construct a series of legal moves made by a knight so that it visits every square of a chessboard exactly once. This paper proposes a model using Firefly Algorithm to solve the problem. Each firefly represents a possible solution of the problem. Each dimensions of the search space represents nth move taken by the knight. The numerical value for each space can be in the range of 0 to 7 according to the 8 possible moves that can be taken by the knight. The fitness of a firefly is then calculated based on the number of legal moves it has taken starting from the first move. The proposed model has been tested using 8x8 chessboard setup. Result obtained shows that the proposed model has a potential to be applied to solve the general knight's tour problem.**

***Keywords*—computational intelligence; firefly algorithm; knight tour problem; optimization.**

PAPER ID : SE 208

ORIENTATION TRACKING WITH MEMS INERTIAL SENSORS

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***Abstract*—In many applications orientation tracking needs to be done, for example in inertial navigation, autonomous mobile robot, virtual reality or industries. This paper proposes a method of doing the orientation tracking using MEMS inertial sensors such as accelerometer, gyro and magnetoresistive sensor. The error problems with this type of sensors are discussed. As results, a comparison of measurements between the three sensors is made. Finally a recommendation on how sensor fusion algorithm could be implemented to get an accurate result.**

***Keywords*—Orientation, tracking, inertial, navigation**

PAPER ID : SE 209

VISION BASED LANE DETECTION FOR AUTOMATIC STEERING SUPPORT SYSTEM.

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***Abstract*—The development of a fully autonomous vehicle capable of running with minimal human guidance requires a significant reduction of human error. Therefore, an On-board Driving Assistance System is designed to be used on vehicle on the road. A vision based system is utilized to capture the road signature for path planning in self guided vehicles. It requires a fast compute algorithm with high speed response system. In this paper a real time road lane vision detection system was proposed as On-board Driving Assistance System solution. A camera mounted on a vehicle to capture real time image for input, which was then processed for road path database. A combination of Hough transform and edge detector was applied on the image as the boundary of the road to minimize road scanning area. From the pairs of road lines scanned, the middle position of the road were constructed and used as the road path. This method depends on the coexistence of the side road lines. It's also work against noise such as light shadow & luminance.**

***Keywords*—Autonomous Guided Vehicle (AGV), Lane Detection, Vision Based System, On Board Driving Assistance System.**

PAPER ID : SE 302

MODELING AND SIMULATION OF VEHICLE STEERING CONTROL ON STEER BY WIRE SYSTEM USING FUZZY LOGIC AND PID CONTROL TUNED BY PARTICLE SWARM OPTIMIZATION (PSO)

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***Abstract*—Steer-by-wire performance is largely determined by the control system is applied. In this paper the present modeling and simulation of vehicle steering control system using Particle Swarm Optimization to tune the parameters that are needed on Fuzzy Logic and PID control, the cascade Fuzzy Logic and PID control used for controlling lateral motion and yaw motion errors on the vehicle model be represented in 10 Degree of Freedom system of vehicle dynamics. The simulation results found that the Fuzzy Logic control and PID control tuned by PSO in vehicle steering control system adapt well the plant output to desired trajectory so that the vehicle stability is maintained.**

***Keywords*—Lateral motion control, Yaw motion control, Tuned parameters.**

PAPER ID : SE 303

DESIGN OF FORMULA VARSITY RACE CAR SUSPENSION UPRIGHT

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***Abstract*—This paper presents the design of a suspension upright for Formula Varsity race car. CATIA V5 R16 CAD software was utilized to generate the 3D model of the final upright design. Aluminum alloy grade 6061-T6 was selected for the upright construction material due to its low density and good mechanical strength as well as wide availability in different sizes. Structural analysis using finite element method (FEM) was implemented to analyze the structural strength. CATIA V5 Generative Structural Analysis workbench as used in the analysis. Results from the structural analysis shows that the upright design has a factor of safety of 12.1, which theoretically proved that the structure is able to perform safely as per design requirement. A part from that, through utilization of aluminum alloy as the upright material, the weight of the component is able to reduce up to 57.5% compared to the upright used in 2010 UTeM Formula Varsity race car. Thus, the new upright design is able to provide the crucial weight saving needed for an efficient race car without compromising its structural strength and safety.**

***Keywords*—suspension upright, design, Formula Varsity race car.**

PAPER ID : SE 304

ANALYSIS OF DYNAMIC INTERACTION BETWEEN FLEXIBLE BODY OF OVERHEAD CONTACT WIRE AND ACTIVE CONTROL PANTOGRAPH CONSIDERING VERTICAL BODY VIBRATION

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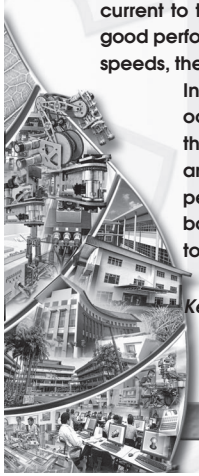
***Abstract*—The current collection system consists of a pantograph placed on the roof top of a trains' vehicle and overhead contact wire supported by evenly spaced vertical holders which supply the current to the pantograph from the electric power grid. Most of the pantographs produce averagely good performances at low and medium speeds, approximately less than 250 km/h. However, at higher speeds, the response of the pantographs is distorted. Thus the stability of the current collection is in peril. In addition, due to vertical vibration of the car body during high speed, contact force variation occurs between the pantograph and overhead wire. Therefore, it is necessary to maintain the contact between pantograph and overhead wire. In this study, the multi-body dynamics analysis is used to model the flexible body of overhead wire. An excitation experiment is performed in order to determine the parameters of pantograph. With consideration of vertical body vibration, an active pantograph control is developed to eliminate the effect of vibration to contact force, reduce the maximum peaks and avoid contact loss.**

***Keywords*—Multi-body Dynamic Analysis; Active Pantograph; Interaction; Active Control.**



PAPER ID : SE 306

DEVELOPMENT OF IIUM CIRCULAR PLANFORM UNMANNED AERIAL VEHICLE (IIUM-CPUAV)

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***Abstract*—In this work, the first IIUM circular planform unmanned Aerial vehicle (IIUM-CPUAV) model, also know as geobat flying saucer was successfully designed, built and tested by the team from the Department of Mechanical Engineering, IIUM. The designing process started with gathering historical data and performing the conceptual design calculations. The maximum diameter and weight of IIUM-CPUAV are 1 m and 900 grams, respectively.Foam was the main material used to construct the IIUM-CPUAV. Flight tests were conducted successfully and IIUM-CPUAV was found to be stable. Based on the flight tests results, design modifications were carried out on the prototype to improve the stability and the performance. The final configuration of the IIUM-CPUAV was successfully tested.**

***Keywords*—UAV, Circular Planform aircraft, aircraft design, fabrication, flying test.**

PAPER ID : SE 307

DESIGN OF A SPACE FRAME CHASSIS FOR UTEM FORMULA VARSITY RACE CAR

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***Abstract*—This paper presents the design of a space frame chassis for a new UTeM Formula Varsity race car. New single-seat open wheel race car chassis was designed as a tube chassis construction as per required in the UTeM Formula Varsity racing competition rules and regulations. Design selection method was performed to select the final concept design of the chassis and 3D CAD model of the selected design was later constructed using CAD software. Later, load analysis used to determine the load acting on the chassis. Low carbon steel A36 was selected for the space frame chassis construction due to low cost and good structural strength properties. Theoretical structural performance of the chassis was analyzed for both bending and torsion load cases through finite element analysis method performed using Generative Structural Analysis module. Results from the simulation shows that the new chassis design has a minimum torsional stiffness of 4874.5 Nm.deg-1 and it is 9.5% stiffer than the previous 2010 UTeM race car chassis. The new chassis was founded to have a factor of safety approximately 15.1 in static bending condition. The results show that the new chassis is capable to operate safely as per design requirements for future Formula Varsity race event.**

***Keywords*—Space frame chassis, design, race car, Formula Varsity.**

PAPER ID : SE 308

DESIGN AND CHARACTERIZATION OF MAGNETORHEOLOGICAL BRAKE

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***Abstract*—This paper investigates the performance of a Magnetorheological Brake (MR brake) system in term of torque generated by various electric current at various rotational shaft speeds. The MR brake consists of a rotating disc immersed with Magnetorheological Fluid (MR fluid) in an enclosure of an electromagnetic coil. The applied magnetic field will increase the yield strength of the MR fluid which will decrease the speed of the rotating shaft. Then, different speeds were applied to the MR brake system continuously by changing the applied electric current. The methodology begins with the design using 3D modeling software followed by the development of mathematical model of the MR brake. Then, magnetostatic analysis using ANSYS software was done by considering three parameters which are magnetic field intensity, magnetic flux density and 2D flux lines. The torque response of the MR brake from the simulation was validated with experimental results and discussed. It can be noted that the MR brake torque increases proportionally with the increasing of current and independent with varying speeds..**

***Keywords*—Magnetorheological Brake (MR brake), Magnetorheological Fluid (MR fluid), Finite Element Analysis (FEM), Torque Response.**

PAPER ID : SE 309

DESIGN AND DEVELOPMENT OF MICROCONTROLLER BASED LOCALISED AIR HEATER

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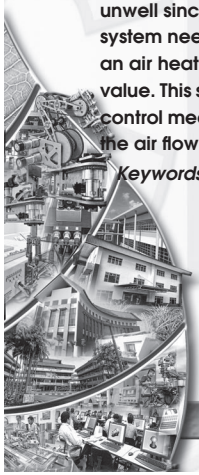
***Abstract*—Although Malaysia is an equatorial country that has a tropical climate, it still has several places that have relative low ambient temperature due to the high altitude. For Cameron Highlands, the air temperature is ranged from 14.6°C to 23.3°C along the year. Humans may feel uncomfortable or unwell since the thermal comfort zone of human body ranges from 20°C to 27°C. Hence, an air heating system needs to be developed in order to solve this problem. This paper discussed the development of an air heating system that can heat up the room automatically when the temperature drops to certain value. This system is designed for a low cost but high performance. The microcontroller is used to provide control mechanism when the sensors detected a temperature drop. Fans and heating elements provide the air flow and heat.**

***Keywords*—Microcontroller; Thermistor; Air heating.**



PAPER ID : SE 310

DESIGN OF PROPORTIONAL-INTEGRAL-DERIVATIVE WALL FOLLOWER ROBOT

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***Abstract*—This study presents the development of a wall follower mobile robot. The robot is designed to follow wall on its left in certain distance while maintaining the parameter. PIC 16F877A microcontroller is used as the brain of the mobile robot and receiver for an input from a sensor. An analog infrared sensor is used as the feedback mechanism to the system. PID controllers are implemented in the microcontroller to generate a control signal. The microcontroller is programmed in C language using PICC compiler. The mobile robot is fine tuned in order to produce smooth movement of the robot.**

***Keywords*—Mobile robot, wall follower, obstacle avoidance, PID.**

PAPER ID : SE 311

MODELING AND VALIDATION OF SIX-BAR RACK AND PINION STEERING LINKAGE SYSTEM

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***Abstract*—A vehicle handling behavior is much influenced by the performance of steering system and its mechanism. Steering linkage play a very important role in maneuvering of a vehicle. In this paper, a planar six-bar rack and pinion steering linkage is modeled in MATLAB SIMULINK to study the relationship between steering wheel angle and tire angle. A set of kinematic relations of steering system is used to analyze the kinematics of a planar linkage. The steering system consists of rack and pinion, tie rod end, tire and steering wheel column are modeled in MATLAB SIMULINK environment based on kinematic model equations is presented. The model is then validated using Hardware-in-the-loop simulations (HILS) consists of LVDT and rotary encoder sensors installed in actual steering system for data measurement at various steering angle. Results from simulation model has been developed demonstrates a linear pattern occurred from maximum lock-to-lock steering wheel angle and it's closely follow the trend through HILS experiment.**

***Keywords*—Rack and pinion; Steering linkage; HILS (Hardware-in-the-loop simulation).**

PAPER ID : SE 312

MOTION SYNTHESIS OF PLANAR FOUR LINKAGE MOVEMENT FOR PART FLIPPING APPLICATION

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***Abstract*—Design methods for four linkages encompass mathematical approach, trial and error method, function generation, motion synthesis and path synthesis. Various literatures found used mathematical approach to find specific solution. The main goal of this paper is to provide study of motion synthesis of four bar mechanism to find solution for mobile part flipping application. Systematic procedures for motion synthesis to determine the length and position of the links in case of desired positions of a coupler are presented. The graphical method provides quick solution for designer regarding kinematic problem without involvement of complicated mathematical equation. Part of the solution is compared with mathematical approach and simulation approach. The graphical approach result matches with other method and helpful to provide better insight of the system during designing the solution.**

***Keywords*—Four Bar Linkages; Motion Synthesis; Slider Crank Mechanism; Analytical; Simulation.**

PAPER ID : SE 313

BUS ACCIDENTS PREVENTION WITH AN INTEGRATED STEERING SYSTEM

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***Abstract*—This paper is focused on improving the drivability of busses for preventing accidents. Bus accidents are not as frequent as car accidents but each bus accidents puts at least forty human lives in risk which is equivalent to eight saloon cars with the maximum allowable passengers. While there are many parts of the busses which can be looked into for improving the safety this paper is focusing on the steering systems. Nowadays, many automobile manufacturers have integrated safety systems into the steering systems for saloon cars and the results shown are positive. They are proven to be effective as the manufacturers have successfully commercialised their technologies. Similarly, a framework will be developed to implement steering system integrated with safety systems for busses. The suggested framework will be focused on overcoming a specific emergency scenario which bus drivers will encounter most commonly.**

***Keywords*—Power steering system; Safety systems; Bus accidents; Accidents prevention.**

PAPER ID : SE 314

HALF CAR ACTIVE SUSPENSION SYSTEM

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***Abstract*—This paper presents a new method in modeling an active suspension system for a half-car model in state space form and develop a robust control strategy in controlling the active suspension system. Fuzzy logic is used to control the system. Velocity and displacement of front wheels are taken as input variables of the fuzzy logic controller. Active forces improving vehicle driving, ride comfort and handling properties are considered to be the controller outputs. The controller design is proposed to minimize chassis and wheels deflection when uneven road surfaces, pavement points, etc. are acting on the tires of running cars. Comparison of performance of active suspension fuzzy control system with passive suspension system is shown using Matlab/Simulink simulation. From the result, it shows that active suspension system has better performance than the passive suspension system.**

***Keywords*—Half Car Suspension System, Fuzzy Logic Controller, Active Suspension System, Passive Suspension System**

PAPER ID : SE 315

DESIGN AND FABRICATION OF SEMI – AUTOMATIC GEAR SHIFTER FOR FORMULA VARSITY RACE CAR

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***Abstract*—This paper present a design and fabrication of semi-automatic gear shifter for Formula Varsity racing car. A new gear shifter system had been designed to resolve shifting gear problem, which to eliminate fully mechanical gear shift and to have a better cockpit area. The existing design was based on motorcycle gear shift mechanism; has been adopted with minor modification in the racing car cockpit. The new design concept has been developed using CATIA software and the concept has gone through the process of material selection, structural analysis and fabrication and assembly of components. Finally, the design concept will be tested to obtain the performance results.**

***Keywords*—semi-automatic gear shifter, design, Formula Varsity race car.**

PAPER ID : SE 316

DEVELOPMENT OF PD CONTROLLER FOR COMPARISON STABILITY STUDY IN MULTIPLE DIFFERENCE DISTURBANCES

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***Abstract*—This paper discusses the development of PD controller for comparison stability study in multiple difference disturbances. The multiple difference disturbances in this paper are added to the inverted pendulum model that based on robotic leg application such as pendubot. By applying the pendubot model via simulink block diagram, the performances between the model and disturbances are compared for stability in the simulation results. The simulation results show that the PD controller play the main role to reduce or eliminate disturbances.**

***Keywords*—Inverted pendulum; pendubot; PD controller; Disturbance.**

PAPER ID : SE 317

DESIGN AND MANUFACTURING OF FORMULA VARSITY RACE CAR PEDAL SYSTEM

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***Abstract*—This paper presents the design and manufacturing of a new pedal system for UTeM Formula Varsity race car. The new pedal was designed according to the rules and regulations for the Formula Varsity 2012. Through finite element analysis, the pedal design was found to be safe for operation. The prototype of the pedals was fabricated using 6061-T6 aluminum alloy material. The new end product was found to be 0.245 kg or 40% lighter than the previous design. The new pedal is expected able to perform successfully as per design requirement in the new 2012 UTeM**

***Keywords*—Pedal system, design, Formula Varsity race car.**

PAPER ID : SE 318

SENSORS CONFIGURATION FOR SMALL SCALE AUTONOMOUS GROUND VEHICLE

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***Abstract*—This paper presents a small scale autonomous ground vehicle which is configured using sensors. The autonomous small scaled vehicle engineered to have dynamic behaviors equivalent with real ground vehicle. The main purpose is to use sensors configuration is to scale environment interactively with human operator. Sensors configuration equipped with more electronic instruments, Arduino Duemilanove, wireless communication system, data acquisition system and number of sensors. The simulation and experiment is provided.**

***Keywords*—Sensors, Arduino Duemilanove, Data Acquisition System, and autonomous small scaled vehicle**

PAPER ID : SE 319

MONITORING OF MECHANICAL VENTILATION AND AIR CONDITIONING (MVAC) DUCTING FOR INDOOR AIR QUALITY (IAQ) IMPROVEMENT

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***Abstract*—Indoor Air Quality (IAQ) became public concern recently. IAQ known as national issues since 2005. The statistic of Occupational Diseases from the Department of Occupational Safety and Health, Ministry of Human Resources show that the worker who are work in ventilated room or building are exposed to the dust and particles and the other IAQ parameter such as Carbon dioxide (CO_2), Carbon monoxide (CO), Formaldehyde (HCHO) , Total Volatile Organic Compounds (TVOC) and etc. To do monitoring in the ducting, the mechanical robot was used to go across ducting to collect physical and chemical data. It will be transferred by using wireless communication to the user. This paper highlights a few issues regarding the development of mechanical robot for indoor air quality (IAQ) monitoring. Furthermore IAQ monitoring will be the idea to improve workplace associated with Mechanical Ventilation Air Conditioning (MVAC) system.**

***Keywords*—Indoor air quality (IAQ), Indoor air pollutant (IAP), Mechanical robot, ventilation.**

PAPER ID : SE 402

DESIGN OF FREQUENCY SELECTIVE LIMITING CIRCUIT

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***Abstract*—This paper explains the design of frequency-selective limiting circuit. The circuit is typically based on nonlinear matched reflection-mode bandstop resonator. This type of Frequency Selective Limiters achieves fast switching, high-level of power limiting, and flexible channel bandwidth. For single channel limiting, a device with one resonator (first order) produced a band-stop response centred at 2 GHz with 250 MHz of limiting bandwidth, 0 dBm limiting threshold, and 32 dB limiting level and it gave an all-pass response with less than 2.5 dB insertion loss at low RF powers. Multi-resonator filter has been used in order to improve the performance of the device. The prototype will produce intermodulation distortions and response time. Simulated results show an excellent highly selective bandstop performance at high powers with a near all-pass response at low signal powers.**

***Keywords*—bandstop filters, limiting, microstrip resonators, microwave limiters, nonlinear filters.**

PAPER ID : SE 404

DESIGN OF LOW-LOSS TEM COAXIAL CAVITY BANDPASS FILTER

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***Abstract*—This paper presents a design of coaxial cavity bandpass filter that utilizing the method of tapped-input coupling. The design procedures have assumed lossless lowpass prototypes, thus yielding lossless bandpass filters. A systematic filter development using lowpass prototype as a starting point to produce four-pole Chebyshevbandpass response is demonstrated. The coaxial cavity filter has the center frequency of 2.5 GHz and bandwidth of 160 MHz. The insertion loss of 0.1 dB insertion loss and return loss better than 20 dB is achieved especially in the passband. This class of filter would be useful in microwave systems where the low insertion loss and high selectivity are crucial, such as in a base station, radar and satellite transceivers.**

***Keywords*—Microwave Filters; Coaxial Filters; Combline Filters.**

PAPER ID : SE 405

SYNTHESIS OF MICROWAVE FILTER WITH DISSIPATIVE ELEMENT

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***Abstract*—This paper presents a procedure for synthesizing microwave filters which allow for realization of filter with lossy responses that equivalent to lossless responses although at an increased insertion and return loss. Hence, this technique enables filter with finite unloaded Qu factor while maintaining the desired selectivity in the passband. In this paper, techniques of filter synthesis based upon classical predistortion, predistorted reflection-mode, reflection mode hybrid and even and odd mode predistortion type are compared. Numerical designs for Butterworth and Chebyshev characteristics are also demonstrated. The technique of filter synthesis with finite dissipative element would be useful in designing microwave filter for receiver systems such as in a satellite input multiplexer (IMUX).**

***Keywords*—Microwave Filters; Filters Synthesis; Butterworth and Chebyshev Filters.**

PAPER ID : SE 406

A REVIEW OF EDGE COUPLE SPLIT RING RESONATOR (EC-SRR) STRUCTURE ON PATCH ANTENNA DESIGN

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***Abstract*—Metamaterials are artificial materials engineered to have properties that may not be found in nature. Split ring resonator or SRR is one types of metamaterial that apply in designing the patch antenna. Edge couple structure is the first design on split ring resonator. This Several researchers applying different types of split ring resonator structure design owns their design for various applications. For the critical review, the size, gain, resonant frequency and gain also had been stated and comparison among the several antenna application design by other researchers.**

***Keywords*—Split ring resonator, Metamaterial, Microstrip antenna.**

PAPER ID : SE 407

PERFORMANCE OF LOW NOISE AMPLIFIER WITH DIFFERENT MATCHING TECHNIQUES FOR GPS APPLICATION

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***Abstract*—This paper presents a Low Noise Amplifier at L1 band RF receiver for GPS application which the operating frequency is 1.575 GHz. This LNA were design by using the AT 41511 transistor manufactured from Avago Technologies with different matching network which are lumped element, quarter wave and single stub matching network. The best matching network is single stub where give noise figure is 2.175 dB and gain is 14.57 dB**

***Keywords*—AT41511;GPS;low noise figure;high gain.**

PAPER ID : SE 408

ANALYSIS AND DYNAMIC SPECTRUM SENSING FOR COGNITIVE RADIO SYSTEM

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***Abstract*—Cognitive radio technology is one approach to optimum the use of spectrum frequency in complement to spectrum assignment method existing. This technology allowed user to move to low level occupancy of spectrum frequency if congestion occurred in the assigned spectrum. To ensure the transferring process of spectrum frequency is accomplished without any interference to other user, the dynamic spectrum sensing technique is used. Thus, in this research, the simulation of dynamic spectrum sensing was developed in order to identify the spectrum holes in range of frequency of 2300 MHz until 2700 MHz for the implementation of radio cognitive technology**

***Keywords*—cognitive radio, spectrum sensing, white area**

PAPER ID : SE 409

PERFORMANCE OF POWER AMPLIFIER WITH DIFFERENT MATCHING TECHNIQUES FOR GPS APPLICATION

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***Abstract*—A Power Amplifier (PA) is designed and optimized to have high efficiency, high output power compression, good return loss and high gain for driving a signal to the antenna without any distortion or losses. The objective was design the PA at GPS L1 frequency 1.575 GHz with at least 10dB gain. Analyze PA is based on type of matching which is stub element, quarter-wave element and lumped element. The entire requirement is determine using calculation and simulated by using AWR software.**

***Keywords*—Power amplifier, GPS, Gain, AT 41533, matching technique.**

PAPER ID : SE 410

THE CASCODE AND CASCADED TECHNIQUES LNA AT 5.8GHZ USING T-MATCHING NETWORK FOR WIMAX APPLICATIONS

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***Abstract*—This project presents the cascode and cascaded techniques LNA at 5.8GHz using T-matching network applicable for WIMAX application. The amplifier use FHX76LP Low Noise SuperHEMT FET. The LNA designed used T-matching network consisting of lump element reactive element at the input and the output terminal. The cascode and cascaded low noise amplifier (LNA) produced gain of 52.4dB and noise figure (NF) at 1.3dB. The input reflection (S11) and output return loss (S22) are -19.71dB and -10.07dB respectively. The bandwidth of the amplifier is more than 1.24GHz. The input sensitivity is compliant with the IEEE 802.16 standards.**

***Keyword*—Cascode and Cascade LNA, Radio Frequency, T -Matching Network**

PAPER ID : SE 502

COLLISION AVOIDANCE PATH PLANNING ALGORITHM FOR MULTI-MANIPULATORS BASED ON MINIMUM DISTANCE TECHNIQUE

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***Abstract*—This paper proposes a Collision Avoidance path planning Algorithm (CAA) for cooperating and non-cooperating multi-manipulators that calculates path by searching grid points in Euclidean Space without collision between manipulator-to-manipulator, link-to-link, and manipulator–to-obstacles based on Minimum Distance Technique (MDT). The key mechanism for avoiding collision based on MDT is the one that determine the minimum distance between two links and between a link and the edge of obstacles, it is necessary to compute the minimum distance between one link segment and another link segment (or edge of obstacles) when a link of manipulator is approaching collide with another link, manipulators and edge of obstacles. In this algorithm, multi-manipulators are considered as a single composite manipulator and path of individual manipulators will calculate completely in parallel. The objective of this research is to develop an efficient algorithm for planning paths of manipulators which is back track free and its computation time and memory space are proportional to the number of links. Therefore, the algorithm can be calculates paths for multi-manipulators with many links in fully complicated and automated environment. The effectiveness of algorithm is evaluated a preliminary prototype to path-planning algorithm by applying in 2-Dimensional Space.**

***Keywords*—Collision Avoidance, Minimum distance technique, Multi-manipulators, Path planning, Computation time.**

PAPER ID : SE 503

PROTEIN-INSPIRED DESIGN OF ROBOTIC ARMS

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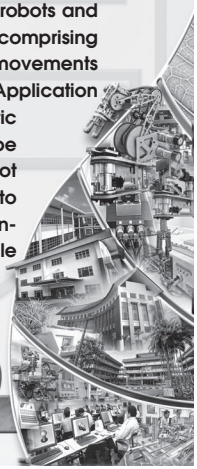
***Abstract*—Proteins are fundamental macromolecules in the human body. Extensive research has been conducted into protein structures and their backbone dynamics in order to appreciate the diversity of protein functions. With inspiration from previous studies on biologically-inspired robots and protein backbone flexibility, this paper describes a minimal protein-inspired robotic arm comprising of three-joints. The design mimics a protein backbone's structure. We simulate the arm's movements in a visualization system. This system is developed using the C++ language and OpenGL Application Programming Interface libraries. The system calculates the possible movements of the robotic arm with the aid of an Inverse Kinematics numerical algorithm. In addition, the system can be used as an educational tool to gain a better understanding of the components of the robot arm and protein backbones. The preliminary design and simulation of the robot is able to reach targets accurately most of the time. We describe the potential usefulness of protein-inspired robots in various emerging robotics applications such as nanosurgery, micro-scale manufacturing, and outer space engineering.**

***Keywords*—Biologically-inspired robots; Protein structures; Inverse kinematics.**



PAPER ID : SE 504

DEVELOPMENT OF A QUADRUPED CRAWLING ROBOT PROTOTYPE

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***Abstract*—Although wheeled robots are commonly used, it has limited ability to move to any terrains at ease. They suffer from difficulties when travelling over uneven and rough terrains. Legged robots have an advantage over the wheeled robots in that they are suited for such situations. The implementation of legged robots normally requires many motors to move every joint in a robot leg. Additional motor will increase the construction cost, robot weight, and the demand for power supply. Moreover, robot simulation becomes more complex. This research is related to the design and development of a cost effective quadruped autonomous robot. The robot can moves according to a unique pattern using three servo motors as its actuator in each of its leg. The design of the robot is firstly made with CAD program and then the structure of the body and the leg is analyzed in order to find a correct balance and to make sure the servo motors are capable to move the robot. A prototype of the quadruped robot is fabricated and tested thoroughly. Experimental studies are carried out to test its stability issues when the robot moves. The robot is capable of moving forward, backward, turn left and turn right by crawling its way. A microcontroller is used as the brain of the robot assisted by two analog distance sensor for better obstacle sensing. It uses a rechargeable battery as the power supply for the microcontroller. The servo motors on the other hand are powered by another rechargeable battery. At the end of this research, a working prototype has been developed.**

***Keywords*—Quadruped robot, crawling robot.**

PAPER ID : SE 505

HEXAGON-DIAMOND GRID MODELING MOTION VECTOR TRACKING USING BLOCK-BASED TECHNIQUE

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***Abstract*—Block-based motion estimation technique is a common technique applied in the field of video coding. Particularly, modeling a grid based search using the block-based technique can assist into motion tracking in the video sequences. A large hexagon and small diamond grid pattern is modeled for motion tracking purposes. The large hexagon grid pattern captures the motion vector in a particular search block before the small diamond grid pattern search takes place for the final best motion vector coordinate. The final best motion vector coordinate is used as reference point to trace the motion displacement coordinates between the current frame and previous frame in the video sequences. Also, motion vector displacement coordinate determines whether the object is moving towards the horizontal or vertical plane. During the search for best motion vector, Point Signal Noise-to-Ratio (PSNR) is applied to measure the video quality.**

***Keywords*—Motion Estimation; Hexagon Pattern; Diamond Pattern; Motion Displacement; Grid Pattern.**

PAPER ID : SE 506

SURVEILLANCE VIDEO PIXEL ANALYSIS VIA BLOCK-BASED PIXEL SUBSTRACTION TECHNIQUE

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***Abstract*—Video is constructed based on sequence of frames which conveys different type of information based on the pixels values. Information of each frame changes from one frame to another frame which also is based on pixels values. These changes are referred as motion translation. This motion translation can be analyzed with comparing or subtracting both the current frame and subsequent frame pixels values. In this paper, a study is conducted to analyze the motion translation using the pixel subtracting technique. A video is processed to extract all the frames into sequences. Two targeted frames are selected from the extracted sequences of frames to be analyzed for motion translation. The two selected frames are divided into 16 × 16 block size for data analysis purposes. This technique is a fast and reduces the processing time due to only pixels values difference is analyzed for data processing purposes. It also saves memory space because it only involves values subtraction.**

***Keywords*—Motion Translation; Block Positioning; Positioning Subtraction; Block of Interest.**

PAPER ID : SE 601

EDFA IN WDM FOR 1545 NM TO 1552 NM C-BAND

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***Abstract*—Erbium Doped Fibre Amplifier (EDFA) enables Wavelength Division Multiplexing (WDM) since the invention of optical fibre. EDFA is the key component for the contribution of long-haul WDM transmission system. Moreover, EDFA manages to overcome signal losses by directly amplify signal entirely in optical domain. In EDFA, gain is one of the key performance features of EDFA. During signal transmission, gain is not always flat because the amplifier will not amplify the signals that have different wavelengths with the same gain. Thus, there will be some reductions in the signal strength as a result of the transmission. In order to achieve good signal strength, gain flatness is an important parameter because wavelengths are proportional to the gain factor. For that reason, gain flatness determines the amplification of signals and all signals should be amplified simultaneously. Therefore, an optical communication system is design using Optiwave Optisystem software to simulate the gain characteristics for EDFA in WDM system.**

***Keywords*—EDFA, gain flatness, pump power, input power.**

PAPER ID : SE 702

DESIGN AND DEVELOPMENT OF OPTIMUM POWER OUTPUT FOR TIDAL ENERGY SYSTEM APPLICATION

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***Abstract*—The paper discusses on developing optimum powers for tidal energy system application. The optimum power will be produce from the Direct Current (DC) to DC converter by the power electronics application system. To get the maximum power DC to DC buck-boost chopper that will step up or step down voltage depending on voltage input. In terms of the mechanical solution part, a research on which design of blade or rotor are the best selection to obtain the maximum power and concerning other mechanical design can be implemented to the system to obtain optimum output voltage. The system will be attached between mechanical part (generator) and DC to Alternating Current (AC) converter (Inverter) to control the power output from the tidal turbine. The power from the tidal generator will be converting to DC supply before the maximum power circuit control attached in the system. The output voltage from the maximum power circuit control will be converting to the AC power by using the inverter application. The last part of the system before distribute to the user is AC voltage transformer to step-up the voltage. The power output from the tidal energy system will be always maximum value either the lower or higher sea current.**

***Keywords*—Tidal energy, optimum power, DC, AC, converter, inverter.**

PAPER ID : SE 704

GENERATION OF CONSTANT CURRENT SOURCE FOR A CURRENT SOURCE INVERTER

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***Abstract*—Current Source Inverter(CSI) has applications in the area of current protection and limits the current harmonics entering into the system, when placed at the converter end. For CSI fed loads, when connected at a point of common coupling(PCC), the system voltage, may not always be a pure sinusoidal waveform. The reason for this can be many power quality issues or due to the neighboring loads connected at PCC. This paper presents two simple controllers, namely comparator type and PI type, to generate a constant current source, for the input to a CSI. These controllers also work effectively even with a distorted voltage waveform. The controllers are validated for various source conditions and varying load conditions.**

***Keywords*—current source inverter; point of common coupling; constant current soutce; power quality; distorted voltage waveform.**

PAPER ID : SE 705

MAGNETIC LEVITATION TRAINING KIT FOR TEACHING BASIC ELECTRICAL CONTROL SYSTEM COURSES

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***Abstract*—In this paper, we propose a training kit for developing a system to assist basic electrical control courses to the undergraduate students of Electrical Engineering or Electrical Engineering Technology. We present magnetic levitation hardware demonstrating a load hanging in the air with the help of electromagnetic coil. The students are provided with unassembled training kit project where they will use it to achieve several learning outcome. Technical data of the system is given along with a basic instruction manual as benchmark for the training kit. The magnetic levitation kits provide an open-ended design problem such as designing a sensor, load, closed loop feedback system and a lot more. The training kit is alter made to provide exciting and excellent teaching tools for controls system subject unlike the conventional trainer module.**

***Keywords*—Magnetic Levitation, Teaching, Electrical Control Assembly.**

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Cluster 3

GREEN TECHNOLOGY

PAPER ID : GT 101

ENERGY CONSERVATION IN OFFICE BUILDINGS CASE STUDY AT PT-ABC, SURABAYA-INDONESIA

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***Abstract*—Commercial Building Graha ABC located in Jalan XYZ, Surabaya, was built in 1996. With a land area of 10,265 m2 and building area of 26132.09 m2. Number of floors is 14. The resources used are of electricity with installed capacity of 2189 kVA, class B.3 rate with a nominal voltage of 20,000 volts, nominal current 63 A and 3 phase. Other plant sources is the genset as backup with the number 2 units and has the capacity of each - each 1000 kVA, nominal output voltage is 400 volts, nominal output current of 1443 kA. Energy provided by the utility is used to cool the room, for lighting, power supply for elevators, office equipment for power systems, etc.. Building ground floor is used for utilities, STP, parking and space control and security guards. Building floor 1 s / d 6 is used by MONEY MARKET. And House floors 7-14 leased to various companies. Office Hours are Monday - Friday 7:30 to 17:00 and Saturday 08:00 to 14:00. Building management is carried out by PT.ABC. Some measurement data for 2008 is now accessible. So that is very helpful for the calculation of Consumption Energy Intensity Earlier, namely in 2008, obtained from calculations = 127.22 kWh/m2 IKE-Year. The figure is still below the SNI ie = 240 kWh/ m2 IKE-year and under the existing office in Singapore is 210 kWh / m 2 - Year. During the year 2008 Graha-ABC also memanfatakan for Genset diesel for 10,118 liters. This oil is converted into electrical energy that is 5.396 kWh/m2-Year, So Total IKE Last year (2008) is a = 132.62 kWh/m2-Year.**

***Keywords*—Conservation of energy, Intencity of energy-consumption, Indonesia.**

PAPER ID : GT 102

SOLAR INSOLATION FORECAST USING ARTIFICIAL NEURAL NETWORK FOR MALAYSIAN WEATHER

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***Abstract*—Solar insolation forecast is essential for photovoltaic (PV) generation plant in enhancing the usage of solar energy for electrical production scheme. Likewise, it improves the PV power generation efficiency by regulating the control algorithm and charge controller corresponding to the prediction probability. An acquired data in solar insolation is required for solar energy harvesting. This paper presents the 12 hourly solar insolation forecast using Artificial Neural Network (ANN). A Multi-level perceptron (MLP) with back propagation technique model is proposed to predict the next day 12 hours solar insolation. The performance of MLP model is investigated with 60 days of solar insolation data from July 9th to September 9th 2011. The investigation is conducted under two different tropical weather conditions, sunny and rainy conditions. Hence, the best performance MLP forecaster model with a minimal error is selected through a trial and error method under various weather conditions. In this paper, the performance of the forecaster is shown. The results allow inferring the adequate performance and pertinence of this methodology to predict complex phenomena, such as solar insolation.**

***Keywords*—Solar Insolation, ANN, MLP, Forecasting, Solar Energy Harvesting.**

PAPER ID : GT 103

SHORT REVIEW ON COMMON METHODS OF BIODIESEL PRODUCTION

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***Abstract*—Biodiesel has been accepted generally as a suitable substitute for conventional fossil fuels because of many advantages that it has, like it is nontoxic, renewable and biodegradable. Different methods exist for converting the oils to the biodiesel such as micro emulsification, transesterification and pyrolysis. Among these methods, transesterification of vegetable oils is the most common process in biodiesel production. Different types of oils are considered as the major sources of biodiesel production and the most important one are vegetable oils. In this paper it has been attempted to focus on the review on conventional methods of biodiesel production and the starting oils in this process.**

***Keywords*—Biodiesel; Fatty acid methyl esters; Transesterification.**

PAPER ID : GT 106

THE EFFECT OF HETEROGENEOUS CATALYSTS IN BIODIESEL PRODUCTION: A SHORT REVIEW

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***Abstract*—The biodiesel production from various types of feedstock's (vegetable oils, waste cooking oils, and animal fats) with different catalysts (homogeneous, heterogeneous, and non catalyzed transesterification) has been carried out by a large number of researchers. The results showed that the application of homogeneous catalysts have some significant disadvantages such as highly sensitive to FFA and water content, slow reaction and difficult and uneconomical purification and separation process in downstream biodiesel production. However, these reasons caused to researchers focused on the application of heterogeneous catalysts recently. Because these type of catalysts are reusable for many times and they eliminate the purification and separation process. This article attempts to review the application of various types of heterogeneous catalysts for biodiesel production.**

***Keywords*—Biodiesel, transesterification, heterogeneous catalyst, solid acid, solid base**

PAPER ID : GT 108

CATALYTIC STEAM GASIFICATION OF WASTE PALM TREE TRUNK DERIVED BIO-CHAR

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***Abstract*—Catalytic steam gasification of Malaysia Waste Palm Tree Trunk Derived Bio-char was studied using alkali metal carbonate (K2CO3) supported perovskite oxide catalysts which showed a favor catalytic activity in the carbon combustion. The bio-char steam gasification reactions were carried out using a fixed reactor under steam atmosphere with different catalysts such as K2CO3/LaMn0.8Cu0.2, K2CO3 and K2CO3/alumina, respectively. The effects of temperature, catalyst support and catalyst mixing ratio on the syngas compositions and carbon conversion were carefully investigated. The syngas compositions were analyzed by gas chromatography. K2CO3/LaMn0.8Cu0.2 catalyst showed the better carbon conversion and gas compositions as compared to the other catalysts, which meant the Perovskite Oxide was more effective as a support for the gasification catalyst. The results showed that the better carbon conversion ratio and gas composition within short time gasification and removed nearly 100% of heavy and light tar.**

***Keywords*—Catalytic steam gasification;Waste Palm Tree Trunk; K2CO3, Perovskite.**

PAPER ID : GT 109

THE PROSPECT OF RENEWABLE ENERGY RESOURCE UTILIZATION TO SUPPORT THE DEVELOPMENT IN SOUTHEAST SULAWESI

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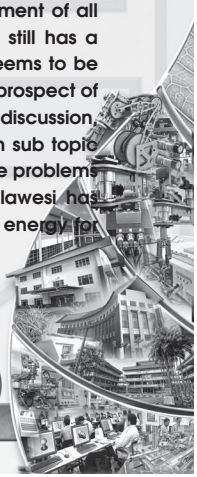
***Abstract*—Energy plays important role in the development of a region. Electricity is one of the energy forms which have been accepted as one of the driving forces of the economic development of all the nations. Southeast Sulawesi, one of the developing regions in Indonesia, apparently still has a problem of electricity provision of its community. The geography–topography condition seems to be one of the main causes for the problem. This paper attempts to deliver a discussion on the prospect of renewable utilization for electricity generation in Southwest Sulawesi. As the sources for the discussion, journal papers, magazines and the authentic government data are utilized. The discussion sub topic will includes the geography and socio-economic condition, the electricity utilization and the problems and the prospect of renewable energy development. It is concluded that Southeast Sulawesi has abundant potential renewable energy sources which can be utilized to assist in delivering energy for the communities in order to leverage the development.**

***Keywords*—Development, Southeast Sulawesi, Prospect, Renewable energy**



PAPER ID : GT 111

IMPACT ASSESSMENT OF PV ON LOW-VOLTAGE DISTRIBUTION NETWORK

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***Abstract*—The Malaysia Building Integrated Photovoltaic Project (MBIPV) has contributed to the growing number of PV units in Malaysia by the end of 2010 when the government took initiatives in developing and commercializing BIPV applications in urban networks. PV systems in Malaysia are typically installed in residential and commercial areas and are connected to existing low-voltage(LV) networks. PV penetration in LV networks will certainly heighten in the coming years since BIPV will not only add aesthetic value to the buildings but users could actually sell the power produced back to the utility through the newly introduced Feed-in Tariff (FiT) in the country. Thus utilities management must be prepared to facilitate high levels of PV into the LV network to ensure a healthy grid system. A large-scale PV deployment in the LV network may possibly result in reverse power flow, voltage deviations and high fault levels. This paper evaluates the technical impacts of different levels of PV penetration in LV network in Malaysia in terms of voltage and power flow. This paper will also assess the maximum PV capacity that the LV network could accommodate without resulting in severe problems to the network. The generic distribution model is built with reference to distribution network parameters provided by the local utility.**

***Keywords*—PV Integration, Low-Voltage Network.**

PAPER ID : GT 112

MONTHLY AVERAGE DAILY GLOBAL SOLAR RADIATION IN SARAWAK, MALAYSIA

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***Abstract*—Solar radiation is a critical parameter in the sizing of solar power system. Various studies on estimating monthly average daily global solar radiation in Malaysia have been carried out throughout the years. Nonetheless, information available for the state of Sarawak is still relatively scarce. In this paper, empirical models based on Angstrom-Prescott and the sky cloudiness are used to estimate the monthly average daily global solar radiation in Sarawak. Relevant weather and solar information is obtained from the Malaysia Meteorological Department, Kuching Branch. The models are further verified with statistical error tests, namely mean bias error (MBE), mean percentage error (MPE), root mean square error (RMSE), correlation coefficient (R) and the Student's t-test. Results show that the Angstrom-Prescott models provide better performance, with for Kuching and for Miri.**

***Keywords*—Monthly Average Daily Global Solar Radiation, Sunshine Hours, Empirical Models, Sarawak, Cloudiness Index**

PAPER ID : GT 113

EXPERIMENTAL AND NUMERICAL SIMULATION ON BIOGAS FLAME PROPAGATION CHARACTERISTIC IN SPARK IGNITION PREMIXED COMBUSTION

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***Abstract*—Biogas is a sustainable and renewable fuel that is produced in digestion facilities. Biogas can be utilized to replace energy derived from fossil fuels, and hence reduce emissions of greenhouse gasses. Based on the chemical composition analysis, the composition of biogas produced in East Java, Indonesia consists of 66.4% methane, 30.6% carbon dioxide and 3% nitrogen. Demands for improved engine design and replacing fossil fuels, in terms of power output, efficiency and emissions control, require improved fundamental understanding of the combustion processes that occur within the cylinder. The most importance characteristic is the burning velocity, which directly affects pressure development and often is expressed in terms of laminar burning velocity. The laminar burning velocity is the most important flame propagation characteristic in spark ignition premixed combustion. The experimental laminar burning velocity of biogas premixed combustion was measured in a high pressure fan-stirred bomb. Analysis based on careful photographic observation has been used to determine precisely defined (unstrectched) laminar burning velocities. The numerical simulation has been done using the Premix module of CHEMKIN. The reaction mechanism used is GRI Mech 3.0 consisting of 325 elementary chemical reactions and associated rate coefficient expressions and thermochemical parameters for the 53 species involved in them. Based on the experimental investigation and the numerical simulation, the unstrecthed laminar burning velocity as the important characteristic of flame propagation in biogas premixed combustion has been found for initial conditions of a stoichiometric at room temperature and atmospheric pressure. Finally, The laminar burning velocity of biogas is better than pure methane in lean and rich mixtures at room temperature and atmospheric pressure initial conditions. Biogas has a good premixed combustion flame propagation characteristic and could be an alternative to replace the fossil fuels.**

***Keywords*—Sustainable energy; Flame propagation; Biogas; Premixed combustion; Laminar burning velocity.**

PAPER ID : GT 114

A STUDY ON DOMESTIC BOX TYPE SOLAR COOKER

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***Abstract*—In this paper, a mirror box type solar cooker has been chosen for the case study for the evaluation of design domestic box type solar cooker. During the design evaluation, an experiment was conducted in order to evaluate the performance of the chosen solar cooker. The higher temperature for four set of experiments is 58.2 oC which was applied to the non-stick reinforced steel cooking pot. However, time to reach at certain temperature could be estimated using linear regression equation and equation from the theory. The time that is estimated using the linear regression method is found to be more than 3 hours while from the equation, it only takes 40.37 min m2kg-1. Therefore, to get a shorter time in cooking period, modification need to be done for domestic box type solar cooker.**

***Keywords*—Box type solar cooker; Malaysia solar radiation; time and temperature; outdoor cooking.**

PAPER ID : GT 115

INFLUENCE OF HUB TO TIP RATIO AND NUMBER OF RUNNER BLADES ON THE PROPELLER TURBINE UNDER LOW HEAD AND LOW FLOW RATE CONDITION

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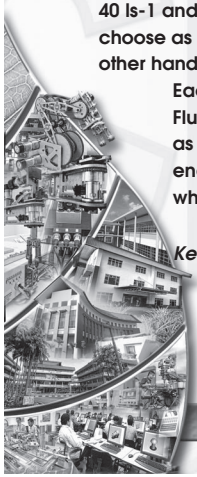
***Abstract*—Influence of hub to tip ratio with number of runner blades are one of the most important parameters in designing a blade especially on the small-scale hydroelectricity scheme such as pico-hydro turbine. Since the conditions of low head with low flow rate need to be considered, therefore, the head has been fixed with 2 meters and the flow rates are variables ranging from 10 ls-1, 20 ls-1, 30 ls-1, 40 ls-1 and 50 ls-1. Straight runner blades design of propeller turbine with angle of blade 450 has been choose as a subject matter. The value of hub to tip ratio to be evaluated is 0.4, 0.5, 0.6 and 0.7. On the other hand, the numbers of runner blades which have been used in this investigation are 3, 4, 5 and 6. Each of these combinations of parameters will be evaluated and analyzed by using Computer Fluid Dynamics (CFD) analysis software in order to find out the optimum stream velocity as well as the power output which integrated between hub to tip ratio and number of blades. At the end of the analysis, the results showed that hub to tip ratio 0.7 with the lowest number of blades which is 3, contributed the best performance of the propeller turbine.**

***Keywords*—Hub to tip ratio; Number of blades; CFD analysis; Low head; Propeller turbine.**



PAPER ID : GT 116

INCREASE PRODUCTIVITY ENERGY CONSUMPTION IN GREEN CONSTRUCTION INDUSTRY

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***Abstract*—Respecting to the necessitate to improve the energy exploitation in the housing section and respecting to module of the optimization system of the energy consumption and production in the country construction and the basic axis of the technology in the stable explains applying practical and scientifically methods in design and structure of the building, considering to civil management issue complicates with the modern trend toward energy consumption optimization to establish building complexes in the fine general sections with the following items:**
1) Principal of site design and energy consumption
2) Bases of plan design with energy consumption
3) Key points in making view and energy consumption
4) Construction detail and insulation methods
5) Innovations and new idea hoping that with promotion policies to prevent irregular consuming of fossil fuel, notes and items of this article can decline energy consumption exploitation with urban life standards toward the stable expansion and decrease of environment pollution the next and it be reaching path to the traditional architecture standard principals of the this country.

***Keywords*—Energy Consumpton; Green Construction Building; Industry**

PAPER ID : GT 117

A FUTURISTIC VIEW OF RENEWABLE ENERGY IN MALAYSIA

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***Abstract*—Energy is identified as the catalyst for improvement. Renewable energy has been considerably replaced as a probable alternative resource of non-renewable energy. In recent times, the continuously increasing demand and prices of fossil fuel as well as climate change, makes the renewable energy as the only key target for future energy market. In order to decrease dependency on fossil fuel and alleviate effects of climate change the Malaysia's recent attention is on developing renewable energy (RE). The abundance of renewable sources makes them to be attractive in Malaysia. Malaysia's achievable renewable energy resources are biomass, solar, wind, and hydro. The purpose of this paper is to describe some various type of renewable energy. Apart from that, this paper will also attempt to indicate the implementation of renewable energy for energy sector in Malaysia.**

***Keywords*—Renewable energy; Wind energy; Solar energy; Hydro; Biomass.**

PAPER ID : GT 118

A STUDY OF HIGHER ENGINE EFFICIENCY THROUGH MOTORCYCLE WASTE HEAT RECOVERY AT EXHAUST PIPE

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***Abstract*—Thermoelectric module is known as solid state device that could change heat directly into electricity without any pollution. It is operates with no moving parts and thus it is completely silent, extremely reliable and environmentally friendly. Since some systems or components in motorcycle are producing waste heat, e.g. exhaust systems, engine block, coolant systems, etc, therefore it is possible to generate electricity by using Motorcycle Thermoelectric Power Generator (MTEG) with thermoelectric material/module as a main component. In this research, the potential of waste heat at the motorcycle's exhaust pipe as a heat source of MTEG is investigated. Experimental study is conducted to find the temperature distribution along the exhaust pipe of Yamaha 135 LC. Result from previous experimental study and data from HZ-20 are used in the theoretical study. As a results, it is found that heat transfer to the surrounding air is vary from 162 W for 60 km/h to 415 W for 120 km/h, thus promising excellent potential for MTEG. At engine speed of 100 km/h, the application of single HZ-20 is capable to generate 13.1 W, achieved at difference temperature of 156.2C with hot and cold side temperature of 211.0 and 54.8 C respectively. This result is 69% close to design output of HZ-20.**

***Keywords*—Waste Heat Recovery; Thermoelectric Modules; Thermoelectric Power Generator.**

PAPER ID : GT 119

WASTE HEAT RECOVERY FROM THE EXHAUST OF NATURAL ASPIRATED ENGINE

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***Abstract*—The utilization of exhaust waste heat is now well known and the basic of many combined cooling, heating, and power installations. Heat recovery from automotive engines has been predominantly for turbo-charging or others such as cabin heating, thermoelectric, and air conditioning. The exhaust gases from such installations represent a significant amount of thermal energy that traditionally has been used for combined heat and power applications. This paper explores the theoretical performance and simulation of natural aspirated spark ignition engine model of 1.6 L, which is occupied with waste heat recovery mechanism (WHRM). Mathematical model and simulation test results suggest that the concept is thermodynamically feasible and could significantly enhance system performance depending on the load applied on the engine. However, the experimental test should be conducted to validate the simulation results as for scalability and reliability that require further investigation.**

***Keywords*—Waste heat recovery; Natural aspirated engine; Turbo-system.**

PAPER ID : GT 120

EXPERIMENTALLY INVESTIGATION THE PERFORMANCE OF TURBO-GENERATOR IN GASOLINE VEHICLE

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***Abstract*—In internal combustion engine, only 25% of heat energy is used to move car down the road and runs accessories. Without realize, around 40% of the heat energy generated from combustion chamber is lost to the environment through exhaust gas. Turbo-generator is developed as a waste heat recovery (WHR) system and installed to 1.6L gasoline engine. This device is meant to convert heat energy (exhaust gas) into electric energy (generator). At a natural aspirated engine, high temperature will be occurred at exhaust manifold up to 600˚C during high speed engine, which is appropriate for turbo-generator device. Power from turbine shaft is transmitted to the generator, which generated current for storing into an additional battery pack. This recovered power can be used to run electric accessories in the vehicles such as audio system, navigation system and others. The road test experiment was conducted to observe the behavior and performance of turbo-generator system. As results, the output voltage from generator reaches up to 13.93V that is sufficient for charging conventional battery pack.**

***Keywords*—Turbo-generator; Waste heat recovery (WHR) system; Exhaust gas**

PAPER ID : GT 121

MODELING OF BIODIESEL PRODUCTION THROUGH TRANSESTERIFICATION PROCESS USING ARTIFICIAL NEURAL NETWORK

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***Abstract*—Artificial neural network (ANN) was used to model the dynamic change of concentration for reaction components involved in biodiesel production process. The ANN is feed-forward type with single hidden layer and coupled with Levenberg-Marquardt (LM) training algorithm. The case study from literature with base-catalyzed transesterification on Jatropha curcas-waste food oil mixture with potassium hydroxide as catalyst is presented. With a single input as time, the ANN models all ten reaction components inclusive of catalyst, free fatty acid and soap. The trained 3-layer ANN had shown the satisfied performance and it is robust in handling the noisy data. No significant improvement over the changes of initial range of weights and biases is observed. The newly proposed updating method for damping factor in LM method had reduced the number of epochs and thus improved the simulation time using noise-contained data.**

***Keywords*—artificial neural network, transesterification, mean squared error, correlation coefficient**

PAPER ID : GT 122

THE STUDY OF SOIL HEAT TRANSFER CHARACTERISTICS FOR DEVELOPMENT OF COST-SAVING AIR CONDITIONING SYSTEM USING EARTH COOL DEHUMIDIFICATION METHOD

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***Abstract*—Study of soil heat transfer characteristic at equator zone within latitudes ½ o and 7 o N and longitudes 100 o to 1191/2 o E in Peninsular of Malaysia. Soil heat transfer parameters selected were thermal resistance, thermal conductivity and delta heat. Soil Canter Lab (Malaysia) uses Proctor Test to find the maximum moisture content and optimum dry density for six samples of soil and after that were used in experiment onto samples. Dry Oven Method was used to find moisture content, Sand-Cone Method was used to find the dry density and Thermocouple was used to find the heat of soil at 100mm and 150mm depth every one minute in thirty minutes. Kersten's Method was used to calculate thermal conductivity of soil and Fourier's Law was used to calculate heat transfer for each samples of soil. Sandy type of soil has higher thermal conductivity, delta heat and soil heat transfer than the salty clay type of soil. Peninsular of Malaysia was influence by Tropical Rainforest. It is warm and wet for the whole year. Higher mean annual rainfall was approximately 2300mm per year give advantages to develop underground air conditioning system according to higher heat transfer of soil and it's for cost saving and more than that it is clean environment system.**

***Keywords*—Soil heat transfer, thermal conductivity, delta heat, moisture content and dry density**

PAPER ID : GT 123

PREDICTION OF CONDENSATION WATER RATE IN THE LIQUID DESICCANT DEHUMIDIFIER USING ARTIFICIAL NEURAL NETWORK

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***Abstract*—The heat and mass transfer process in the packed bed dehumidifier is affected by many parameters, such as the inlet parameters of the air and the desiccant (air and desiccant mass flow rate, air and desiccant temperature, air humidity, and desiccant concentration), the design of the dehumidifier, and the type of packing. So, the solution of the dehumidification process in the liquid desiccant is complex with the theoretical study and number of assumption may be suggesting to simplifying the solution. In this paper, the ANN model presents for predicting the dehumidification process effectiveness in terms of water condensation rate. Six inlet parameters of the air and desiccant are used as inputs to the ANN. In order to investigate how capable the Artificial Neural Network technique is at estimating the prediction value of the water condensation rate in the dehumidifier, a real experimental test data have been taken from a previous researchers, Y. H. Zurigat et al.(1), tested a packed column dehumidifier using triethylene glycol (TEG) as desiccant. MATLAB code is designed for studying feed forward back propagation with traingdm, learngdm, MSE, tansig as the training, learning, performance, and transfer functions, respectively. 70 % from experimental data used for training the model and 30% for testing the output.**

***Keywords*—ANN, MATLAB, dehumidifier, condensation rate.**

PAPER ID : GT 124

LIFE CYCLE ASSESSMENT OF A MARINE CURRENT TURBINE

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***Abstract*—Renewable energy is gradually establishing itself in the world energy scenario. Marine current power generation is out of the leading renewable technologies and one of a great significance. It offers predictable energy delivery (based on gravity) and high energy intensity in comparison to wind power. This article publishes key results of a recent life cycle analysis study on an installed marine current turbine based on ReCiPe life cycle impact analysis method. The study calculates the life cycle impacts on different mid-point & end-point categories. It identifies leading impact contributing processes and finally perfroms an impact comparison of marine power with some other leading power generation technologies. The study ushers new research on this field which will eventually be helpful in harnessing massive scale marine current power generation from different potential corners of the world.**

***Keywords*—Marine current turbine; life cycle analysis; ReCiPe method; impact reduction; power-plant impact comparison.**

PAPER ID : GT 125

ENERGY AND EXERGY ANALYSIS OF A TWO PASS HYBRID-TYPE (PV/T) SOLAR AIR HEATER

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***Abstract*—A solar hybrid energy system having photo-voltaic and thermal devices, which produces both thermal and electrical energies simultaneously, is considered for analysis. The collector is designed in such a way that the absorber plate is partially covered by solar cells. The raise in temperature of the solar cell is expected to decrease its electrical performance. Thin metallic strips called slats are attached longitudinally at the bottom side of the absorber plate to improve the system performance by increasing the cooling rate of the absorber plate. Thermal and electrical performances of the whole system at varying cooling conditions are presented. The energy and exergy values of the present system are increasing with increase in mass flow rate. The instantaneous energy and exergy efficiency of the double pass hybrid (PV/T) solar air heater varies between 37- 63% and 18-22% respectively and values are comparable with that of published results.**

***Keywords*—Photo-voltaic: Solar Air Heater: Slats: Double Pass: Exergy.**

PAPER ID : GT 126

AN EXPERIMENTAL STUDY OF DI DIESEL ENGINE FUELLED WITH EMULSION FUEL

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***Abstract*—Engine performance in term of fuel consumption and exhaust temperature of a diesel engine fuelled with emulsion fuel were observed. Emulsion fuel used in this experiment is a blend of 79% of diesel fuel, 20% of water and 1% of surfactant. This experiment compares the effect of usage between emulsion fuel and diesel fuel to single cylinder diesel engine. This experiment is conducted using a single cylinder diesel engine brand Yanmar TF 120, 4 stroke, water cooled. The engine speed is set up to 1200, 1500, 1800 and 2100 rpm and the data is taken at each engine speed. The data that is observed and collected is fuel consumption and exhaust gas temperature at each engine speed of every fuel type usage. From analysis of the experiment, it is observed that the fuel consumption due to usage of emulsion fuel is lower compared to diesel fuel after the content of the diesel fraction (79% diesel content) in the emulsion fuel is taken into account. The amount of energy consumed when emulsion fuel used (without 79% of diesel oil content is taken into account) is lower than diesel fuel by 14.7%. For the exhaust temperature, the temperature due to usage of emulsion fuel is same with diesel fuel for engine speed 1200, 1500 and 1800rpm while for 2100 rpm, the exhaust temperature when the engine is operating with emulsion fuel is lower than the diesel fuel.**

***Keywords*—emulsion fuel, diesel fuel, fuel consumption, diesel engine**

PAPER ID : GT 127

CHARACTERIZATION AND PERFORMANCE OF GREEN HYDRAULIC FLUID

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***Abstract*—Palm oil is a versatile product that can be used in several applications e.g. lubricants, hydraulic fluid, bio-fuel and food production. Hydraulic system poses as one of the potential uses of palm oil. Therefore, the work aims to study the capability of palm oil to be used in such system. The characterization studies of the thermal properties of palm oil were conducted. The viscosity studies were conducted using palm-based oil and mineral oil at 40oC and 100oC, where the levels of viscosity induced by the temperature were compared. The work attempts to screen several potential palm base oils to be used as energy transport media in hydraulic system. The use of additived palm oil and mineral oil was demonstrated in a circulation in hydraulic system at 60oC and pump speed of 1200 rpm. The results of the rheological studies e.g. fluid density, viscosity and wear scar diameter for palm-based and mineral oil were presented.**

***Keywords*—Hydraulic: Oil: Thermal: Viscosity.**

PAPER ID : GT 128

EMISSION CHARACTERISTIC OF ALKALINE-CATALYSTS BIODIESEL

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***Abstract*—Fossil fuel resources are now facing fast depletion due to huge global demand. Factors such as climate change, rising fuel prices and instability in the Middle East, it might be a very good idea to have a biodiesel as a solution for a future. In this study, three biodiesel fuels which produce by several alkaline-base catalysts with methanol via transesterification were tested in a four cylinder Mitsubishi Pajero 2.5 L Intercooler Turbo Diesel Engine. The engine emissions were recorded under 65% loads and within the range of 1000 to 3000 rpm for each sample of fuel compare with diesel fuel. The experimental test was carried out using gas analyzer and smoke detector. All of the biodiesel fuels exhibited the nearly similar emissions performance characteristic at the speed from 1000 rpm to 3000 rpm. Thus from the result, different catalyst did not give huge effecton the exhaust emission characteristic in engine combustion. At the end of the research, NaOCH3 is the best catalyst use to produce UFO biodiesel in order to obtain the lowest emission catalyst.**

***Keywords*—Biodiesel, used frying oil, alkaline based catalyst, emission, diesel engine.**

PAPER ID : GT 201

EVALUATING THE EFFECTIVENESS OF ENERGY EFFICIENT AND ECO-LEVELING ICT INFRASTRUCTURES FOR ENVIRONMENTAL SUSTAINABILITY

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***Abstract*—This article portrays a critical issue of environmental pollution caused by the extensive use of high technology for ICT development process all over the world which creates a challenge for global sustainability. ICT infrastructures produce numerous environmental pollutions during of its production and disposal. Therefore, it is very important to discard the electronic waste in proper ways to ensure the sustainable environment by adoption of green technology. In this regard, this paper evaluates the energy consumption scenario in the field of ICT and its effect on environment. Following this issue depiction of green technology and its advancement along with a model has been proposed for green adoption which may ensure the sustainable environment. This paper also draws an attention of designing energy efficient computing system and eco-leveling ICT products which are 'feasible and economical', and minimizing the risk of human health as well as decreasing pollution towards the environmental sustainability. And finally current advancement as well as future challenges has been addressed in this paper.**

***Keywords*—ICT Infrastructures; Green Technology; Eco-leveling IT products; Environmental Sustainability.**

PAPER ID : GT 202

CHARACTERIZATION OF A STRUCTURE- BORNE SOURCE USING THE RECEPTION PLATE METHOD

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***Abstract*—This paper presents the characterization of vibration strength obtained from reception plate method by applying the mobility concepts. It describes a laboratory-based measurement procedure, which determines the strength of a vibration source in terms of the total squared free velocity of the source. The source used in the experiment is the small electric fan motor installed on high mobility aluminum panel in order to neglect the influence of the source mobility. The complexity of the mobility at the contact points are reduced using the single value of effective mobility. The aim is to validate the data obtained from the reception plate method with one from the direct measurement. Thus, this research is expected to give a simple but accurate way to determine input power from a structure-borne sound source.**

***Keywords*—reception plate method; effective mobility; squared free velocity; structure-borne source; input power**

PAPER ID : GT 203

DETECTION OF HIGH IMPEDANCE FAULT ON POWER DISTRIBUTION SYSTEM USING PROBABILISTIC NEURAL NETWORK

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***Abstract*—High impedance fault (HIF) is abnormal event currents on electric power distribution feeder which does not draw sufficient fault current to be detected by conventional protective devices. The waveforms of normal and HIF current signals on electric power distribution feeders are investigated and analysis the characteristic of HIF. The purpose of this study is to use a new feature which indicates HIF faults. Fast Fourier Transformation (FFT) is used to extract the feature of the fault signal and other power system events, odd harmonics frequency components of the phase currents are analyzed. The effect of capacitor banks and other events on distribution feeder harmonics is discussed. The features extracted are using to train and test the probabilistic neural network (PNN) which is used as the classifier to detect HIF from other normal event in power distribution system.**

***Keywords*—High Impedance Faults; FFT; Power System; Probabilistic Neural Network**

PAPER ID : GT 205

SINGLE CYLINDER FOUR STROKE ENGINE IMPROVEMENT: AN ANALYTICAL AND SIMULATION APPROACH

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***Abstract*—Previous investigations proved that gasoline engine performance can be improved via variable valve timing (1). Thus, the current paper aims to study engine performance tuning via simulation and investigate valve timing effects on fuel consumption on a fuel efficient vehicle. To serve this purpose, Honda GX 160 was chosen as a reference model to a generalized single cylinder four stroke engine to be modeled by using Ricardo Wave 8.0 to carry out the validations. Manipulation of valve timing benefits EGR, reduced fuel consumption, improved level of braking torque and braking power and reduced amount of NOx and HC content in exhaust emissions. Thus, fuel efficient vehicle is then achieved with variable valve timing over crank angle.**

***Keywords*—Engine combustion, variable valve timing, simulation, Ricardo Wave**

PAPER ID : GT 206

MODELLING AND SIMULATION OF MICROTURBINE FOR A DISTRIBUTION SYSTEM NETWORK WITH PASSIVE FILTER

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***Abstract*—Distributed generation systems have become the new focus of the world and microturbine generation system is one of the systems. The connection of a microturbine generator to a distribution system requires the use of an AC/DC/AC power converter which in turn creates a harmonic problem to the distribution system. A modelling of a microturbine generation system on PSCAD is presented and the harmonic impact of the microturbine generation system on the distribution system is investigated. The necessity of reducing the harmonics injected by the microturbine generation system into the grid is solved by introducing a passive filter. The simulation of the microturbine generation system for the filter is done and the waveforms, THD and harmonic spectrum of the grid current with the use of the passive filter in the system are studied. The study shows that the passive filter provides harmonic reduction in the grid current.**

***Keywords*—Instructions; Maximum five keywords; Power.**

PAPER ID : GT 207

ENERGY EFFICIENCY PROGRAM IN THE BUILDINGS OF FKE, UTEM

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***Abstract*—The growth in world energy consumption was strongly increased over the decades and give negative impact to global warming issues. Awareness towards energy conservation and retrofitting are important in order to reduce energy consumption in the buildings and minimize negative environmental impacts. Malaysian's government takes efforts to increase energy efficiency and strategies of energy conservation. Energy efficiency program bring great savings if planned and implemented correctly with energy audit process. Energy audit is considered as one of the comprehensive strategies to identify areas of end-use consumption where waste of energy can be reduced without negatively affecting the output. The Energy Efficiency Program in Faculty of Electrical Engineering, UTeM is the process of monitoring, controlling, and conserving energy in a building to achieve and maintain optimum energy procurement and utilization, throughout the organization. This research also discusses about the potential area for energy saving and energy conservation.**

***Keywords*—Energy efficiency; Energy conservation; Energy audit**

PAPER ID : GT 208

AN APPROACH ON OPTIMAL LOCATION, SIZING AND SWITCH TYPE OF POLE TOP CAPACITOR BANK IN LV NETWORK

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***Abstract*—This paper presents an algorithm for optimal placement, sizing and switching of pole top capacitor bank on LV network. The optimization problem is formulated based on the maximization of savings obtained from the reduction in energy loses. An objective function of the total net saving is formulated taking into consideration of economic factor. The option with the highest total net saving is selected as optimal choice. The proposed algorithm also considers the switching state and switching sequence of capacitor bank in order to determine optimal capacitor switching types.**

Keywords—Optimal, Pole Top Capacitor, Size, Location, Switching State, LV Network.

PAPER ID : GT 209

ANALYTICAL STUDY OF SIGNAL TO NOISE RATIO USING GREEN LIGHT TECHNOLOGY FOR WIRELESS COMMUNICATION

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***Abstract*—With the trend of towards green technology nowadays, the white Light Emitting Diodes(LED) is regarded as the solution introduced by the lighting industries. Besides having advantageous properties such as high efficiency, low power consumption, long lifetime time, the white LED is also expected to be used for indoor wireless communication as it is able to on and off very fast. The purpose of this paper is to identify the number of LEDs light that are needed to an area with dimension of 5m (length) × 5m (width) × 2m (height) to represent typical living room environment to allow wireless communication. By using an analytical approach, the performance of visible light communication is evaluated by the Signal to Noise Ratio(SNR) simulation. From the result obtained, the numbers of LEDs lights are proportional with the efficient coverage area for communication. The excellent coverage area within 40dB-35dB SNR value increased dramatically from 4%(using single source light) to 60% (using double sources light). This result showed that LEDs is possible to have dual functions – communication and lighting for next generation.**

***Keywords*—green technology, LED, wireless communication, SNR, frequent switching**

PAPER ID : GT 210

BOUNDARY LAYER HEATING TO REDUCE DRAGON THE PLANE

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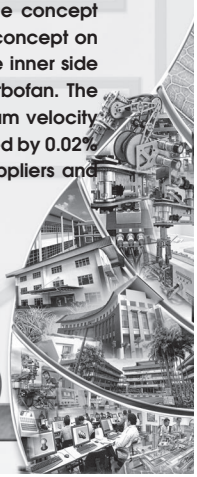
***Abstract*—A dolphin can swim at a faster rate than theoretically expected by reducing the drag using boundary layer heating and its body texture,. Applying this concept to airplane it is suggested that less power will be needed to travel at the same speed. Reduction of power meant less fuel needed and less green-house gas emission to the atmosphere. This paper discusses the findings of the concept of boundary layer heating by using simulation software and highlighted the effects of the concept on the business life cycle of the Airbus A330-300. Silicon rubber heater is proposed to heat the inner side of airplane body. The power source for the heater is derived from excess energy from turbofan. The simulation results show that it is possible to reduce the drag using this concept. The minimum velocity has increased by 12.87% when the surface of airplane is heated and the force of air is reduced by 0.02% on the scaled model. Some suggestions and guidelines for the design, manufacturing, suppliers and end-of-life aspects are also discussed.**

***Keywords*—Boundary layer, Drag, Heating, Airplane.**



PAPER ID : GT 211

STUDY ON THE LOAD DISTRIBUTION BY A CHARGE CONTROLLER OF A PASSIVE SOLAR GREENHOUSE

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***Abstract*—This paper presents a study on the load distribution in a passive solar greenhouse through a self-developed charge controller. The study has been conducted in which the controller was being tested with 12 V 1.2Ah battery to measure the battery voltages over time in different load's conditions. The battery voltage measurement was taken from a digital panel display consists of IC TC7107 and seven segments display which were connected to the SPC3 charge controller. This controller consists of both charging and low voltage disconnect circuits and is able to work with solar charged 12V DC system. The results obtained are the values of the battery voltage connected with no load, fan, motor and both fan and motor. These data were then converted into graph that illustrates the behavior of load distribution in a passive solar greenhouse.**

***Keywords*—Loads; Battery; Controller.**

PAPER ID : GT 212

INVESTIGATION OF ENGINE PERFORMANCE AND EMISSION LEVEL OF SI ENGINE RUNNING WITH DIFFERENT RON FUEL GRADES

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***Abstract*—This paper discuss about engine performance and emission characteristic produced by gasoline vehicle by using different type of RON fuel grades and brands. This investigation involves engine performance test using chassis dynamometer and emission measurement with portable combustion analyzer. In the engine performance analysis, the engine first is tested using chassis dynamometer with different type of RON fuel grades (RON 95, RON97) from different manufacturers. Chassis dynamometer test will show the engine performance graph which includes power, torque and brake specific fuel consumption (BSFC). Next, the emission test is performed to validate and compare the data of emission level produced by vehicle. This emission test will run in condition of vehicle on idle and running by using chassis dynamometer with different type of RON fuel grades and brands. In this project the standard procedure of fuel and emission testing using chassis dynamometer have been successfully established. At the end of the project, results will show which type of RON fuel grades and brands produced higher engine performance, better fuel economy and less emission level. Further experimental test could be implemented utilizing engine dynamometer to obtain better result for fuel testing with improved instrumentation control.**

***Keywords*—Fuel Testing, RON grade, Engine Performance, Emission Level, Light Duty Gasoline Engine.**

PAPER ID : GT 302

THE EFFECT OF BINDER ON THE ACOUSTICAL PERFORMANCE OF THE PADDY STRAW 'GREEN' SOUND ABSORBER

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***Abstract*—Sound absorbing material are widely use in application. It was started from asbestos-based material and now generally fabricated from synthetic materials. These non-biodegradable materials do not only cause pollution to the environment, but also contribute significantly in increasing the CO2 causing the effect of global warming. Therefore researchers have now driven their attentions to find sustainable and eco-friendly materials to be an alternative sound absorber. This paper discusses the use of natural fibers from dried paddy straw as fibrous acoustic material. Since these are common natural waste materials found across South East Asia, the usage will also minimize the production cost. Panels of sound absorbers from paddy straw are fabricated using hot press and their acoustic properties are investigated through experiment. The effect of the binder on the acoustic performance of the panel is investigated. In average, good sound absorption coefficient is found particularly above 2 kHz.**

***Keywords*—Global warming; non-biodegradable; sustainable.**

PAPER ID : GT 303

SUPERABSORBENT POLYMER HYDROGEL FROM SAGO STARCH: THE EFFECTS OF CROSSLINKER CONTENT ON WATER ABSORBENCY

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***Abstract*—Grafting monomers onto natural polysaccharides as starches, becoming a preferred method to derive superabsorbent gels due to it afforded unique environmental and commercial advantages. This paper reported the study on the effect of cross linker on the water absorbency of superabsorbent, prepared by graft co-polymerization method of acrylic acid (AA) onto sago starch (SS). The AA grafted copolymer was obtained via a redox initiator system of ammonium persulfate (APS) and in the presence of N, N' - methylenebisacrylamide (N-MBA) crosslinker. The percentage of water absorbency was observed reduced with the increament of the crosslinker. The morphology of synthesized hydrogel obtained by Scanning Electron Microscope (SEM) were agreeable with the water absorbencies results whereby lesser pores observed for higher content of crosslinkers. Fourier Transform infrared spectroscopy (FTIR) spectra proved that AA was grafted onto SS.**

***Keywords*—superabsorbent; polymerization; water absorbency; starch.**

PAPER ID : GT 304

THE REDESIGN OF STABILIZER PRODUCT BASED ON DESIGN FOR ENVIRONMENT CONCEPT

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***Abstract*—This paper gives the application of design for environment concept on stabilizer product. The environment effects can be observed on the life cycle of the product, start from the material extraction process, material processing, manufacturing process, product distribution, the use of the product, until the disposal of the product. The redesign of environmentally friendly product had done by using Life Cycle Assessment (LCA) concept from the effects which is caused by the product. The evaluation is done by using two methods, AT&T methods which results the evaluation through environmental responsible product rating (RERP) for each life cycle of the product, and also Eco-Indicator methods which results the evaluation through Eco-Indicator (Pt) points. The result of AT&T method evaluation through environmental responsible product rating (RERP) is 28, and from Eco-Indicator 95 method find out that material extraction give the biggest negative effect to the environment. The redesign of stabilizer through material changes, simplify product design, minimize product dimension, and clustering product component. The environmental responsible product rating (RERP) of redesign product increased to 41 and the indicator points decreased at each product life cycle.**

***Keywords*—DFE, Life Cycle Assessment, and design**

PAPER ID : GT 305

DESIGN OF A UREA GRANULATOR WITH ENERGY OPTIMIZATION

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***Abstract*—Urea granules are one of the popular fertilizers among synthetic fertilizer industry. Its main function is to provide nitrogen which enhances leaf growth on plant. Urea granules are produced from the process of granulation. Granulation process is divided to wet and dry granulation. Generally, there are two type of dry granulator which is slugger and roller compactor. Roller compactor or also known as roll press is using two counter rotating rolls to compact raw material such as powder to become ribbons or granules. If ribbons instead of granules are produced from compaction, milling will be used to produce granules. It is difficult obtain a numerical result of the process due to the variety of parameters. Therefore, this work will only consider the parameters which are related to feeder system and roller. The parameters include the feeding rate of feeder, roller force, roller pressure, and roller gap size. While powder flow to roller from feeder, overfeeding may occurs. Overfeeding is harmful because it will cause motor failure. To overcome this problem, the function of roller needs to be improved. The roller will be modified and hence, a new design will be produced.**

***Keywords*—Urea granulation; Roller compactor; Granules.**

PAPER ID : GT 306

A REVIEW OF APPLICATION OF MULTI CRITERIA DECISION MAKING IN GREEN SUPPLIER SELECTION

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***Abstract*—In order to evaluate the green suppliers, both qualitative and quantitative elements must be considered. Hence, green supplier selection is a kind of multiple criteria decision making (MCDM) issue. This paper has been written in the field of GSCM and decision making. In this paper it is tried to provide a survey of the literature on MCDM applications to green supplier selection (GSS) problems. This accommodates an integral and authentic source of references in a way that could be used by a number of students, researchers and practitioners. The rest of this paper copes with an assessment of the literature presented, conclusions, and future trends in this line of research.**

***Keywords*—Green Supply Chain Management (GSCM); Multi Criteria Decision Making (MCDM).**

PAPER ID : GT 307

CASTING OF SAGO STARCH- NANOCOMPOSITES FILM

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***Abstract*—A starch-based biodegradable nanocomposites film was prepared through casting process by homogenously compounded it with montmorillonite (MMT) nano-clay particles. The present paper analyzes the effect of the MMT nano-clay particles into starch based-biodegradable nano bio-composites. Film samples were prepared by varying the percentage amount of starch to MMT nanoclay while the amount of glycerol that acts as plasticizer was kept constant. Its physical properties were studied and the structure of the film was characterized through Fourier transform infrared spectroscopy (FT-IR) and Scanning Electron Microscopy (SEM). Thicknesses of the films were decreasing with increasing ration of MMT nanoclay from 50% to 15%. A hydrogen bond was formed in starch/MMT nanoclay and intermolecular hydrogen bonding of the starch was decreased with the addition of MMT nanoclay. The FT-IR result also shows intercalation of clays with the starch and SEM micrograph revealed that the formation of phase separation due to the addition of plasticizer was reduced with the addition of clays.**

***Keywords*—Sago Starch, Nano-Clay, Film, Casting**

PAPER ID : GT 308

MOTIVATIONS FOR ALLIANCE WITH EXTERNAL AGENTS TO PROMOTE ENVIRONMENTAL INNOVATION

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Abstract **—The role of cooperation with external partners in the establishment of Sustainable Development by Small and Medium- Sized Enterprises (SMEs) has been a subject of debate in the research literature. However, discussion of how partners help SMEs to develop sustainable practices that promote environmental innovation is scant. SMEs face several challenges in the integration of these practices, which are somewhat different to those of large organizations. The main barriers for small firms in adoption of sustainable practices are the lack of financial, human and capital resources, low pressures from influential stakeholders together with low awareness of environmental impacts. To overcome these hurdles, SMEs look for support from partners beyond their boundaries. Through cooperation, firms can access new knowledge and technology, sources of technical support and expertise, and market requirements. Cooperative activities also promote legitimacy from influential stakeholders. This paper applies resource-based and institutional theories from strategic management to examine the motivations for alliance with other agents to achieve environmental innovations. In the promotion of a firm's innovativeness, each partner's contribution is different. Reviewing empirical studies, this paper sheds light on the importance of each partner and the extent that they influence environmental innovation of the firm.**

Keywords**—Environmental innovation; alliance; SME; Barrier.**

PAPER ID : GT 309

ON METAHEURISTIC ALGORITHMS APPLICATIONS IN GREEN SUPPLY CHAIN

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Abstract**—Increasing severity of the environment suchas limited raw materials and resources, increasing pollutions and overflowing disposal push companies to green supply chain. On the other hand, customers' caution to environment issues and government ecologic role force companies to design green product and process. Then manufacturer can use this opportunity satisfy customers and minimize resources therefore green supply chain can helps company to reach more competitiveness and profitability. Besides the benefits, a problem comes out to run and develop green supply chain due to new variables and limitations based on environment issues to supply chains. Most of the green supply chain problems have been known to have characteristics of being combinatorial and NP-hard. As a result, all possible combinations of the decisions and variables must be explored to find the optimum solution. The time required to solve the problem becomes extremely long as the number of variables increase to more than hundreds. In this paper, metaheuristic algorithms that they are widely being recognized as one of the best approaches for solving combinatorial problems and modelswill be presented. Then, we will discuss about metahiuristic basic and their applications in complex green supply chains models and combinatorial problems.**

Keywords**—Heuristics, Metaheuristicalgorithms, Green supply chain,combinatorial problem, NP-hard problems**

PAPER ID : GT 310

GREEN TECHNOLOGY OF PYRAMIDAL MICROWAVE ABSORBER USING RICE HUSK AND RUBBER TIRE DUST

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***Abstract*—Agricultural waste and industrial waste has potential to be used as an alternative material for the microwave absorber used in the RF anechoic chamber. New material had been research to reduce the cost of designing pyramidal microwave absorber. In this case, rice husk from paddy are mixed with recycled rubber tire dust to give the best reflection loss performance to the pyramidal microwave absorber. The reflection loss of pure rice husk and 50:50 rice husk-rubber tire dusts had been compared. The pyramidal microwave absorber is operating in the frequency range from 7 GHz to 12 GHz.**

***Keywords*—Microwave Absorber; Rice husk; Rubber tire dust.**

PAPER ID : GT 311

A PREDICTION OF WELDING PROCESS CONTROL VARIABLES BY PREDICTION OF WELD BEAD GEOMETRY USING FACTORIAL DESIGN APPROACH

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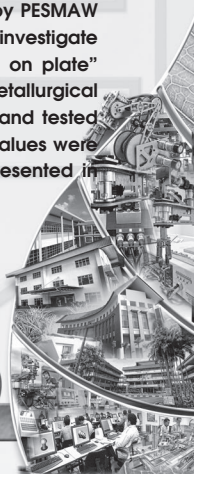
***Abstract*—Plasma Enhanced Shielded Metal Arc Welding (PESMAW) is a modified version of the age old manual metal arc welding (MMA) where the cellulose based flux coated solid wires are replaced by tubular low hydrogen flux coated electrodes. PESMAW process is aimed to eliminate the usage of cellulose in the electrode coating so as to save some trees and hence make the welding process partially green. The high heat content of the cellulose supported arc is achieved by controlled supply of auxiliary plasma gas through the tubular wire directed into the arc. This paper discusses the influence of the welding process parameters to the weld bead characteristics of weldments made by PESMAW process using mild steel as base metal. Two level fractional factorial design was adopted to investigate and quantify the direct and interactive effects of four major control parameters. "Bead on plate" technique was used to lay weldments and bead geometry was measured using standard metallurgical procedures. Statistical models were made from the obtained results and were analyzed and tested by using analysis of variance technique and students't' test. The estimated and obtained values were compared. The main and interactive effects of control parameters were studied and presented in graphical form.**

***Keywords*—Weld bead geometry, Design of Experiments, Fractional Factorial Design**



PAPER ID : GT 401

DIAGNOSIS OF OLTC USING DGA AND STATIC WINDING RESISTANCE TEST

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***Abstract*—On Load Tap Changer (OLTC) failure occurs is due to the insulation degradation and contacts failure inside it. Other than that, contacts wear influences the OLTC performances. The worn contacts will cause hotspots in the OLTC tank and cause the insulating oil to degrade faster. As a result, this will lead to the damage of complete transformer unit. Thus, the research work that has been carried out applied the Dissolved Gas Analysis (DGA) via latest Duval Triangle method during the diagnosis of OLTC rated at 33/11kV, 30MVA at the first stage to provide early indication of OLTC's breakdown. The Static Winding Resistance Test is then applied at the second stage to figure out any increase of contact resistances for all phases. In addition, it is expected to have a relationship between both results. The results showed that it was proven that by performing DGA via latest Duval Triangle method, the early indication of OLTC's breakdown can be obtained. Besides, this paper revealed that the Static Winding Resistance Test was capable to provide any sign of bad contacts in fixed condition as well as looses connections.**

***Keywords*—Contact resistance, Dissolved Gas Analysis (DGA), Duval Triangle Method, OLTC testing, Static Winding Resistance Test.**

PAPER ID : GT 402

MECHANICAL CONDITION ASSESSMENT OF TNB IN-SERVICE DISTRIBUTION TRANSFORMERS USING SWEEP FREQUENCY RESPONSE ANALYSIS (SFRA)

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***Abstract*—Distribution transformers in TNB (Tenaga Nasional Berhad) are exposed to the thermal and electrical stresses. Those stresses are effecting to the main mechanical active parts in transformer such as core and winding. In field, lightning strikes and cable faults may cause problem due to transformer core and winding. Sweep Frequency Response Analysis (SFRA) is an off-line diagnostic tool used for finding out any possible winding displacement or mechanical deterioration inside the transformer especially core and winding. SFRA diagnosis is made based on the comparison between two SFRA responses and any significant difference in low, middle and high frequency sub-bands region would potentially indicate mechanical or electrical problem to the winding and core of transformer. The aim of this paper is to assess the condition of TNB in-service distribution transformers by using SFRA method.**

***Keywords*—Winding Deformations, Dissolved Gas Analysis, Power Transformer, Sweep Frequency Response Analysis (SFRA)**

PAPER ID : GT 403

ANALYSIS OF KRAFT PAPER INSULATION'S LIFE FOR 15MVA POWER DISTRIBUTION TRANSFORMER IN TENAGA NASIONAL BERHAD

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***Abstract*—Among the most expensive and major equipment in any transmission and distribution electrical network is a transformer. Examples of electrical insulations for transformer are mineral oil and cellulose based paper. The said insulations degraded as transformers performed their work, while the most critical component of the transformer insulation system is the paper insulation. It is not easily replaced as compared to oil where it is easily reconditioned in-order to remove water and contaminants. Experimental and simulation studies on paper insulation showed that temperature, oxygen and moisture contents contributed to its degradation. Moisture and Furan were produced from these deterioration processes. In this study level of 2-Furaldehyde (2FAL) were obtained from Tenaga Nasional Berhad (TNB) in-service distribution power transformer. Categorizations were then carried out on these data for end-of-life analysis. This study shows that the end-of-life in years derived from probability density function (Pdf)) can be used to estimate the life of paper insulation.**

***Keywords*—Kraft Paper, Paper Insulation's Life, Power Transformer, Probability Density Function (Pdf), 2-Furaldehyde (2FAL)**

PAPER ID : GT 501

NANOFLUID AS COOLANT IN AUTOMOTIVE COOLING SYSTEM-HEAT TRANSFER CHARACTERISTICS OF CAR RADIATOR USING CU-BASED NANOFLUID)

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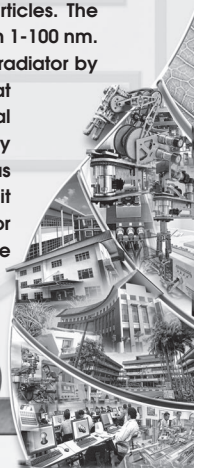
***Abstract*—Nanofluid is a potential fluid with enhanced thermal physical properties as compared to conventional fluid. The conventional fluids such as water and ethylene glycol acted as coolants in automotive cooling system could show superior properties through dispersion of nanoparticles. The nanoparticles are either metal, non-metal or carbon nanotube (CNT) is in nano-size between 1-100 nm. This study focused on heat transfer characteristics of Cu/water nanofluid in an automotive radiator by analyzing the thermal physical properties of the coolant; thermal conductivity (k) and heat transfer coefficient (h). The mixture of solid nanoparticles and coolant showed that the thermal properties of the coolant were increasing with copper (Cu) nanoparticle volume fraction. By adding 10 % of nanoparticle suspension, the heat transfer coefficient of the nanofluid was increased up to 26000 W.m-2K-1 with 92 % of percentage enhancement. Consequently, it also enhanced the heat transfer rate in the cooling system. The results showed good indicator for automotive industry to design an eco-car that sustain the energy and minimizing the environmental impact**

***Keywords*—Nanofluid; Heat transfer; Automotive radiator; Thermal conductivity.**



PAPER ID : GT 502

PROPOSAL FOR HYBRID PASSIVE COOLING SYSTEM OF BATTERIES IN ELECTRIC VEHICLE

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***Abstract*—This paper addresses the challenges faced by Electric Vehicle (EV) thermal management system and proposed a method to overcome them. Due to the non existence of internal combustion engine (ICE) in EV, the driving mechanisms of conventional cooling system need to be revamped. Therefore, in this paper a combination of liquid cooled, air cooled and phase change material (PCM) cooling system was introduced. The main heat dissipation from EV was identified coming from electric motor, battery module and the electronics controller and components. As this is a preliminary study, the reliability and sustainability of the system need to be further investigated. The investigation would include the, simulation and modeling of heat dissipated from the EV and also the cooling capacity of the proposed cooling system.**

***Keywords*—EV Thermal Managemet. , Passive Cooling, Phase Change Material, EV cooling system.**

PAPER ID : GT 503

THERMAL ANALYSIS OF A OF BRAKE DISC ROTOR FOR PERSONAL ELECTRIC VEHICLE

Muhammad Zahir Bin Hassan[1,a*], Fudhail Abdul Munir[2,b] , Mohd Rody Mohd Zin[3,c] and Mohd Irwan Mohd Azmi[4,d]
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***Abstract*—In this paper, thermal analysis of a brake disc rotor design for a personal electric vehicle(PEV) is demonstrated. The finite element method was used to obtain the temperature behavior during braking and non-braking conditions. Steady state response in temperature distributions was conducted for this research paper. The analysis is limited to heating and cooling condition of the designed brake disc rotor.**

Keywords—Personal Electric Vehicle; Thermal Analysis Of Brake Disc; Finite Element Method.

PAPER ID : GT 504

PERFORMANCE ENHANCEMENT OF SINGLE CYLINDER SPARK IGNITION ENGINE FUELED BY LPG

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***Abstract*—This paper analyze the characteristics of single piston SI ICE operated with ULP and LPG has been compared. LPG Fuel system used for this research totally new developed system namely as LPG Capsule Valve. In particular, torque and engine speed were examined using universal dynamometer in WOT condition. In additional the exhaust gas temperature and fuel consumption has been measure to identify which fuel can contribute damage on engine component and which fuel is more practical for SI ICE. SI engine fueled by LPG has slightly decreased on power output up to 9.8% compared to ULP. However, engine fueled by LPG reduce on specific fuel consumption for 32.55%. This research is to the method to improve the performance and to promote further study and to encourage world to use LPG fuel for engine especially in Malaysia**

***Keywords*—Performance; Enhancement; LPG; SI.**

PAPER ID : GT 505

2D TURBULANCE SIMULATION MODELS ON FORWARD–BACKWARD FACING STEP

N.H. Zakaria,[a*], M.Z.M. Rody,[b] and F.A. Munir[3,c]
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***Abstract*—In this paper, turbulent flow over forwad-backward facing step, of height h = 50 mm and l = 10h long is studied. Simulations were carried out at Reynolds number Reh = 1.7 x 105 and constant external flow velocity by using three different type of turbulent model and compare with Large Eddy Simulation (LES) model. K-epsilon, K-omega and Spalart-allmaras model were used. The axial and normal velocity ratio at certain distance ratio at different height is compared with each other. The results obtained from the simulation for three model shows a good agreement with the Large Eddy Simulation (LES) model.**

***Keywords*—Large Eddy Simulation;Reynold Numbers;2 Dimensional**

The 3rd International Conference on Engineering and ICT (ICEI) 2012

Cluster 4

HUMAN INTERACTION TECHNOLOGY

PAPER ID : HT 101

CMARGA: PRUNING DECISION TREE USING GENETIC ALGORITHM IN CLASSIFICATION BASED ON MULTIPLE ASSOCIATION RULES

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***Abstract*—Associative classification is known by its accuracy and strong flexibility at handling unstructured data. However, it is still influenced by low quality dataset which consists of noise and irregular data. In this paper, we propose a new pruning technique to prune Apriori-TFP decision tree using genetic algorithm in classification based on multiple association rules (CMARGA). In order to find the most optimum decision tree, decision tree is translated into fixed binary string that allowed going through evolution process. By using 5% of random mutation and 80% of Roulette crossover as common GA operators, we evolved each population. Finally the algorithm returns the chromosome with the best fitness value to the associative classification and the allele of the best chromosome will be used to prune the decision tree to produce a set of best rules. Our experiments on databases from UCI machine learning database repository show that CMARGA is consistent, highly effective at classification of various categories of databases and has better average classification accuracy in comparison with CBA and CMAR.**

***Keywords*—Pruning; Decision Tree; Associative Classification; Genetic Algorithm**

PAPER ID : HT 103

HALAL COMPUTER SYSTEMS VALIDATION – QUALITY ASSURANCE, RISK ASSESSMENT AND REGULATORY COMPLIANCE FOR THE PHARMACEUTICAL AND HEALTHCARE INDUSTRY

Raja Rina Raja Ikram [1,a*], Mohd Khanapi Abd Ghani [2,b], Abd Samad Hasan Basari [3,c]
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***Abstract*—This research aims to develop a framework to address halal regulatory industry requirements for computer validation in the pharmaceutical and healthcare industry. Computer validation is a regulatory pharmaceutical industry requirement to produce documented evidence that all computerized systems are qualified and validated to demonstrate their ability for intended use. With regard to that, the research examines the processes involved to comply with the Halal Pharmaceuticals Guidelines from a technology point of view by identifying processes involved in the pharmaceutical supply chain and common computerized systems used to support it. A risk analysis of controls and validation required from the technology perspective is proposed for the critical points.**

***Keywords*—Halal Pharmaceuticals; Computer Validation.**

PAPER ID : HT 105

KNOWLEDGE MANAGEMENT: TOOLS AND TECHNOLOGIES

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***Abstract*—Carrying out knowledge management effectively requires support from a repertoire of methods, techniques and tools. This paper presents a framework for characterizing the various tools and technologies available to knowledge management practitioners. It provides an overview of a number of key terms and concepts, describes the framework, provides examples of how to use it, and explores a variety of potential application areas. The stress of knowledge management tools and technologies has been manoeuvred to share knowledge through communication and collaboration tools which specify the shift from process to practice.**

***Keywords*—Knowledge management; Tools and technologies; Web-based tools; Decision support system; Case-based reasoning systems.**

PAPER ID : HT 201

BEHAVIORAL ANALYSIS FOR SCANNING INTERNET WORMS

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***Abstract*—In this paper, we introduce the analysis of the request and reply message for infector machine, when the worm attacks the different victims. Moreover, the paper studied three main protocols, TCP, UDP, and ICMP that used by different scanning worms. We focused on a request from infector the machine and a reply message from the victim. We found new failure messages that depend on the type of protocol that uses it for scanning worm. In the future work, we design algorithm that able to reduce the false alarm, and be faster detection than the current techniques, via using the new failure message.**

***Keywords*—Internet Worm Detection, Worm Behavioral.**

PAPER ID : HT 202

CLASSIFICATION OF TRADITIONAL PAKISTANI MUSICAL INSTRUMENTS USING A NOVEL SOFT SET THEORY BASED ALGORITHM

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***Abstract*—Automatic musical instrument classification system comprises of feature extraction and machine learning techniques. Most of the studies conducted to find differences and similarities with features schemes evaluate and compare with various classifiers and as a result, a robust classification system built. However, studies mainly focus on western musical instruments. Therefore, in handling an effective classification system for Traditional Pakistani musical instrument sounds, proper data treatment, effective feature scheme are crucial phases for tackling this study. The proposed classification algorithm is based on the notions of soft set theory. Motivation for using soft set theory is the choice of convenient parameterization strategies for instance real numbers, function or mappings and makes it applicable to decision making applications. Thus, the study investigates some adaptively parameters such as audio length, frame size and starting point which have influential impact on overall performance of classification results. For feature extraction, 37 features have been extracted. Meanwhile, soft set theory based algorithm is deployed to generated datasets. Initial experimental results shows that 94.26 % was obtained from the generated datasets. It is also revealed that identified parameters had significant role to the performance of classification accuracy.**

***Keywords*—Audio Representation, automatic instrument classification system, Feature Extraction, Traditional Pakistani musical instrument.**

PAPER ID : HT 204

OPTIMAL MEAN VALUE ESTIMATION VIA MARKOVIAN APPROACH

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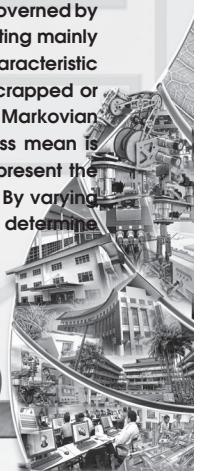
***Abstract*—The determination of process mean is important in industries especially items that governed by laws and regulations on net content labeling. Thus, the economic selection of process targeting mainly the optimum process mean is critically significant since it will directly affected the quality characteristic of the item. Depending on the value of quality characteristic, an item can be reworked, scrapped or accepted by the system which is successfully transform to the finishing product by using the Markovian model. By assuming the quality characteristic is normally distributed, the optimum process mean is obtained via probability of the item being rework, scrap and accepted.In this paper, we present the preliminary analysis of selecting the process mean by referring to SME production process. By varying the rework and scrap cost, the analysis shows the sensitivity of the Markov approach to determine process mean which maximizes the expected profit per item.**

***Keywords*—Markovian approach; optimal mean;**



PAPER ID : HT 301

A STUDY OF THE NON-AUDITORY EFFECTS OF NOISE ON WORKERS IN A SHEET METAL MANUFACTURING INDUSTRY

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***Abstract*— Several studies pertaining to non-auditory effects of noise on workers have shown that it was hampered their job performance. Some studies indicated significant reduction in the tasks being executed whilst others showed a marked drop in them and affected the quality of life. This paper will attempt to study the non-auditory effects of noise experienced by the workers concerned in the sheet metal workplace. The questionnaire was used in gathering information among 40 male workers from various departments. The questionnaire was distributed to the selected workers in order to measure the psychological effects of noise. The results of the study are presented to improve the occupational safety and health and ultimately elevate productivity in the process.**

***Keywords*—Non-auditory effects; Job performance; Psychological effects; Occupational safety and health; Productivity.**

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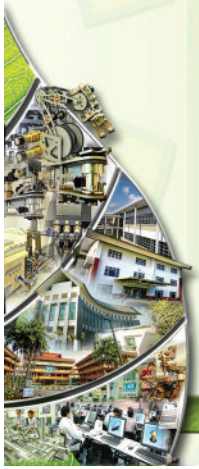

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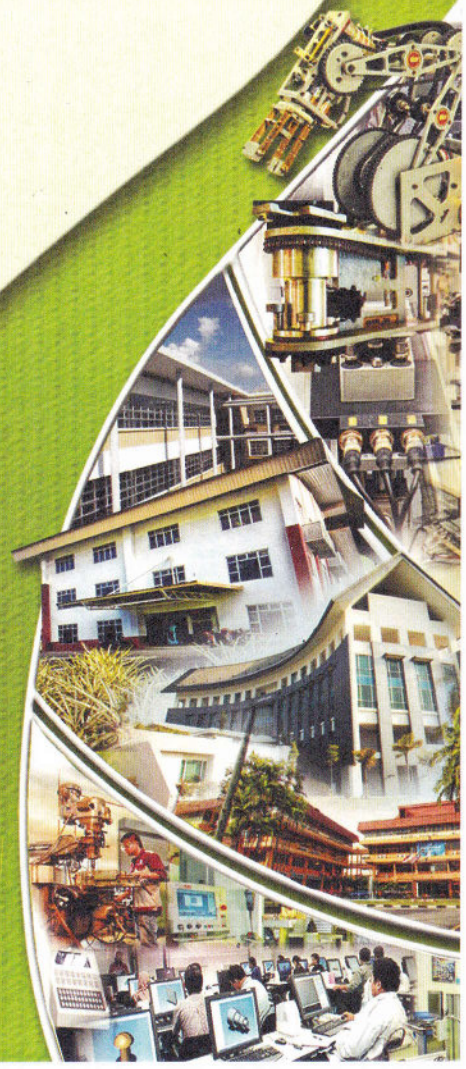

3rd International Conference on Engineering and ICT (ICEI2012)
Melaka, Malaysia
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EXPERIMENTAL AND NUMERICAL SIMULATION ON BIOGAS FLAME PROPAGATION CHARACTERISTIC IN SPARK IGNITION PREMIXED COMBUSTION

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Abstract*—Biogas is a sustainable and renewable fuel that is produced in digestion facilities. Biogas can be utilized to replace energy derived from fossil fuels, and hence reduce emissions of greenhouse gasses. Based on the chemical composition analysis, the composition of biogas produced in East Java, Indonesia consists of 66.4% methane, 30.6% carbon dioxide and 3% nitrogen. Demands for improved engine design and replacing fossil fuels, in terms of power output, efficiency and emissions control, require improved fundamental understanding of the combustion processes that occur within the cylinder. The most importance characteristic is the burning velocity, which directly affects pressure development and often is expressed in terms of laminar burning velocity. The laminar burning velocity is the most important flame propagation characteristic in spark ignition premixed combustion. The experimental laminar burning velocity of biogas premixed combustion was measured in a high pressure fan-stirred bomb. Analysis based on careful photographic observation has been used to determine precisely defined (unstrectched) laminar burning velocities. The numerical simulation has been done using the Premix module of CHEMKIN. The reaction mechanism used is GRI Mech 3.0 consisting of 325 elementary chemical reactions and associated rate coefficient expressions and thermochemical parameters for the 53 species involved in them. Based on the experimental investigation and the numerical simulation, the unstrecthed laminar burning velocity as the important characteristic of flame propagation in biogas premixed combustion has been found for initial conditions of a stoichiometric at room temperature and atmospheric pressure. Finally, The laminar burning velocity of biogas is better than pure methane in lean and rich mixtures at room temperature and atmospheric pressure initial conditions. Biogas has a good premixed combustion flame propagation characteristic and could be an alternative to replace the fossil fuels.

***Keywords*—Sustainable energy; Flame propagation; Biogas; Premixed combustion; Laminar burning velocity.**

I. INTRODUCTION

Sustainable development is an integral concept for achieving quality of life, interdependence, fundamentals and equity. Sustainable product development is defined as resource, context and future oriented product development, aimed at the fulfilment of elementary needs, better quality of life, equity and enviromental harmony [15]. Based on the principal of sustainable product development, biogas is a sustainable product.

Biogas is a sustainable, renewable and green energy (product) that produced in digestion facilities. The consumption of fossil fuels in internal combustion engines and the associated environmental impacts are now the worldwide concerns. These concerns have stimulated researchers into more environmentally friendly alternative fuels that can replace the use of fossil fuels. Biogas as "Powergas" is one of these alternative fuels. The target of using biogas are: diversification of energy supply, reduction of CO_2 (carbon dioxide) emissions and contribute to rural development.

Biogas can be utilized to replace energy derived from fossil fuels, and hence reduce emissions of greenhouse gasses. Biogas does not contribute to increasing atmospheric carbon dioxide concentrations because the gas is not released directly into the atmosphere and the carbon dioxide comes from an organic source with a short carbon cycle.

Demands for improved engine design and replacing the fossil fuel, in terms of power output, efficiency and emissions control, require improved fundamental understanding of the combustion processes that occur within the cylinder. The primary importance characteristic is the burning velocity, which directly affects pressure development and often is expressed in terms of laminar burning velocity. The laminar burning velocity is the most important flame propagation characteristic in spark ignition premixed combustion.

Simulation is the solution to solve the limitation of the complexity real experiment in the laboratory. The simulation can be visualize the preformance of the mechanical design in the real experiment during engineering design [1]. The simulation also can be visualize the preformance of the Combustion Process in the real experiment [13].

The unstretched laminar burning velocities of a freely propagating, one-dimensional, adiabatic premixed flame with the Sandia PREMIX code was computed for methane-air mixtures. This used a hybrid time-integration/ Newton-iteration technique to solve the steady state comprehensive mass, species, and energy conservation equations. Computations covered methane–air mixtures, Equivalence ratio (φ)= 0.6 to 1.2, at initial temperatures and pressures between 300 and 400 K and 0.1 and 1.0 MPa. Sufficient grid points were allowed (usually 500) to ensure a converged solution [4].

The numerical simulation for methane-air mixtures at 298K initial temperature and atmospheric pressure (1 atmospher) initial condition for various equivalence ratio has been reported using CHEMKIN code based on a compilation of 325 elementary chemical reactions and associated rate coefficient expressions and thermochemical parameters for the 53 species involved in them [17].

There are a good (almost similar) result between all the report and the numerical simulation of flame speed in various equivalent ratio methane-air mixtures at initial conditions of a stoichiometric at room temperature and atmospheric pressure using CHEMKIN code based on a compilation of 325 elementary chemical reactions and associated rate coefficient expressions and thermochemical parameters for the 53 species involved in them[17].

II. EXPERIMENTAL AND SIMULATION METHOD

The experimental laminar burning velocity of biogas premixed combustion was measured in the Mk 2 high pressure fan-stirred bomb at the University of Leeds, England as shown in Fig. 1. The bomb is a spherical stainless steel vessel 380 mm diameter. The stainless steel bomb had three pairs of orthogonal windows of 150 mm diameter and was equipped with four fans driven by electric motors [3].

Based on the chemical composition analysis, the composition of biogas produced in East Java, Indonesia consists of 66.4% methane, 30.6% carbon dioxide and 3% nitrogen. Methane is a flammable gas, nitrogen is inert gases and carbon dioxide is an inhibitor gas [6,11].

Table 1. Composition of Biogas Produced in East Java

Matter	%
Methane	66.4
Carbon dioxide	30.6
Nitrogen	3.0

The experiments were conducted using Mk2 combustion bomb. The fuel-air mixtures have been centrally ignited and flame progress recorded by high speed schlieren cine-photography. The unstrecthed laminar burning velocity as the important characteristic of flame propagation in biogas premixed combustion have been found at stoichiometric, room temperature and atmospheric pressure initial conditions. The propagating flames were recorded by schlieren cine´photography using a Photosonics Phantom digital camera, which ran at a framing rate of 2500 frames/s with a resolution of 768 x 768 in all the experiments as shown in Fig. 2. The flame radius was calculated as that of a circle encompassing the same area as that enclosed by the schlieren imaged flame. The laminar burning velocity is derived from schlieren photographs. Analysis based on careful photographic observation has been used to determine precisely defined (unstrectched) laminar burning velocities. The biogas and air mixtures have been centrally ignited and flame progress recorded by high speed schlieren cine-photography. The images of the spherical flame propagating within the combustion vessel 150 mm windows and there are no significant rise in pressure occurred during the image recoding period [12].

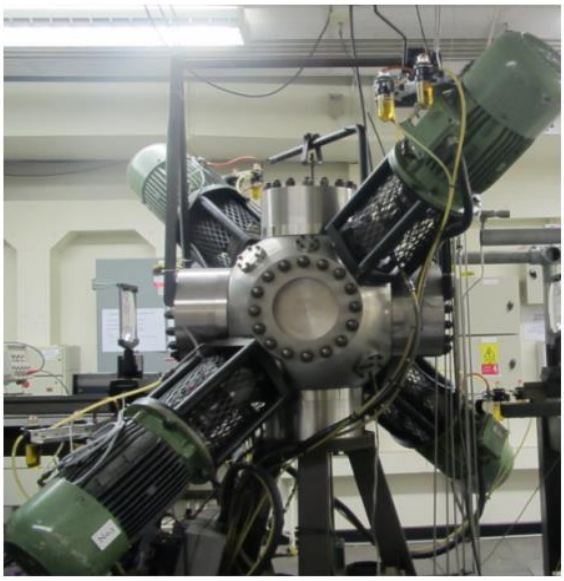

Figure 1. Mk2 Combustion Bomb

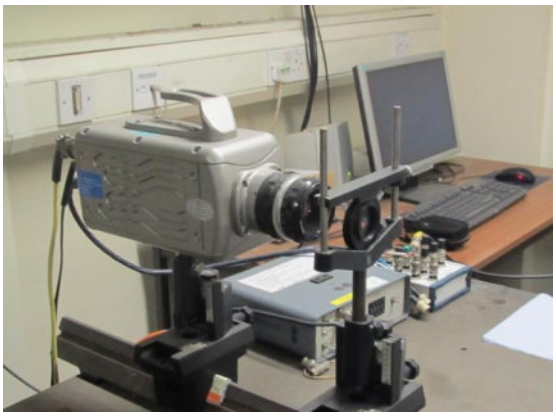

Figure 2. Flame Speed Against Equivalent Ratio Methane-Air Mixtures

The laminar burning velocity for a spherically expanding flame can be deduced from Schlieren, the stretched flame velocity (Sn) can be derived from the flame radius versus time data as: Sn = dru/dt, where ru is the flame radius in Schlieren photographs and t is the elapsed time from spark ignition. The flame stretch rate α is defined as $\alpha = d(\ln A)/dt = (dA)/(A\,dt)$, where A is the area of the flame. In the case of spherically propagating premixed flame, the flame stretch rate can be calculated by $\alpha = (2/ru)(dru/dt)$ [2, 4, 9,10,12,13].

The linear relationship between flame speed and the total stretch exist, and this quantified by a burned gas Markstein length, L_b, and is defined at the radius, r_u, such that: $S_n – S_s = L_b\ \alpha$, where S_s is the unstretched flame speed, and is obtained as intercept value of S_n at $\alpha = 0$, in the plot of S_n against α. The gradient of the best straight line fit to the experimental data gives L_b. The unstretched laminar burning velocity, u_l, is deduced from S_s using $u_l =$

S_s (ρ_b/ρ_u), where ρ_b is burned density of gas mixtures and ρ_u is unburned density of gas mixtures) [2, 4].

The numerical simulation use the Premix module of CHEMKIN. The Premix module of CHEMKIN based on a compilation of 325 elementary chemical reactions and associated rate coefficient expressions and thermochemical parameters for the 53 species involved in them.

III. RESULT AND DISCUSSION

The experiments were conducted using Mk2 combustion bomb. The stoichiometric biogas-air mixtures at initial room temperature and atmospheric pressure have been centrally ignited and flame propagation was recorded by high speed schlieren cine-photography.. The images result of the spherical flame propagating within the combustion vessel 150 mm windows are shown in Fig. 3.

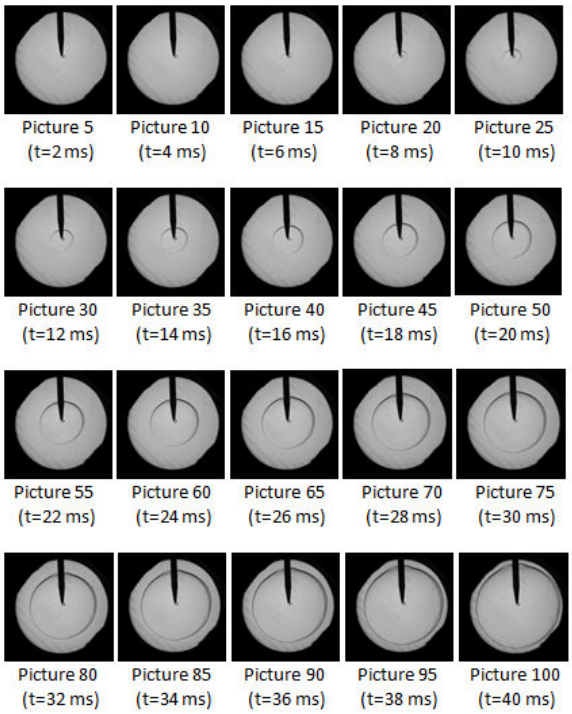

Figure 3. Flame Propagation Stoichiometric Biogas-Air Mixtures

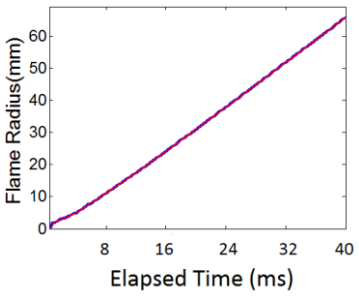

Figure 4. Flame Radius vs Elapsed Time of Flame Propagation Stoichiometric Biogas-Air Mixtures

The radius of spherical flame propagation in Fig. 3 are presented in Fig. 4 as a function of elapsed time. The stretched flame velocity (Sn) can be derived from the flame radius at Fig. 4 as: Sn =dru/dt, where ru is the flame radius in Schlieren photographs and t is the elapsed time from spark ignition. The flame stretch rate α is defined as $\alpha = d(\ln A) / dt = (dA) / (A\, dt)$, where A is the area of the flame. In the case of spherically propagating premixed flame, the flame stretch rate can be calculated by $\alpha = (2/ru)(dru/dt)$. A linear relationship between flame speed and the total stretch exist, and this quantified by a burned gas Markstein length, L_b, and is defined at the radius, r_u, such that: $S_n - S_s = L_b\, \alpha$, where S_s is the unstretched flame speed, and is obtained as intercept value of S_n at $\alpha = 0$, in the plot of S_n against α. The gradient of the best straight line fit to the experimental data gives L_b. The unstretched laminar burning velocity, u_l, is deduced from S_s using $u_l = S_s (\rho_b / \rho_u)$, where ρ_b is burned density of gas mixtures and ρ_u is unburned density of gas mixtures. Based on the experimental result, the laminar burning velocity of biogas premixed combustion has been found for initial conditions of a stoichiometric at room temperature and atmospheric pressure is 0.2638 m/s.

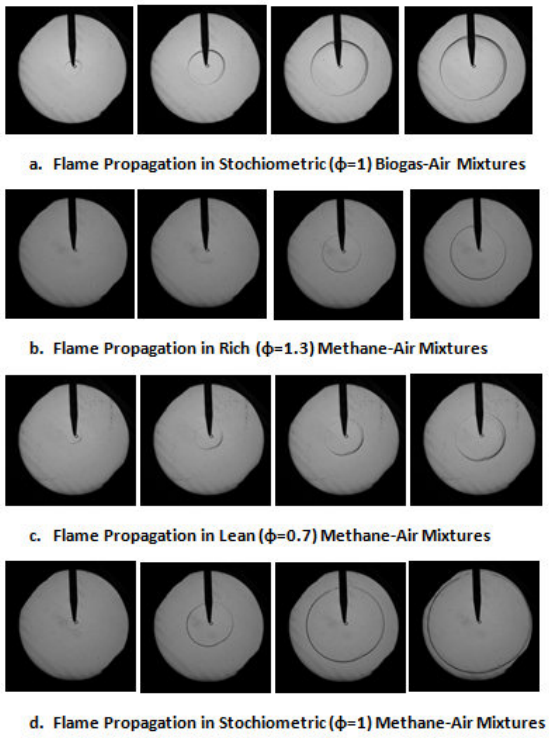

Figure 5. The Real Experimental Result Comparison for Four Fuel-Air Mixtures

The flame propagation at the same time comparison flame propagation of four fuel-air mixtures is shown in Fig. 5. The fuel-air mixtures are stoichiometric (equivalence ratio (φ)=1) biogas-air mixtures, rich (φ=1.3) methane-air mixtures, lean (φ=0.7) methane-air mixtures, stoichiometric (φ=1) methane-air mixtures. The flame propagation measured at room temperature and atmospheric pressure initial conditions. The flame propagation of stoichiometric biogas-air mixtures is faster than flame propagation of rich and lean methane-air mixtures. The flame propagation of stoichiometric biogas-air mixtures is lower than flame propagation of stoichiometric methane-air mixtures (Fig. 5).

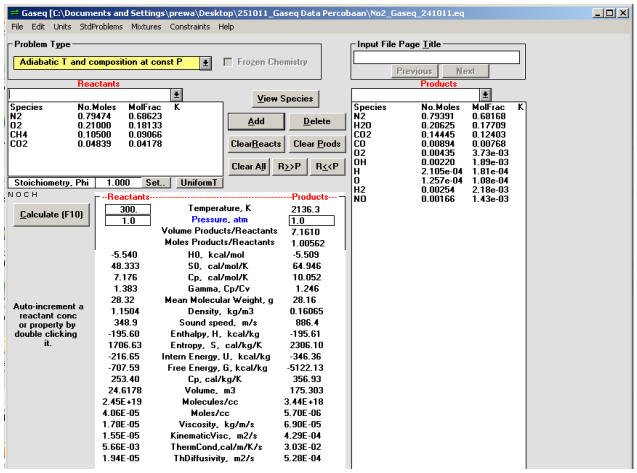

Figure 6. Properties of Stoichiometric Biogas-Air Mixtures

The properties of stoichoimetric (equivalence ratio (φ)=1) biogas-air mixtures at room temperature and atmospheric pressure initial condition is shown in Fig 6. Based on the Gaseq software, the properties are unburned density, burned density, unburned kinetic viscosity and burned kinetic viscosity are 1.1504 kgm^{-3}, 0.16065 kgm^{-3}, 1.55E-05 m^{2}s^{-1}, and 4.29E-04 m^{2}s^{-1}.

Table 2. Experimental and Numerical Simulation Results of Stoichiometric Biogas-Air Mixtures at room temperature and atmospheric pressure initial conditions

	Experimental Results	Numerical Simulation Results
Flame speed (m/s)	1.89	1.97
Laminar burning velocity (m/s)	0.2638	0.2746

The laminar burning velocity as the important characteristic of flame propagation in the fuel-air mixtures premixed combustion have been found as Table 2. Both experimental and numerical simulation give the same agreement (have similar values). The numerical simulation laminar burning velocity error is 4.09% respected to the experimental result.

Table 3. Stoichiometric Biogas-Air, Rich Methane-Air, Lean Methane-Air, and Stochoiometric Methane-Air Mixtures Comparison Results

	Stoichiometric (ϕ=1.0) Biogas-Air Mixtures	Rich (ϕ=1.3) Methane-Air Mixtures	Lean (ϕ=0.7) Methane-Air Mixtures	Stoichiometric (ϕ=1.0) Methane-Air Mixtures
Unburned density (kg/m^3)	1.1504	1.10950	1.13640	1.1226
Burned density (kg/m^3)	0.16065	0.15323	0.18542	0.15017
Unburned kinematic viscosity (m^2/s)	1.55E-05	1.61E-05	1.60E-05	1.60E-05
Burned kinematic viscosity (m^2/s)	4.29E-04	4.36E-04	3.38E-04	4.72E-04
Flame speed (m/s)	1.89	1.46	1.08	2.64
Laminar burning velocity (m/s)	0.2638	0.2015	0.1762	0.3527

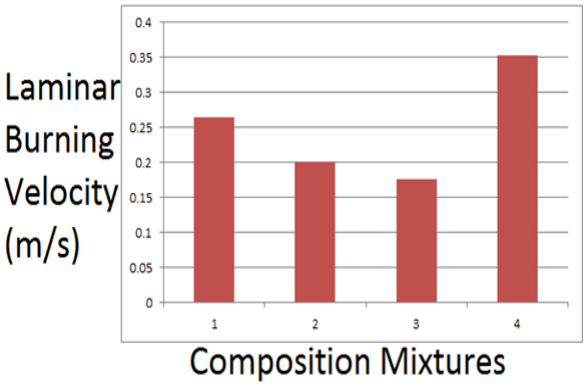

Figure 6. Laminar Burning Velocity Comparison Results of Stoichiometric Biogas-Air, Rich Methane-Air, Lean Methane-Air, and Stochoiometric Methane-Air Mixtures

Table 3 and Fig. 6 show the premixed combustion flame propagation characteristic of stoichiometric biogas-air mixtures, stoichiometric methane-air mixtures, lean (φ=0.7) methane-air mixtures and rich (φ=1.3) methane-air mixtures. The laminar burning velocity of stoichiometric biogas is higher than methane-air mixtures at lean (φ=0.7) and rich (φ=1.3) at room temperature and atmospheric pressure initial condition. The laminar burning velocity of stoichiometric biogas is lower than stoichiometric methane-air mixtures at room temperature and atmospheric pressure initial condition because of the chemical composition of biogas. Biogas consists of 66.4% methane, 30.6% carbon dioxide and 3% nitrogen. Methane is a flammable gas. Carbon dioxide and nitrogen are impurities as inhibitor gases.

IV. CONCLUSIONS

Numerical simulation can be visualize the preformance of the combustion process in the real experiment. The numerical simulation use the Premix module of CHEMKIN. The Premix module of CHEMKIN based on a compilation of 325 elementary chemical reactions and associated rate coefficient expressions and thermochemical parameters for the 53 species involved in them. There are a good agreement (have similar values) between experimental and numerical simulation results of laminar burning velocity of biogas-air mixtures. The numerical simulation laminar burning velocity error is 4.09% respected to the experimental result.

Based on the experimental investigation and the numerical simulation, the unstrecthed laminar burning velocity as the important characteristic of flame propagation in biogas premixed combustion has been found for initial conditions of a stoichiometric at room temperature and atmospheric pressure. Finally, The laminar burning velocity of biogas is higher than pure methane in lean (φ=0.7) and rich (φ=1.3) mixtures at room temperature and atmospheric pressure initial

conditions. Biogas has a good premixed combustion flame propagation characteristic and could be an alternative to replace the fossil fuels. Biogas is one of the solution for green technology for sustainable development of the combustion processes.

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