THE INTERNATIONAL CONFERENCE ON ENGINEERING AND TECHNOLOGY 2017 (INTCET 2017)

PROGRAMME & ABSTRACTS

23TH NOVEMBER 2017, PALM GARDEN HOTEL, PUTRAJAYA, MALAYSIA

WELCOME MESSAGE BY THE CHAIRMAN OF INTCET 2017

Dear participants,

It is indeed an honour and a great pleasure to welcome you to the International Conference on Engineering & Technology (INTCET 2017). On behalf of the organizers and the committee members, I would like to express our utmost appreciation to the distinguished speakers and presenters who are willing to share your knowledge and experience in this conference.

The INTCET 2017 is held with the intention to provide a platform for interactions among academicians, researchers and industries in the area of engineering, science and technology. It is hoped that INTCET 2017 capable to facilitate interactions among participants and serve as a platform to gather and disseminate the latest knowledge in engineering, science and technology and also open up doors of opportunity for further collaborations among universities, research institution and industry.

I would like to take this opportunity also to convey my heartfelt gratitude and appreciation to those who had so generously provided assistances and supports whether in the form of sponsorship, consultations, manpower or so forth. Your contributions have benefited this event towards its successful implementation.

Finally, we wish you the very best and pleasant experience while spending your time here in Putrajaya.

Kind regards and wassalam.

LT. COL. ASSOC. PROF. DR. KHAIROL AMALI AHMAD

SPEAKER PROFILE 1

PROF. DR. M. A. HANNAN

Prof. Dr. M. A. Hannan graduated from Chittagong of Engineering and Technology, Bangladesh in 1990 with Bachelor of Science in Electrical and Electronics Engineering. He served as engineer in Bangladesh Power Development Board then assistant director in Ministry of Energy and Mineral Resources of Bangladesh. He obtained his MSc and PhD from National University of Malaysia in 2003 and 2007. He served as Senior Lecture in National University of Malaysia in 2008, Associate Professor in 2010 and Full Professor in 2013 until 2016. He held numbers of professional bodies such as IEEE Professional development 2010, 2017, Institute of Engineers, Bangladesh: Professional Development and International Association of Engineer (IAENG): Professional development- 2009. His expertise is intelligent system development specially on power electronic, energy storage, microgrid, solid waste and vehicle safety applications, RE based inverter controllers and hybrid vehicle energy management systems. For current research projects, he involved in Modularised Charge Equalisation Controller Using Battery Monitoring IC for Lithium Ion Battery Strings in Electric Vehicle, Investigation of a Vision Based Robust Algorithm for Vehicle Predictive Safety Information Sharing Model, Advanced Autonomous Standalone Renewable Photovoltaic Thermal and Wind Energy Hybrid Systems with Nano Grids for Remote Areas - Case Study of the UKM Marine Research Centre (EKOMAR), Investigation of an Optimal Algorithm and Scheduling Controller for an Energy Storage System in Microgrid Applications and many more.

SPEAKER PROFILE 2

COL PROF IR DR NORAZMAN MOHAMAD NOR

He graduated from University of Texas, USA in 1986 with BSc in Civil Engineering & Mathematics. Then served in the Royal Engineer Regiment of the Malaysian Army. He obtained his MSc from University of Science Malaysia in 1995. He pursues his PhD at Cranfield University, UK in 1997 and was conferred with the doctorate in 2000. He served the Army Headquarters until 2002, and then joints the National Defence University of Malaysia (UPNM), formerly known as Military Academy Malaysia (ATMA), as a lecturer and researcher in the Engineering Faculty. Held various post including Head of Civil Engineering Department, Deputy Dean of Engineering, Dean of Graduate Studies and Assistant Vice Chancellor NIEEd. He is an editor to The Journal of Defence and Security (MIDAS). His current active researches include design of portable structural elements using advance materials, innovation in blast protective structure, and military operational research. He is currently a Professor in Engineering, holding the post of Deputy Vice Chancellor (Research and Innovation) in UPNM since 2015.

COMMITTEE MEMBERS

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Universiti Pertahanan Nasional Malaysia

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CONFERENCE SCHEDULE

23TH NOVEMBER 2017

0730 – 0830 REGISTRATION
0830 – 1000 OPENING CEREMONY

a. Welcoming Speech by Chairman INTCET 2017
b. Opening Ceremony by Gen. Tan Sri Dato' Seri Panglima Prof. Hj Zulkifli Hj Zainal Abidin
c. Keynote Speaker: Prof. Dr. M. A. Hannan, UNITEN
   "Battery Charge Equalization Controller for Electric Vehicle Applications"
d. Keynote Speaker: Col. Prof. Dr. Norazman Mohamad Nor, Deputy Vice Chancellor (Research & Innovation) UPNM
   "Engineering Innovation in the 4th I.R."

1000 – 1030 TEA BREAK
1030 – 1300 MORNING PARALLEL SESSION
1300 – 1430 LUNCH BREAK
1430 – 1700 AFTERNOON PARALLEL SESSION

PARALLEL SESSION I

VENUE: **PUTRA 2**

SEQ	PAPER ID	DOMAIN	TITLE	AUTHOR
1	INTCET2017-096	EE	Modellıng Of Buıldıng Integrated Renewable Energy System	Suresh Thanakodi*
2	INTCET2017-020	EE	Development Of A Low-Cost Biogas Filtration System To Achieve Higher-Power Efficient Ac Generator	Edison Mojica
3	INTCET2017-053	EE	Assessment Of Utility Side Financial Benefits Of Demand Side Management Considering Environmental Impacts	Saranga Abeygunawardane
4	INTCET2017-112	EE	Aortic Annulus Sizing Using Watershed Transform And Morphological Approach For Ct Images	Zaid Omar
5	INTCET2017-064	EE	Identification And Modelling Of Flight Characteristics For Self-Build Shock Flyer Type UAV	Zuhairi Abdul Rashid
6	INTCET2017-055	EE	A Probabilistic Maintenance Model For Diesel Engines	Saranga Abeygunawardane
7	INTCET2017-046	EE	An Investigation On Rapeseed Oil As Potential Insulating Liquid	Mohd Taufiq Ishak
8	INTCET2017-104	EE	Energy Harvestıng Usıng Teg And Pv Cell For Low Power Applıcatıon	Siti Nooraya Mohd Tawil
9	INTCET2017-047	EE	Comparison On Dielectric Properties Of Vegetable Oils And Mineral Oil With Different Ageing Time	Mohd Taufiq Ishak
LUNCH				
10	INTCET2017-103	EE	Reconfigurable Antenna Using Plasma Reflector	Mohd Taufik Jusoh**
11	INTCET2017-051	EE	Classification Of Functional Interactions From Multi-Electrodes Data Using Conditional Modularity Analysis	Siti Noormiza
12	INTCET2017-039	EE	Impact Of Foliage On Lora 433mhz Propagation In Tropical Environment	Khairol Amali Ahmad

13	INTCET2017-101	EE	Modelling Voltage Sag Mitigation Using Dynamic Voltage Restorer And Analyzing Power Quality Issue	Nor Laili Ismail
14	INTCET2017-099	EE	A Complete Hardware Base Trigonometric Function On Altera Modelsim	Muhazam Mustapha
15	INTCET2017-059	EE	Development Of Wireless Sensor Technologies For Haze Smart Greenhouse	Nor Azliana Akmal Jamaludin
16	INTCET2017-092	EE	Implementation Of Trigonometric Function Using Cordic Algorithms	Anis Shahida Niza Mokhtar
17	INTCET2017-091	EE	Calibration Of Ultra-High Frequency (Uhf) Partial Discharge Sensors Using Fdtd Method	Asnor Mazuan Ishak
18	INTCET2017-041	EE	Methodological Comparison On OLED And OLET Fabrication	Mukhzeer Mohamad Shahimin

* Session chair – morning.
** Session chair – afternoon.
EE – Electrical & Electronics.

PARALLEL SESSION II
VENUE: **PUTRA 3**

SEQ	PAPER ID	DOMAIN	TITLE	AUTHOR
1	INTCET2017-004	CE	Effect Of Rainfall Infiltration Into Unsaturated Soil Using Soil Column	Aniza Ibrahim
2	INTCET2017-003	CE	Self-Consolidating Concretes Containing Waste Pet Bottles As Sand Replacement	Faisal Sheikh khalid
3	INTCET2017-007	CE	Adsorption Potential Of A Modified Activated Carbon For The Removal Of Nitrogen Containing Compounds From Model Fuel	S M Anisuzzaman
4	INTCET2017-013	CE	Rice Husk Ash (RHA) As A Partial Cement Replacement In Modifying Peat Soil Properties	Nik Norsyahariati Nik Daud
5	INTCET2017-016	CE	Experimental Study On Compressive Strength Of Sediment Brick Masonry	Lee Woen Ean
6	INTCET2017-043	CE	The Effect Of Calcium Hydroxide, Alkali Dilution, And Calcium Concentration In Mitigating The Alkali Silica Reaction Using Palm Oil Fuel Ash	Hidayati Asrah
7	INTCET2017-028	CE	A Review On Bridge Dynamic Displacement Monitoring Using Global Positioning System And Accelerometer	Nuremira Ibrahim
8	INTCET2017-008	CE	Field Investigation On Structural Performance Of The Buried Upvc Pipes With And Without Geogrid Reinforcement	Gokula Krishnan Balaji
9	INTCET2017-017	CE	A Solid Waste Management Survey In Davao Del Sur	Mark Jude Trondillo
10	INTCET2017-031	CE	Mangrove Vulnerability Index Using Gis	Fatimah Shafinaz Ahmad
LUNCH				
11	INTCET2017-010	CE	Emergency Field Water Supply System Using Natural Disinfectant	Vikneswaran

12	INTCET2017-029	CE	Predicting Of Soil Erosion With Regarding To Rainfall Erosivity And Soil Erodibility	Zuliziana Saif
13	INTCET2017-014	CE	The Physical And Mechanical Properties Of Treated And Untreated Gigantochloa Scortechinii Bamboo	Norazman Mohamed Nor
14	INTCET2017-027	CE	Stability Performance And Interface Shear Strength Of Geocomposite Drain/Soil Systems	Maidiana Othman
15	INTCET2017-015	CE	Application Of Water Flowing Pvc Pipe And Eps Foam Bead As Insulation For Wall Panel	Norazman Mohamed Nor
16	INTCET2017-009	CE	New Conceptual Design Of Portable Bamboo Bridge For Emergency Purposes	Norazman Mohamed Nor
17	INTCET2017-011	CE	Implementation Of Safety Signage To Ease Transportation System In Disaster Prone Area	Vikneswaran
18	INTCET2017-002	CE	An Optimum Urban Road Junction Design	Othman Ahmad
19	INTCET2017-006	CE	Site Selection For Wastewater Treatment Plant In Rural Areas Using The Analytical Hierarchy Process And Geographic Information System	Mazyar Peyda
20	INTCET2017-032	CE	The Influences Of Attributes, Skills, And Knowledge Of Managers On Refurbishment Project Performance	Nurfadzillah Ishak

* Session chair – morning.

** Session chair – afternoon.

CE – Civil & Environmental.

PARALLEL SESSION III

VENUE: **PUTRA 4**

TIME	PAPER ID	DOMAIN	TITLE	AUTHOR
1	INTCET2017-019	MET	The Potential Of Hybrid Micro-Vortex Generators To Control Flow Separation Of A NACA 4415 Under Subsonic Flow	Mohd Rashdan Saad
2	INTCET2017-057	MET	Pavement Condition Assessment To Forecast Maintenance Program On Jkr State Roads In Petaling District	Hadyan Hafizh
3	INTCET2017-021	MET	Development, Characterization & Machining Of Al & Sicp Nano Particles Metal Matrix Nano Composite	Pradyutkumar Swain
4	INTCET2017-056	MSE	Effect Of Hexamethylenetetramine (Hmt) Concentration On The Performance Of Dye-Sensitized Solar Cell (Dssc) Utilizing Boron Doped Zno Nanotube Photoanode	Mohd Yusri Abd Rahman
5	INTCET2017-023	MSE	Development And Mechanical Characterisation Of Green Bamboo Composites	Aidy Ali
6	INTCET2017-024	MET	Investigation, Evaluation And Analysis Of Sicp Nano Particle Metal Matrix Nano Composite Using A Hybrid Process	Pradyutkumar Swain
7	INTCET2017-036	MSE	Flexural Behavior Of The Fibrous Cementitious Composites (Fcc) Containing Hybrid Fibres	Muhamad Fadli Samsudin
8	INTCET2017-113	MET	Solar Updraft Power Genetaor With Radial And Curved Vanes	Hadyan Hafizh
9	INTCET2017-035	MSE	Modification Of Bitumen Using Polyacrylic Wig Waste	Noor Adilah Mohd Solehan
10	INTCET2017-026	BCST	The Effect Of Sodium Hydroxide On Drag Reduction Using Banana Peel As A Drag Reduction Agent	Harvin Kaur
LUNCH				

11	INTCET2017-048	MSE	The Effects Of Different Heat Treatment Annealing On Structural Properties Of $Lafe_{11.5}Si_{1.5}$ Compounds	Muhamad Faiz Md Din
12	INTCET2017-030	MSE	Fine Granular Of Shredded Waste Tyre For Road Curb Application As Improvised Road Furniture	Mohd Azani Yahya
13	INTCET2017-111	MET	Hypervelocity Penetration Against Mechanical Properties Of Target Materials	Khairul Hasni
14	INTCET2017-109	MET	Feasibility Study On Paraffin-Based Fuels For Hybrid Rocket Motor Applications	Mohd Tarmizi Ahmad
15	INTCET2017-110	MET	Preliminary Development Of A Wing In Ground Effect Vehicle	Razali Abidin
16	INTCET2017-042	MSE	Characterization Of Magnetic Refrigeration System In Room Temperature	Muhamad Faiz Md Din
17	INTCET2017-052	BCST	Deproteinization Of Natural Rubber Latex By Urea As Single Denaturant: Effect Of Low Concentration	Aziana Abu Hassan
18	INTCET2017-025	MET	Quality Assurance Functions In A Diesel Generator Assembly Unit: A Practical Approach	Muhammad Yousaf Jamil
19	INTCET2017-012	MET	Development Of Plastic Fiber Optic As Colour Sensor	Fatin Nur Ashyqin

* Session chair – morning.
** Session chair – afternoon.
BCST – Biological Chemical Science & Technology.
MET – Mechanical Engineering & Technology.
MSE - Material Science & Technology.

LIST OF ABSTRACTS

DEPROTEINIZATION OF NATURAL RUBBER LATEX BY UREA AS SINGLE DENATURANT: EFFECT OF LOW CONCENTRATION

N. Abdullah, A. A. Hassan, S. N. Q. Manaf, N. A. Rahman
Malaysian Rubber Board

Abstract. Generally during proteins denaturation process of natural rubber (NR) latex with urea, an excessive amount of urea may be consumed as the process pragmatically conducted in higher concentration level. This study however assessed the potential of utilizing low concentration of urea in producing NR latex with lesser allergenic risk and potentially higher mechanical strength. The effect of various urea concentrations (0.01, 0.02, 0.03, 0.04, and 0.05%) on colloidal properties, proteins content and green strength of NR low protein latex were evaluated. It is assumed in this preliminary data that different urea concentration may leads to different proteins unfolded ensembles hence affecting the calculated N2 content in latex. Interestingly, the green strength of urea treated NR latex was higher than high ammonia NR latex (HANRL) suggesting effective polyisoprene inter-particle networking during film formation. The presence of proteins embedded within the rubber particle in HANRL may possibly hinder the effective inter-particle entanglement of hydrocarbon. On the whole, the properties of urea treated NR latex were markedly associated with the concentration of urea.

AN OPTIMUM URBAN ROAD JUNCTION DESIGN

O. Ahmad, I. Yusuf and M. A. Ladin
Universiti Malaysia Sabah

Abstract. As traffic congestion gets worse, tunnels had been proposed. Other solutions such as mass transportation systems are not always the best because they require sacrifices in the living style of the commuters. Traffic lights are not efficient in handling road junctions. Road junctions that do not use traffic lights will use flyovers or tunnels but are expensive and occupy a large area. In an urban environment where the average road speed is low, a low cost in expense and area design is proposed. The road junction design consists of only one level of tunnels for small vehicles and mixed with normal traffic lights for all other vehicles. An increase in handling road traffic is possible without disallowing larger vehicles. If larger vehicles are not present, the traffic lights can be removed completely, increasing the effective traffic flow.

THE EFFECT OF SODIUM HYDROXIDE ON DRAG REDUCTION USING BANANA PEEL AS A DRAG REDUCTION AGENT

H. Kaur and A. Jaafar
Universiti Teknologi PETRONAS and Asia Pacific University of Technology and Innovation

Abstract. Drag reduction is observed as reduced frictional pressure losses under turbulent flow conditions. Drag reduction agent, such as polymers, can be introduced to increase the flowrate of water flowing and reduce the water accumulation in the system. Currently used polymers are synthetic polymers which will harm our environment in excessive use of accumulation. A more environmentally-friendly drag reduction agent, such as the polymer derived from natural sources or biopolymer, is then required for such purpose. As opposed to the synthetic polymers, the potential of biopolymers as drag reduction agents, especially those derived from a local plant source, are not extensively explored. The drag reduction of a polymer produced from a local plant source within the turbulent regime was explored and assessed in this study using a rheometer where a reduced a torque produced was perceived as a reduction of drag. This method proposed is less time consuming and is more practical which is producing carboxymethylcellulose from the banana peel. The cellulose powder was converted to carboxymethylcellulose (CMC) by etherification process. The carboxymethylation reaction during the synthesizing process was then optimized against the reaction temperature, reaction time and solubility. The biopolymers were then rheologically characterized where the viscoelastic effects and the normal stresses produced by these biopolymers were utilized to further relate and explain the drag reduction phenomena. The research was structured to focus on producing the biopolymer and to assess the drag reduction ability of the biopolymer produced. The rheological behavior of the biopolymers was then analyzed based on the ability of reducing drag. The results are intended to expand the currently extremely limited experimental database. Based on the results, the biopolymer works as a good DRA.

STABILITY PERFORMANCE AND INTERFACE SHEAR STRENGTH OF GEOCOMPOSITE DRAIN/SOIL SYSTEMS

M. Othman, M. Frost and Neil Dixon
Universiti Pertahanan Nasional Malaysia and Loughborough University, United Kingdom

Abstract. Landfill covers are designed as impermeable caps on top of waste containment facilities after the completion of landfill operations. Geocomposite drain (GD) materials consist of a geonet or geospacer (as a drainage core) sandwiched between non-woven geotextiles that act as separators and filters. GD provides a drainage function as part of the cover system. The stability performance of landfill cover system is largely controlled by the interface shear strength mobilised between the elements of the cover. If a GD is used, the interface shear strength properties between the upper surface of the GD and the overlying soil may govern stability of the system. It is not uncommon for fine grained materials to be used as cover soils. In these cases, understanding soil softening issues at the soil interface with the non-woven geotextile is important. Such softening can be caused by capillary break behaviour and build-up of water pressures from the toe of the drain upwards into the cover soil. The interaction processes to allow water flow into a GD core through the soil-geotextile interface is very complex. This paper reports the main behaviour of in-situ interface shear strength of soil-GD using field measurements on the trial landfill cover at Bletchley, UK. The soil softening at the interface due to soaked behaviour show a reduction in interface shear strength and this aspect should be emphasized in design specifications and construction control. The results also help to increase confidence in the understanding of the implications for design of cover systems.

A REVIEW ON BRIDGE DYNAMIC DISPLACEMENT MONITORING USING GLOBAL POSITIONING SYSTEM AND ACCELEROMETER

M. Z. M. Yunus, N. Ibrahim and F. S. Ahmad
Universiti Teknologi Malaysia

Abstract. This paper reviews previous research on bridge dynamic displacement monitoring using Global Positioning System (GPS) and an accelerometer for Structural Health Monitoring (SHM) of bridge. These include the review of the advantages and disadvantages of the measurement as well as the methodology of the measurements used in the recent research study. This review could provide a preliminary decision overview for students or researchers before initiating a research related to the bridge dynamic displacement monitoring.

PREDICTING OF SOIL EROSION WITH REGARDING TO RAINFALL EROSIVITY ABD SOIL ERODIBILITY

Z. Suif
Universiti Pertahanan Nasional Malaysia

Abstract. The soil along the hill and slope are wearing away due to erosion and it can take place due to occurrence of weak and heavy rainfall. The aim of this study is to predict the soil erosion degree in Universiti Pertahanan Nasional Malaysia (UPNM) area focused on two major factor which is soil erodibility and rainfall erosivity. Soil erodibility is the possibilities of soil to detach and carried away during rainfall and runoff. The "ROM" scale was used in this study to determine the degree of soil erodibility, namely low, moderate, high, and very high. As for rainfall erosivity, the erosive power caused by rainfall that cause soil loss. A daily rainfall data collected from January to April was analyzed by using ROSE index classification to identify the potential risk of soil erosion. The result shows that the soil erodibilty are moderate at MTD`s hill, high at behind of block Lestari and Landslide MTD hill, and critical at behind the mess cadet. While, the highest rainfall erosivity was recorded in March and April. Overall, this study would benefit the organization greatly in saving cost in landslide protection as relevant authorities can take early measures repairing the most affected area of soil erosion.

SELF-CONSOLIDATING CONCRETES CONTAINING WASTE PET BOTTLES AS SAND REPLACEMENT

F. S. Khalid, N. B. Azmi, P. N. Mazenan, S. Shahidan, N. H. Othman and N. A. Guntor
Universiti Tun Hussein Onn Malaysia

Abstract. This study evaluates the effect of self-consolidating concrete (SCC) containing waste polyethylene terephthalate (PET) granules on the fresh, mechanical and water absorption properties. Fine aggregates were replaced from 0% to 8% by PET granules. The fresh properties of SCC containing PET granules were determined using slump flow and V-funnel flow time tests. The compressive and splitting tensile strength were evaluated. The results indicated that utilization of waste PET granules in production of SCC could be an effective way for recycling purpose. The maximum amount of PET replacement should be limited to 5%. Exceeding 5% of PET content may result in an increase of V-funnel flow time to overpass the limiting value, decrease in strength. The production of high performance SCC containing 5% PET granules satisfies all the requirements for SCC with satisfactory outputs.

RICE HUSK ASH (RHA) AS A PARTIAL CEMENT REPLACEMENT IN MODIFYING PEAT SOIL PROPERTIES

N. N. Nik Daud, M. N. Mohd Daud and A. S. Muhammed
Universiti Putra Malaysia

Abstract. This paper describes the effect of rice husk ash (RHA) and ordinary Portland cement (OPC) as a potential binder for modifying the properties of peat soil. The amounts RHA and OPC added to the peat soil sample, as percentage of the dry soil mass were in the range of 10-15% and 15%, respectively. Observations were made for the changes in the properties of the soil such as maximum dry density (MDD), optimum moisture content (OMC) and shear strength. Scanning Electron Micrograph-Energy Dispersive X-Ray (SEM-EDX) test were also conducted to observe the microstructure of treated and untreated peat soil. The results show that the modified soil of MDD and OMC values are increased due to the increment amount of binder material. Shear strength values of modified peat showing a good result by assuming that it is relative to the formation of major reaction products such as calcium silicate hydrate (C-S-H). The presence of C-S-H formation is indicated by the results produced from microstructural analysis of peat before and after modification process. This depicts the potential usage of RHA as a partial cement replacement in peat soil which is also improving its engineering properties.

SITE SELECTION FOR WASTEWATER TREATMENT PLANT IN RURAL AREAS USING THE ANALYTICAL HIERARCHY PROCESS AND GEOGRAPHIC INFORMATION SYSTEM

M. Peyda, Y. Khosravi and M. Mehrasebi
Zanjan University of Medical Sciences, Iran

Abstract. Clean water sources are declining due to increased consumption, which is related to growth of population, industrial usage, and agricultural activities. Another significant issue in addition to the need for clean water is treatment of wastewater. Determining a suitable site for a wastewater treatment plant (WWTP) has a significantly high impact on its successful operation. The aim of this study was to identify an optimal site for a WWTP in the rural complexes of the Zanjanrood catchment in Zanjan Province, Iran. Each complex contains two or more villages. In this study, a site priority map was generated using a geographic information system (GIS) and the analytical hierarchy process (AHP). Determining a location of WWTP requires different parameters and related constraints. The priority and values of these parameters are useful in generating a site priority map. After preparing the required map, the weight of each parameter was determined using AHP and overlaying of layers was performed with GIS. In the first stage, the site priority map for each sub-catchment was determined. Then, the optimal site for each complex was selected based on minimizing sewage transmission lines in lower elevation compared to villages. These findings indicated that using AHP followed by the optimization method can pinpoint the best sites for locating WWTPs in rural areas, while considering environmental protection.

MANGROVE VULNERABILITY INDEX USING GIS

M. Z. M. Yunus, F. S. Ahmad and N. Ibrahim
University Technology Malaysia

Abstract. Climate change, particularly its associated sea level rise, is major threat to mangrove coastal areas, and it is essential to develop ways to reduce vulnerability through strategic management planning. Environmental vulnerability can be understood as a function of exposure to impacts and the sensitivity and adaptive capacity of ecological systems towards environmental tensors. Mangrove vulnerability ranking using up to 14 parameters found in study area, which is in Pulau Kukup and Sg Pulai, where 1 is low vulnerability and 5 is very high vulnerability. Mangrove Vulnerability Index (MVI) is divided into 3 main categories Physical Mangrove Index (PMI), Biological Mangrove Index (BMI) and Hazard Mangrove Index (HMI).

NEW CONCEPTUAL DESIGN OF PORTABLE BAMBOO BRIDGE FOR EMERGENCY PURPOSES

A. A. Musthaffa, N. M. Nor, M. A. Yusof and M. Y. Yuhazri
Universiti Pertahanan Nasional Malaysia

Abstract. Portable bridges serve as routes for troops during the military operations and the disaster relief operation. Nowadays, bamboo has been regarded as one of the alternative construction materials for building and bridge structures. This paper presents the conceptual design of the portable bridge. Several types of portable bridges and bamboo bridges are reviewed in the current work. The characteristics, capability and method of construction of each bridge are discussed. Finally, the conceptual of the portable bamboo bridge for emergency purposes is presented. The idea of producing portable bridge is proposed in the current work as it is crucial for providing route for communities affected by natural disasters.

ADSORPTION POTENTIAL OF A MODIFIED ACTIVATED CARBON FOR THE REMOVAL OF NITROGEN CONTAINING COMPOUNDS FROM MODEL FUEL

S. M. Anisuzzaman, D. Krishnaiah and D. Alfred
Universiti Malaysia Sabah

Abstract. The purpose of this study is to find the effect of the modified activated carbon (MAC) on the adsorption activity for nitrogen containing compounds (NCC) removal from model fuel. Modification of commercial activated carbon (AC) involved impregnation with different ratios of sulfuric acid solution. Pseudo-first and pseudo-second order kinetic models were applied to study the adsorption kinetics while the adsorption isotherms were used for the evaluation of equilibrium data. All of the experimental data were analyzed using ultraviolet-visible spectroscopy after adsorption experiment between different concentration dosage of adsorbent and model fuel. It has been found that adsorption of NCC by MAC was best fit is the Langmuir isotherm for quinoline (QUI) and Freundlich isotherm for indole (IND) with a maximum adsorption capacity of 0.13 mg/g and 0.16 mg/g, respectively. Based on the experimental data, pseudo-first order exhibited the best fit for QUI with linear regression (R^2) ranges from 0.0.9777 to 0.9935 and pseudo-second order exhibited the best fit for IND with linear regression (R^2) ranges from 0.9701 to 0.9962. From the adsorption isotherm and kinetic studies result proven that commercial AC shows great potential in removing nitrogen.

THE PHYSICAL AND MECHANICAL PROPERTIES OF TREATED AND UNTREATED GIGANTOCHLOA SCORTECHINII BAMBOO

N. M. Daud, N. M. Nor, M. A. Yusof, A. A. M. Al Bakriri and A. A. Shaari
Universiti Pertahanan Nasional Malaysia

Abstract. Bamboo's advantages such as fast growing, renewable and easily available raw material meets the demand of sustainable material in construction. Bamboo act as reinforcement to enhance strength in structural members. This paper investigated on the properties of Gigantochloa Scortechinii bamboo (moisture content, density, compression, shear and bending) by referring to ISO 22157. Moisture content for both untreated and treated bamboo high at the bottom section while density is high at the top section. Compression strength for untreated bamboo were between 19.96 to 23.80 MPa and treated bamboo were between 31.74 to 36.60 MPa. High compression was at the top section which have the greatest wall thickness. Shear strength recorded between 4.28 to 5.69 MPa for untreated bamboo with node and 3.67 to 5.21 MPa for treated bamboo with node. The shear strength of samples with node recorded high strength compared to internode. Untreated bamboo recorded the MOR between 53.64 to 73.66 MPa and 58.23 to 62.86 MPa for treated bamboo. MOE of untreated bamboo were between 26.70 GPa to 36.31 GPa while treated bamboo were between 28.83 to 33.41 GPa. By replacing bamboo to the conventional building material, cost of materials will be reduced and sustainability will be enhanced

DENOISING ELECTROCARDIOGRAM SIGNALS USING EMPIRICAL MODE DECOMPOSITION METHOD

F. R. Hashim, J. Adnan, N. G. Nik Daud and K. A. Ahmad
Universiti Pertahanan Nasional Malaysia

Abstract. The process of producing an accurate, good quality electrocardiogram (ECG) is quite straightforward providing physicians to develop a good technique. A poor quality trace not only reduces the accuracy of the test but also makes interpretation difficult and sometimes impossible. Therefore, failure to recognize interference can all lead to erroneous diagnosis and unnecessary treatment or interventions. Hence, the development of good denoising technique is required to obtain the free noise ECG signal. In the other hand, major noises in ECG signal need to identify and studied. In this project, Empirical mode decomposition (EMD) technique is choose to filter four major noise in ECG signal, which is powerline interference (PLI), baseline wander (BW), electromyogram (EMG), and motion artifact (MA).

EFFECT OF RAINFALL INFILTRATION INTO UNSATURATED SOIL USING SOIL COLUMN

A. Ibrahim, M. Mukhlisin and O. Jaafar
Universiti Pertahanan Nasional Malaysia and Universiti Kebangsaan Malaysia

Abstract. Rainfall especially in tropical region caused infiltration to the soil slope. The infiltration may change pore water pressure or matric suction of the soil. The event of rainfall infiltration into soil is a complex mechanism. Therefore, the main objectives of this research paper is to study the influence of rainfall intensity and duration that changed pore water pressure to soil. There are two types of soils used in this study; forest soil and kaolin. Soil column apparatus is used for experiments. Rainfall were applied to the soil and result for 3, 6, 12, 24, 72, 120, and 168 hours were retrieved. Result shows that for the both types of soil, the negative pore water pressures were increased during wetting process and gradually decreased towards drying process. The results also show that pore water pressure at top part was increased greatly as the wetting process started compared to the middle and bottom part of the column.

FIELD INVESTIGATION ON STRUCTURAL PERFORMANCE OF THE BURIED UPVC PIPES WITH AND WITHOUT GEOGRID REINFORCEMENT

A. S. S. Teja, R. R. G. Krishnan and R. Aravindh
SSN College of Engineering, Kalavakkam, India

Abstract. Buried pipes are used mainly for water supply and drainage besides many other applications such as oil, liquefied natural gas, coal slurries and mine tailings. The pipes used may be rigid (Reinforced concrete, vitrified clay, and ductile iron) or flexible (Steel, UPVC, aluminium, Fibre glass and High-density polyethylene) although the distinction between them is blurring. Flexible pipe design is governed by deflection or buckling. UPVC pipes are preferred due to light weight, long term chemical stability and cost efficiency. This project aims to study the load deformation behaviour of the buried pipe and stress variation across the cross section of the pipe under static loading along with the influence of depth of embedment, density of backfill on the deformation and stresses in pipe & the deformation behaviour of buried pipe when soil is reinforced with geogrid reinforcement and evaluate the structural performance of the pipe.

APPLICATION OF WATER FLOWING PVC PIPE AND EPS FOAM BEAD AS INSULATION FOR WALL PANEL

U. N. Ali, N. M. Nor, M. A. Yusuf, M. Othman and M. A. Yahya
Universiti Pertahanan Nasional Malaysia

Abstract. Malaysia located in tropical climate which have a typical temperature range between 21 °C to 36 °C. Due to this, air-conditioning system for buildings become a necessity to provide comfort to occupants. In order to reduce the energy consumption of the air-conditioning system, the transmission of heat from outdoor to indoor space should be kept as minimum as possible. This article discusses about a technology to resist heat transfer through concrete wall panel using a hybrid method. In this research PVC pipe was embedded at the centre of concrete wall panel while the EPS foam beads were added about 1% of the cement content in the concrete mix forming the outer layer of the wall panel. Water is regulated in the PVC pipe from the rainwater harvesting system. The aim of this study is to minimize heat transfer from the external environment into the building. Internal building temperature which indicated in BS EN ISO 7730 or ASHRAE Standard 55 where the comfort indoor thermal is below 25°C during the daytime. Study observed that the internal surface temperature of heat resistance wall panel is up to 3°C lower than control wall panel. Therefore, we can conclude that application of heat resistance wall panel can lead to lower interior building temperature.

FULL CYCLE TRIGONOMETRIC FUNCTION ON INTEL QUARTUS II VERILOG

M. Mustapha and N. A. Zulkarnain
Universiti Pertahanan Nasional Malaysia

Abstract. This paper discusses about an improvement of a previous research on hardware based trigonometric calculations. Tangent function will also be implemented to get a complete set. The functions have been simulated using Quartus II where the result will be compared to the previous work. The number of bits has also been extended for each trigonometric function. The design is based on RTL due to its resource efficient nature. At earlier stage, a technology independent test bench simulation was conducted on ModelSim due to its convenience in capturing simulation data so that accuracy information can be obtained. On second stage, Intel/Altera Quartus II will be used to simulate on technology dependent platform, particularly on the one belonging to Intel/Altera itself. Real data on no. logic elements used and propagation delay have also been obtained.

EXPERIMENTAL STUDY ON COMPRESSIVE STRENGTH OF SEDIMENT BRICK MASONRY

E. L. Woen, M. A. Malek, B. S. Mohammed, T. C. Wei and M. T. Tamunif
Universiti Tenaga Nasional, Universiti Teknologi PETRONAS and Cheng Hiu University, Taiwan.

Abstract. The effects of pre-wetted unit bricks, mortar type and slenderness ratio of prisms on the compressive strength and failure mode of newly developed sediment brick have been evaluated and compared to clay brick and cement-sand bricks. The results show that pre-wetted sediment brick masonry exhibits higher compressive strength of up to 20% compared to the dry sediment masonry. Using cement- lime mortar leads to lower compressive strength compared to cement mortar. However, the sediment brick masonry with the cement lime mortar exhibit higher compressive strength in comparison with cement mortar masonry. More of diagonal shear cracks have been observed in the failure mode of the sediment bricks masonry compared to clay and cement-sand bricks masonry that show mostly vertical cracks and crushing. The sediment unit bricks display compressive strength in between clay and cement-sand bricks.

THE INFLUENCES OF ATTRIBUTES, SKILLS, AND KNOWLEDGE OF MANAGERS ON REFURBISHMENT PROJECT PERFORMANCE

N. Ishak
Universiti Malaysia Perlis

Abstract. Recently, the momentum on the growth of national building industry shows the increasing of the demand in refurbishment works becomes a trend spreading over the Malaysia. However, the potential of these activities normally related with the complexity in technical aspect compared to new build schemes. It will be reflecting on the unsatisfactory project performance. A competent manager is required to have the appropriate attributes, skills and knowledge in able to perform all the duties associated with managing the refurbishment building projects. Therefore, this paper is to identify the most appropriate attributes, skills and knowledge that required for managers to indicate the relationship between the influences on the refurbishment projects performance. This finding is indicate the importance of development the personal attributes, skills, and knowledge of managers and adds as benefit of raising the profile and image of managers in refurbishment building industry through a dissemination of the findings.

IMPLEMENTATION OF SAFETY SIGNAGE TO EASE TRANSPORTATION SYSTEM IN DISASTER PRONE AREA

M. Vikneswaran, R. A. A. Raffiee, M. A. Yusof, M. A. Yahya,
S. A. Subramaniam, W. W. Loong, M. Othman and J. Galerial
Universiti Pertahanan Nasional Malaysia

Abstract. The research is conducted to study the exact need of the signage at disaster prone area. The smart signage is needed to increase the safety, reduce the search and rescue time and finally will ease the help to arrive at the relieve center in any condition at any time without interruption. Signage implementation for disaster relief centers is still a foreign matter in Malaysia. The level of preparedness to the natural disaster mainly flood among our citizens is inadequate. Here the signage which usually used as a tool to help and protect the health and safety of the road users, employees and work place visitors (Safety Sign and Colors at Work, 2007). For many years, the signage has played its part miraculously to provide vivid information to the users in whatever condition. The signage also could be used as an indicator or information provider for the natural disaster victims to move to a safer place on time. Sometimes the victims would not have sufficient time to safe themselves, due to lack of information and time. Thus it can be concluded that the signage at disaster prone area is vital.

MLP BASED LOGSIG TRANSFER FUNCTION FOR SOLAR GENERATION MONITORING

F. R. Hashim, K. A. Ahmad, S. Ahmad, M. K. Awang, N. F. Joini
and M. T. Ishak
Universiti Pertahanan Nasional Malaysia

Abstract. Solar panel is one of the renewable energy that can reduce the environmental pollution and have a wide potential of application. The exact solar prediction model will give a big impact on the management of solar power plants and the design of solar energy systems. The MLP network can be used to calculate the temperature module (TM) in Malaysia. This can be done by simulating the collected data of four weather variables which are the ambient temperature (TA), local wind speed (VW), solar radiation flux (GT) and the relative humidity (RH) as the input into the neural network. The transfer function will be applied to the 14 types of training. Finally, an equation from the best training algorithm will be deduced to calculate the temperature module based on the input of weather variables in Malaysia.

THE EFFECT OF CALCIUM HYDROXIDE, ALKALI DILUTION, AND CALCIUM CONCENTRATION IN MITIGATING THE ALKALI SILICA REACTION USING PALM OIL FUEL ASH

H. Asrah, A. K. Mirasa and N. Bolong
Universiti Malaysia Sabah

Abstract. This study investigated the mechanism of how POFA mitigated the alkali silica reaction (ASR) expansion. Two types of POFA; the UPOFA and GPOFA with different fineness were used to replace the cement at 20% and 40% and their effects on the mortar bar expansion, calcium hydroxide, alkali dilution, and calcium concentration were investigated. The results showed that UPOFA has a significant ability to mitigate the ASR, even at a lower level of replacement (20%) compared to GPOFA. The mechanism of UPOFA in mitigating the ASR expansion was through a reduction in the calcium hydroxide content, which produced low calcium concentration within the mortar pore solution. Low pore solution alkalinity signified that UPOFA had good alkali dilution effect. Meanwhile, a higher dosage of GPOFA was required to mitigate the ASR expansion. An increase in the pore solution alkalinity of GPOFA mortar indicated higher penetration of alkalis from the sodium hydroxide solution, which reduced the alkali dilution effect. However, this was compensated by the increase in the cement dilution effect at higher GPOFA replacement, which controlled the mortar bar expansion below the ASTM limit.

MATLAB IMPLEMENTATION OF SATELLITE POSITIONING ERROR OVERBOUNDING BY GENERALIZED PARETO DISTRIBUTION

K. A. Ahmad, S. Ahmad and F. R. Hashim
Universiti Pertahanan Nasional Malaysia

Abstract. In the satellite navigation community, error overbound has been implemented in the process of integrity monitoring. In this work, Matlab programming is used to implement the overbounding of satellite positioning error CDF. Using a trajectory of reference, the horizontal position errors (HPE) are computed and its non-parametric distribution function is given by the empirical Cumulative Distribution Function (ECDF). According to the results, these errors have a heavy-tailed distribution. Sınce the ECDF of the HPE in urban environment is not Gaussian distributed, the ECDF is overbound with the CDF of the generalized Pareto distribution (GPD).

CALIBRATION OF ULTRA-HIGH FREQUENCY (UHF) PARTIAL DISCHARGE SENSORS USING FDTD METHOD

A. M. Ishak and M. T. Ishak
Universiti Pertahanan Nasional Malaysia

Abstract. Ultra-high frequency (UHF) partial discharge sensors are widely used for conditioning monitoring and defect location in insulation system of high voltage equipment. Designing sensors for specific applications often requires an iterative process of manufacturing, testing, and mechanical modifications. This paper demonstrates the use of finite-difference time-domain (FDTD) technique as a tool to predict the frequency response of UHF PD sensors. Using this approach, the design process can be simplified and parametric studies can be conducted in order to assess the influence of component dimensions and material properties on the sensor response. The modelling approach is validated using gigahertz transverse electromagnetic (GTEM) calibration system. The use of a transient excitation source is particularly suitable for modeling using FDTD, which is able to simulate the step response output voltage of the sensor, from which the frequency response is obtained using the same post-processing applied to the physical measurement.

ASSESSMENT OF UTILITY SIDE FINANCIAL BENEFITS OF DEMAND SIDE MANAGEMENT CONSIDERING ENVIRONMENTAL IMPACTS

S. K. Abeygunawardane
University of Moratuwa, Sri Lanka

Abstract. Any electrical utility prefers to implement demand side management and change the shape of the demand curve in a beneficial manner. This paper aims to assess the financial gains (or losses) to the generating sector through the implementation of demand side management programs. An optimization algorithm is developed to find the optimal generation mix that minimizes the daily total generating cost. This daily total generating cost includes the daily generating cost as well as the environmental damage cost. The proposed optimization algorithm is used to find the daily total generating cost for the base case and for several demand side management programs using the data obtained from the Sri Lankan power system. Results obtained for DSM programs are compared with the results obtained for the base case to assess the financial benefits of demand side management to the generating sector.

IMPLEMENTATION OF TRIGONOMETRIC FUNCTION USING CORDIC ALGORITHMS

A. S. N. Mokhtar, M. I. Ayub, N. Ismail and N. G. Nik Daud
Universiti Pertahanan Nasional Malaysia

Abstract. In 1959, Jack E. Volder presents a brand new formula to the real-time solution of the equation raised in navigation system. This new algorithm was the most beneficial replacement of analog navigation system by the digital. The CORDIC (Coordinate Rotation Digital Computer) algorithm are used for the rapid calculation associated with elementary operates like trigonometric function, multiplication, division and logarithm function, and also various conversions such as conversion of rectangular to polar coordinate including the conversion between binary coded information. In this current time CORDIC formula have many applications in the field of communication, signal processing, 3-D graphics, and others. This paper would be presents the trigonometric function implementation by using CORDIC algorithm in rotation mode for circular coordinate system. The CORDIC technique is used in order to generating the output angle between range 0o to 90o and error analysis is concern. The result showed that the average percentage error is about 0.042% at angles between ranges 00 to 900. But the average percentage error rose up to 45% at angle 90o and above. So, this method is very accurate at the 1st quadrant. The mirror properties method is used to find out an angle at 2nd, 3rd, and 4th quadrant.

HAZE SMART GREENHOUSE WITH INTERNET OF THINGS

N. A. A. Jamaludin
Universiti Pertahanan Nasional Malaysia

Abstract. Wireless Sensor Technologies (WST) is entering a new phase. Recent advances offer vast opportunities for research and development. On top of that, this is the consequence of the decreasing costs of ownership, the increase of smaller sensing devices in engineering and the achievements in radio frequency technology and digital circuits. The aim of this research was to combine the Wireless Sensor Network with ZigBee technology. It is expected to develop Haze Smart Greenhouse to control the temperature and humidity via remote automation. In addition, a GUI interface will be built to ease in controlling and managing the prototype through computer via wired and wireless technology. This Haze Smart Greenhouse prototype will be proposed to be developed and tested with operational via remote automation.

A SOLID WASTE MANAGEMENT SURVEY IN DAVAO DEL SUR

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Abstract. Environmental degradation has become a very alarming issue at present. Human activities have been the primary cause of this unfortunate event which has resulted to other complications such as health problems. The resources are limited and people solely depend on it for living. Thus, the necessity to address these concerns arises. Various solid waste management programs have been established however the people's commitment has continued to challenge the local authorities as well as the cooperating agencies. This study was conducted in order to assess the awareness, practice, and attitude towards the existing solid waste management programs of the selected students in Davao del Sur. It also aims to measure the effectiveness and current status of these implemented programs. The study used survey method. One hundred sixty-eight of 227 students were surveyed using a validated, self-administered instrument. The study revealed that majority of the students is well aware of the existing solid waste management programs, practice them and is willing to learn more about the issue. Others, on the other hand, do the opposite. It is of great importance that all citizens must commit in the implementation of environmental programs so as to be more effective.

DEVELOPMENT OF WIRELESS SENSOR TECHNOLOGIES FOR HAZE SMART GREENHOUSE

N. A. A. Jamaludin, M. N. Ismail, M. A. Mohd Shukran and M. R. Mohd Isa
Universiti Pertahanan Nasional Malaysia

Abstract. Wireless Sensor Technologies (WST) is entering a new phase. Recent advances offer vast opportunities for research and development. On top of that, this is the consequence of the decreasing costs of ownership, the increase of smaller sensing devices in engineering and the achievements in radio frequency technology and digital circuits. The aim of this research was to combine the Wireless Sensor Network with ZigBee technology. It is expected to develop Haze Smart Greenhouse to control the temperature and humidity via remote automation. In addition, a GUI interface will be built to ease in controlling and managing the prototype through computer via wired and wireless technology. This Haze Smart Greenhouse prototype will be proposed to be developed and tested with operational via remote automation.

EMERGENCY FIELD WATER SUPPLY SYSTEM USING NATURAL DISINFECTANT

M. Vikneswaran, M. A. Yahya, M. A. Yusof and S. N. K. Ismail
Universiti Pertahanan Nasional Malaysia

Abstract. Water is the most important resource in times of emergency and during military missions. In addition, if there is a war in a country, sources of clean water are essential for life. But the safety and cleanliness of the river water for the campers and hikers still uncertain. Usually, polluted and contaminated river water is not safe to be directly consumed by human. However, this problem can be partly resolved by using water filter where the river water can be consumed directly after the filtration process. In respect of that, this study was conducted to design the filter media for personal water purification system. Hence, the objective of this work also is to develop a personal, portable dual purpose handy water filter to provide an easier way to get safe, clean and healthy drinking water for human wherever they go. The water quality of samples collected before and after filtration were analysed. Water samples were taken from a waterfall near Lestari Block, and Lake Beside Marine Centre UPNM Campus. The experimental results were analysed based on the assessment of water quality parameters. Overall, the analysis of the results showed that the water filter was designed with basic mix tabs aqua filter water purification tablets, is showing a better result where it achieves the class I of water quality index (WQI). In details, the water sample taken from waterfall near Lestari Block shown the WQI around 93 which is higher than WQI of water sample from Lake near Marine Centre UPNM which is 86, class II A which can be used for external purpose only.

PREDICTION OF HEART ABNORMALITY USING MLP NETWORK

J. Adnan, K. A. Ahmad, S. Ahmad, M. H. Mat and M. K. Awang
Universiti Pertahanan Nasional Malaysia

Abstract. Heart abnormality does not choose gender, age and races when it strikes. With no warning signs or symptoms, it can result to a sudden death of the patient. Generally, heart's irregular electrical activity is defined as heart abnormality. Via implementation of Multilayer Perceptron (MLP) network, this paper tries to develop a program that allows the detection of heart abnormality activity. Utilizing several training algorithms with Purelin activation function, an amount of heartbeat signals received through the electrocardiogram (ECG) will be employed to condition the MLP network.

A REVIEW ON THE BENCHMARKING CONCEPT IN MALAYSIAN CONSTRUCTION SAFETY PERFORMANCE

N. Ishak, M. A. Azizan
Universiti Malaysia Perlis

Abstract. Construction industry is one of the major industries that propels Malaysia's economy in highly contributes to our nation's GDP growth, yet the high fatality rates on construction sites have caused concern among safety practitioners and the stakeholders. Hence, there is a need of benchmarking in performance of Malaysia's construction industry especially in terms of safety. This concept can create a fertile ground for ideas, but only in a receptive environment, organization that share good practices and compare their safety performance against other benefit most to establish improvement in safety culture. This research was conducted to study the awareness important, evaluate current practice and improvement, and also identify the constraint in implement of benchmarking on safety performance in our industry. Additionally, interviews with construction professionals were come out with different views on this concept. Comparison has been done to show the different understanding of benchmarking approach and how safety performance can be benchmarked. But, it's viewed as one mission, which to evaluate objectives identified through benchmarking that will improve the organization's safety performance. Finally, the expected result from this research is to help Malaysia's construction industry implement best practice in safety performance management through the concept of benchmarking.

CARDIAC ABNORMALITY PREDICTION USING HMLP NETWORK

J. Adnan, K. A. Ahmad, S. Ahmad, M. H. Mat and M. K. Awang
Universiti Pertahanan Nasional Malaysia

Abstract. Cardiac abnormality often occurs regardless of gender, age and races but depends on the lifestyle. This problem sometimes does not show any symptoms and usually detected once it already critical which lead to a sudden death to the patient. Basically, cardiac abnormality is the irregular electrical signal that generate by the pacemaker of the heart. This paper attempts to develop a program that can detect cardiac abnormality activity through implementation of HMLP network. A certain amount of data of the heartbeat signals from the electrocardiogram (ECG) will be used in this project to train the MLP and HMLP network by using Modified Recursive Prediction Error (MRPE) algorithm and to test the network performance.

SMALL RANGE LOGARITHM CALCULATION ON INTEL QUARTUS II VERILOG

M. Mustapha, A. S. Mokhtar and A. A. Ahmad
Universiti Pertahanan Nasional Malaysia

Abstract. Logarithm function is the inverse of exponential function. This paper implement power series of natural logarithm function using Verilog HDL in Quartus II. The mode of design used is RTL in order to decrease the number of megafunctions. The simulations were done to determine the precision and number of LEs used so that the output calculated accurately. It is found that the accuracy of the system only valid for the range of 1 to exponent.

CLASSIFICATION OF FUNCTIONAL INTERACTIONS FROM MULTI-ELECTRODES DATA USING CONDITIONAL MODULARITY ANALYSIS

S. N. Makhtar and M. H. Senik
Universiti Pertahanan Nasional Malaysia and Universiti Sains Malaysia

Abstract. The availability of massive amount of neuronal signals are attracting widespread interest in functional connectivity analysis. Functional interactions estimated by multivariate partial coherence analysis in the frequency domain represent the connectivity strength in this study. Modularity is a network measure for the detection of community structure in network analysis. The discovery of community structure for the functional neuronal network was implemented on multi-electrode array (MEA) signals recorded from hippocampal regions in isoflurane-anaesthetized Lister-hooded rats. The analysis is expected to show modularity changes before and after local unilateral kainic acid (KA)-induced epileptiform activity. The result is presented using color-coded graphic of conditional modularity measure for 19 MEA nodes. This network is separated into four sub-regions to show the community detection within each sub-region. The results show that classification of neuronal signals into the inter- and intra-modular nodes is feasible using conditional modularity analysis. Estimation of segregation properties using conditional modularity analysis may provide further information about functional connectivity's from MEA data.

AORTIC ANNULUS SIZING USING WATERSHED TRANSFORM AND MORPHOLOGICAL APPROACH FOR CT IMAGES

N. Mohammad, Z. Omar, and M. Sahrim
Universiti Teknologi Malaysia and Universiti Sains Islam Malaysia

Abstract. Aortic valve disease occurs due to calcification deposits on the area of leaflets within the human heart. It is progressive over time where it can affect the mechanism of the heart valve. To avoid the risk of surgery for vulnerable patients especially senior citizens, a new method has been introduced: Transcatheter Aortic Valve Implantation (TAVI), which places a synthetic catheter within the patient's valve. This entails a procedure of aortic annulus sizing, which requires manual measurement of the scanned images acquired from Computed Tomographic (CT) by experts. The step requires intensive efforts, though human error may still eventually lead to false measurement. In this research, image processing techniques are implemented onto cardiac CT images to achieve an automated and accurate measurement of the heart annulus. The image is first put through pre-processing for noise filtration and image enhancement. Then, a marker image is computed using the combination of opening and closing operations where the foreground image is marked as a feature while the background image is set to zero. Marker image is used to control the watershed transformation and also to prevent oversegmentation. This transformation has the advantage of fast computational, and oversegmentation problems which usually appear with the watershed transform can be solved with the introduction of marker image. Finally, the measurement of aortic annulus from the image data is obtained through morphological operations. Results affirm the approach's ability to achieve accurate annulus measurements compared to conventional techniques.

A PROBABILISTIC MAINTENANCE MODEL FOR DIESEL ENGINES

S. Pathirana and S. K. Abeygunawardane
University of Moratuwa, Sri Lanka

Abstract. In this paper, a probabilistic maintenance model is developed for inspection based preventive maintenance of diesel engines based on the practical model concepts discussed in the literature. Developed model is solved using real data obtained from inspection and maintenance histories of diesel engines and experts' views. Reliability indices and costs were calculated for the present maintenance policy of diesel engines. A sensitivity analysis is conducted to observe the effect of inspection based preventive maintenance on the life cycle cost of diesel engines.

DEVELOPMENT OF A LOW-COST BIOGAS FILTRATION SYSTEM TO ACHIEVE HIGHER-POWER EFFICIENT AC GENERATOR

E. E. Mojica, J. G. Leguid, A. S. Ardaniel and A. T. Loyola
University of Perpetual Help System Dalta

Abstract. The paper focuses on the development of a low-cost biogas filtration system for alternating current generator to achieve higher efficiency in terms of power production. A raw biogas energy comprises of 57% combustible element and 43% non-combustible elements containing carbon dioxide (36%), water vapor (5%), hydrogen sulfide (0.5%), nitrogen (1%), oxygen (0 – 2%), and ammonia (0 – 1%). The filtration system composes of six stages: stage 1 is the water scrubber filter intended to remove the carbon dioxide and traces of hydrogen sulfide; stage 2 is the silica gel filter intended to reduce the water vapor; stage 3 is the iron sponge filter intended to remove the remaining hydrogen sulfide; stage 4 is the sodium hydroxide solution filter intended to remove the elemental sulfur formed during the interaction of the hydrogen sulfide and the iron sponge and for further removal of carbon dioxide; stage 5 is the silica gel filter intended to further eliminate the water vapor gained in stage 4; and, stage 6 is the activated carbon filter intended to remove the carbon dioxide. The filtration system was able to lower the non-combustible elements by 72% and thus, increasing the combustible element by 54.38%. The unfiltered biogas is capable of generating 16.3 kW while the filtered biogas is capable of generating 18.6 kW. The increased in methane concentration resulted to 14.11% increase in the power output. The outcome resulted to better engine performance in the generation of electricity.

MODELLING OF BUILDING INTEGRATED RENEWABLE ENERGY SYSTEM

N. S. Moh Nazar, S. Thanakodi, N. I. Kamarozaman, M. Syarıpuddın and N. L. Ismaıl
Universiti Pertahanan Nasional Malaysia

Abstract. The energy that can generate electricity without causing any pollution to the environment is known as Renewable Energy (RE). There are many types of building integrated renewable energy (RE) that can be used as a source for electrical generation for example wind energy, tidal energy, biomass energy and solar energy. Thus, the solar energy is the most suitable RE for Malaysia to generate electricity because of Malaysia's tropical climate. This paper mainly concerns about Photovoltaic (PV) system performance in the standalone system in terms of I-V characteristic and output energy that is effected by solarradiation and ambient temperature. A PV model issimulatedin MATLAB/Simulink software. The verification of the output energy resulting from the paper were verified with the actual solar datasheet.

AN INVESTIGATION ON RAPESEED OIL AS POTENTIAL INSULATING LIQUID

N. I. A. Katim, M. S. M. Nasir and M. T. Ishak
Universiti Pertahanan Nasional Malaysia

Abstract. Insulation oils are a vital part in power transformers. Insulation oil is not only work as electrical insulation but also as a coolant inside the transformer. Due to the increasing tight regulations on the environment and safety in recent years, vegetable oils are being considered for insulation oils in power transformer. This paper presents two conditions of Rapeseed Oil (RO), which are as received (new) and dried (dry) under difference uniform field electrodes configuration (mushroom-to-mushroom and sphere-to-sphere) with gap distance at 2.5 mm as recommended by the international standards. A comparative study of AC breakdown voltage, dissipation factor (tan δ), and resistivity under variation of temperature were investigated. The experimental works were done according to the IEC 60156 and IEC 60247 standards. The results indicated that the breakdown voltages of both condition are comparable to mineral oil. The dielectric constant and resistivity of two conditions are decreased along with the increasing temperature. However, the dissipation factor properties rose up along with the temperature. The Weibull distribution was used to determine the withstand voltages at 1% and 50% probabilities for RO in two conditions.

POWER PLANT FAULT DETECTION USING ARTIFICIAL NEURAL NETWORK

S. Thanakodi, N. S. Moh Nazar, F. R. Hashım, H. D. Mohd Hıdzır and M. Z. K. Awıra
Universiti Pertahanan Nasional Malaysia

Abstract. The fault that commonly occurs in power plants is due to various factors that affect the system outage. There are many types of faults in power plants such as single line to ground fault, double line to ground fault, and line to line fault. The primary aim of this paper is to diagnose the fault in 14 buses power plants by using an Artificial Neural Network (ANN). The Multilayered Perceptron Network (MLP) that detection trained utilized the offline training methods such as Gradient Descent Backpropagation (GDBP), Levemberg-Marquardt (LM), and Bayesian Regularization (BR). The best method is used to build the Graphical User Interface (GUI). The modelling of 14 buses power plant, network training, and GUI used the MATLAB software.

SOLAR UPDRAFT POWER GENERATOR WITH RADIAL AND CURVED VANES

H. Hafizh, R. Hamsan, A. A. Ahmad Zamri, M. F. M. Keprawi and H. Shirato
City University and Kyoto University

Abstract. Solar radiation is the largest source of energy available on earth and the solar updraft power generator (SUPG) is a renewable energy facility capable of harnessing its abundant power. Unlike the conventional wind turbines that harness natural wind in the atmosphere and often encounter with the intermittent issue or even complete cut-off from airflow, the SUPG creates artificial wind as a result of solar-induced convective flows. However, the SUPG has an inherent low total efficiency due to the conversion of thermal energy into pressure energy. Acknowledging the low efficiency and considering its potential as a renewable energy facility, the current work aims to increase the total efficiency by installing a series of guide walls inside the collector. Two types of guide walls were used i.e. radial and curved vanes. The result with curved vanes showed that the updraft velocity is higher compare to those without vanes. About 18% and 64% improvement of updraft velocity and mechanical power were attained respectively. Furthermore, it was observed that the role of radial vanes configuration was more to produce a smooth updraft velocity profile rather than increasing the total efficiency.

DC MOTOR SPEED CONTROL USING FUZZY LOGIC CONTROLLER

N. L. Ismail, K. A. Zakaria, N. S. Moh Nazar, M. Syaripuddin, A. S. N. Mokhtar and S. Thanakodi
Universiti Pertahanan Nasional Malaysia

Abstract. The automatic control has played a vital role in the advance of engineering and science. Nowadays in industries, the control of direct current (DC) motor is a common practice thus the implementation of DC motor controller speed is important. The main purpose of motor speed control is to keep the rotation of the motor at the present speed and to drive a system at the demand speed. The main purpose of this project is to control speed of DC Series Wound Motor using Fuzzy Logic Controller (FLC). The expectation of this project is the Fuzzy Logic Controller will get the best performance compared to dc motor without controller in terms of settling time (Ts), rise time (Tr), peak time (Tp), and percent overshoot (%OS).

IDENTIFICATION AND MODELLING OF FLIGHT CHARACTERISTICS FOR SELF-BUILD SHOCK FLYER TYPE UAV

Z. A. Rashid, S. M. F. S. M. Dardin, A. A. Azid, K. A. Ahmad
Universiti Pertahanan Nasional Malaysia

Abstract. The development of an autonomous Unmanned Aerial Vehicle (UAV) requires for a fundamentals studies of the UAV's flight characteristic. The aim of this study was to identify and model the flight characteristic of a conventional fixed wing type UAV. Subsequence to this, the mode of flight of the UAV can be investigated. One technique to identify the characteristic of a UAV is through a flight test where it required specific maneuvering to be executed while measuring the attitude sensor. In this study, a simple shock flyer type UAV was used as the aircraft. The result shows that the modelled flight characteristic has a significant relation with actual values but the fitting value is rather small. It is suggested that the future study is conducted with an improvement of the physical UAV, data filtering and better system identification methods.

DEVELOPMENT OF INTELLIGENT PERISTALTIC PUMP CONTROL SYSTEM USING ARDUINO FOR APPLICATION OF HEMODIALYSIS MACHINE

M. S. Salleh, A. Miskon and F. R. Hashim
Universiti Pertahanan Nasional Malaysia

Abstract. The implications of treatment using hemodialysis machine and equipment remain speculative. Most studies, case reviews and medical surveys have shown statistics of side effects of hypertension and/or hypotension while undergo a treatment using hemodialysis machine. Therefore, a specific action must be taken to prevent the effects of hypertension and/or hypotension during treatment especially using hemodialysis machine. In order to reduce this matter in terms of frequency of hypotension and/or hypertension while undergo hemodialysis treatment, many approach have been undertaken for improvement. This project reviews the technique of controlling instantaneous blood pressure and describe the challenges faced by a researcher in order to control the level of blood pressure and velocity according to human stability. The methodology used is to develop the bio-artificial modular including an intelligent controller features which aligned with human blood pressure. The liquid flow rate was measured by using flow sensor where it located at Input and Output part. This system is using a tube with dimension of 6mm inner diameter. In this study, it is decided to list out a human blood category and match it with the needed flow rate from 300 mL/min to 900 mL/min. The ideal flow rate for hemodialysis machine is determined from 300 until 500 mL/min and would consider under normal human blood pressure category. Results shows an efficiency for Normal Blood Pressure Category is 97.964%, Pre-hypertension is 100.152%, Hypertension Stage 1 is 99.548% and Hypertension Stage 2 is 109.206%. A range of efficiency for this system are from 97.964% to 109.206%. In addition, analysis and simulation of the system delivers a better performance efficiency.

ENERGY HARVESTING USING TEG AND PV CELL FOR LOW POWER APPLICATION

M. Z. Zaınal and S. N. Mohd Tawıl
Universiti Pertahanan Nasional Malaysia

Abstract. A thermoelectric generator (TEG) module and photovoltaic cell (PV) were utilized to harvest energy from temperature gradients of heat sources from ambient heat and light of sun. The output of TEG and PV were connected to a power management circuit consist of step-up dc-dc converter in order to increase the output voltage to supply a low power application such as wireless communication module and the photovoltaic cell for charging an energy storage element in order to switch on a fan for cooling system of the thermoelectric generator. A switch is used as a selector to choose the input of source either from photovoltaic cell or thermoelectric generator to switch on DC-DC step-up converter. In order to turn on the DC-DC step-up convertor, the input must be greater than 3V. The energy harvesting was designed so that it can be used continuously and portable anywhere. Multiple sources used in this energy harvesting system is to ensure the system can work in whatever condition either in good weather or not good condition of weather. This energy harvesting system has the potential to be used in military operation and environment that require sustainability of energy resources.

IMPACT OF FOLIAGE ON LORA 433MHZ PROPAGATION IN TROPICAL ENVIRONMENT

K. A. Ahmad, S. Ahmad and F. R. Hashim
Universiti Pertahanan Nasional Malaysia

Abstract. LoRa employs chirp spread spectrum technology and being considered as one of the promising system for Low-Power-Wide-Area-Network (LPWAN) to support the growth of Internet of Things (IoT) applications. Designed to operate in the industrial, scientific and medical (ISM) bands, LoRa had been tested and evaluated mainly in Europe and US in the 868 MHz and 915 MHz modulation bands. This paper provides some initial results in the performance of LoRa signal propagation of 433 MHz modulation in tropical climate environments.

MODELLING VOLTAGE SAG MITIGATION USING DYNAMIC VOLTAGE RESTORER AND ANALYZING POWER QUALITY ISSUE

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Abstract. Power quality problem which are arise due to a fault or a pulsed load can have caused an interruption of critical load. The modern power systems are becoming more sensitive to the quality of the power supplied by the utility company. Voltage sags and swells, flicker, interruptions, harmonic distortion and other distortion to the sinusoidal waveform are the examples of the power quality problems. The most affected due to these problems is industrial customers who use a lot of sensitive equipment. There has suffered a huge loss to these problems. Resulting of broken or damage equipment if voltage sag exceeds the sensitive threshold of the equipment. Thus, device such as Static Synchronous Compensator (STATCOM) and Dynamic Voltage Restorer (DVR) has been created to solve this problem among users. DVR is a custom power device that most effective and efficient. This paper intended to report the DVR operations during voltage sag compensation.

METHODOLOGICAL COMPARISON ON HYBIRD NANO ORGANIC SOLAR CELL FABRICATION

M. M. Shahimin
Universiti Pertahanan Nasional Malaysia

Abstract. The development of low cost solar cells has been the main focus in recent years. This has lead to the generation of photovoltaic cells based on hybrid of nanoparticle –organic polymer materials. This type of hybrid photovoltaic cells can overcome the problem of polymeric devices having low optical absorption and carrier mobilities. The hybrid cell has the potential of bridging the efficiency gap which in present in organic and inorganic semiconductor materials. This project focuses on obtaining a hybrid active layer consisting of nanoparticles and organic polymer, to understand the parameter involved in obtaining this active layer, and finally to investigate if the addition of nano particles in to the active layer could enhance the output of the hybrid solar cell. The hybrid active layer have will be deposited using the spin coating technique by using CdTe, CdS nano particles mixed with poly (2-methoxy,5-(2-ethyl-hexyloxy)-p-phenylvinylene) MEH-PPV.

METHODOLOGICAL COMPARISON ON OLED AND OLET FABRICATION

M. M. Shahimin
Universiti Pertahanan Nasional Malaysia

Abstract. The potential of organic semiconductor devices for light generation is demonstrated by the commercialization of display technologies based on organic light emitting diode (OLED). In OLED, organic materials play the role of light emission once the current is passed through. However, OLED do have major drawbacks whereby it suffers from photon loss and excite quenching. Organic light emitting transistor (OLET) emerged as the new technology to compensate the efficiency and brightness loss encountered in OLED. The structure has combinational capability to switch the electronic signal such as the field effect transistor (FET) as well as light generation. The aim of this study is to methodologically compare and contrast fabrication process and evaluate feasibility of both organic light emitting diode (OLED) and organic light emitting transistor (OLET). The proposed light emitting layer in this study is poly [2-methoxy-5- (2'-ethyl-hexyloxy)-1,4-phenylene vinylene] (MEH-PPV).

THE POTENTIAL OF HYBRID MICRO-VORTEX GENERATORS TO CONTROL FLOW SEPARATION OF A NACA 4415 UNDER SUBSONIC FLOW

M. R. Saad and M. T. Jumahadi
Universiti Pertahanan Nasional Malaysia

Abstract. Boundary layer separation is detrimental to the lift and drag of most aeronautical applications. Many vortex generators (VG), both passive and active have been designed to reduce these drawbacks. This study targets to investigate the effectiveness of hybrid micro-VGs, which combine both active and passive micro-VGs in controlling separation under subsonic conditions. NACA 4415 airfoils installed with passive, active and hybrid micro-VGs each are designed, 3D printed, and tested in a wind tunnel at 26.19 m/s under Re = 2.5x10^5. The lift and drag measurements from a 3-component force balance prove that hybrid micro-VGs increase lift by up to 21.2%, increase drag by more than 11.3% and improve lift-to-drag ratio by at least 8.6% until up to 33.7%. From this research, it is believed that hybrid micro-VGs are competitive to the performance of active VGs and a better configuration is to be considered to reduce parasitic drag and outstand active VGs.

DEVELOPMENT OF PLASTIC FIBER OPTIC AS COLOUR SENSOR

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Universiti Kuala Lumpur

Abstract. This research is to develop a colour sensor using plastic optical fibers. A fiber tip probe is fabricated using decladded plastic optical fiber with a 980-micron core. The probe is dipped in red, blue, green and yellow coloured solutions to observe the reflection spectrum of the light signal from a broadband light source. The fabricated sensor is able to detect the four colours mentioned successfully. Repeated experiments produced 98% success rates for the colour detection results.

INVESTIGATION, EVALUATION AND ANALYSIS OF SICP NANO PARTICLE METAL MATRIX NANO COMPOSITE USING A HYBRID PROCESS

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Abstract. The present study was performed on mixing of fine powder of aluminum and silicon carbide nano particles 25nm size each. In this process aluminum works as matrix and silicon carbide works as reinforcement with volume fraction of 1, 1.5, and 2%. Scanning electron microscopy (SEM) and electron microscopy techniques were used for crystal structure and micro structural characterization of the nano composite material. The objective of study was to achieve uniform distribution of SiCp nano particles in the aluminum matrix. The effect of reinforcement of Silicon carbide nano particle size and its volume fraction with aluminum encouraged investigation of stress strain response, elastic modulus and yield strength of nano composite metal matrix. Nano indentation and compression test were performed to characterize the nano composite material. Yield strength, compressive strength and elastic modulus were obtained from the compression test. Whereas nano indentation results gave the yield strength, maximum shear stress and elastic modulus. The tensile test was conducted to find out the ultimate tensile strength. FESEM and EDAX techniques were also used to evaluate the different elements and their properties of Aluminum and SiCp nano particle metal matrix nano composite. The study reveals that in the liquid metal nano particle were uniformly dispersed and the segregation of the particles near the grain boundaries is due to pushing of the nano particle during growth of grain.

PAVEMENT CONDITION ASSESSMENT TO FORECAST MAINTENANCE PROGRAM ON JKR STATE ROADS IN PETALING DISTRICT

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Abstract. This research allows local authorities to project road maintenance in term of activities and financial expenditure through pavement condition assessment and then Highway Development and Management (HDM-4) analysis. Current form of road maintenance carried out by local authority is on reactive manner where corrective actions were taken based on reports recorded. Some went unrecorded hence causing prolonged damages. This causes the local authority unable to project the required cost to maintain the roads. This affects the socio-economy of the surrounding routes. Hence, it is seen, as preventive maintenance of the roads will provide more feasible option in term of work force and finance to the local authority. To overcome this issue, a preventive model was introduced. This was done through pavement condition assessment (PCA) where analysis was done through HDM-4. Nondestructive test and destructive test were conducted in order to provide an indicator to the road's health. This were then analysed in HDM-4 where the result was benchmarked with maintenance standard. The scope of this research is set to PCA where DT and NDT were performed on the routes of Petaling and the output is analysed in HDM-4. The result of this research provides a 10 years forecast maintenance budget in maintaining the roads in Petaling. This allows the local authority to perform good practice in term of maintaining the roads while at the same time helps them in forecasting their budget for the upcoming years. This research will have a strong impact on the local socio-economy as well as local road user confidence towards the authority over good practices. This research can be further expanded to other type of roads as well as highway bridges.

COMPARISON ON DIELECTRIC PROPERTIES OF VEGETABLE OILS AND MINERAL OIL WITH DIFFERENT AGEING TIME

M. T. Ishak, M. M. Ariffin and M. H. Roslan
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Abstract. Sustainable development is growing importance issues nowadays and requires the consideration of environmental criteria to develop of all new materials and equipment. A better balance must be found in properties of oils so that the impact on the environment can be minimized. In transformers, a stable liquid, inert, with good electrical and thermal properties is necessary and the liquid must be non-toxic to environment and readily biodegradable. The objective of this research is to make a comparative study of different vegetable oils: Palm oil, Corn Oil, Rice Bran Oil and analyze the dielectric properties such as relative permittivity, dielectric constant and resistivity with variation temperature 30°C – 90°C and breakdown voltage with different ageing time 30 days, 90 days and 180 days. The dielectric properties data of the vegetable oils are compared with the transformer oil (Mineral oil) and appropriate causes for similarities and different have been discussed.

EFFECT OF HEXAMETHYLENETETRAMINE (HMT) CONCENTRATION ON THE PERFORMANCE OF DYE-SENSITIZED SOLAR CELL (DSSC) UTILIZING BORON DOPED ZNO NANOTUBE PHOTOANODE

L. Roza, I. Iwantono, G. Andika**,** A. A. Umar and M. Y. A. Rahman
Universiti Kebangsaan Malaysia and Universitas Riau

Abstract. This paper reports the effect of hexamethylenetetramine (HMT) concentration on the structural, morphological and optical properties of B-doped ZnO nanotubes arrays. B-doped ZnO nanotubes were employed as anode in dye-sensitized solar cells (DSSCs). The effect of these properties on the photovoltaic performance was also studied. B-doped ZnO nanotube arrays were prepared via hydrothermal technique on FTO substrate at constant concentration of zinc nitrate. The field emission scanning electron microscopy (FESEM) images indicate that the density and length of B-doped ZnO nanotubes increase with the concentration of HMT. However, the diameter decreases with the increase of HMT concentration. The J_{SC}, V_{OC}, FF and η of 1.48 mA cm^{-2}, 0.38 V, 0.39 and 0.224%, respectively have been obtained by the DSSC utilizing B-doped ZnO nanotube prepared at 0.06 M HMT.

DEVELOPMENT, CHARACTERIZATION & MACHINING OF AL & SICP NANO PARTICLES METAL MATRIX NANO COMPOSITE

P. K. Swain, A. K. Sahoo, R. Das and P. Padhi
KIIT University and Konark Institute of Science & Technology, India

Abstract. The present study has been developed to ensure proper mixing of SiCp nano particle with powder of aluminum metal matrix. Different wt fraction of SiCp 1, 1.5, and 2% samples were prepared for characterization of nano composite material. The paper deals with the influence of different machining parameters at different wt fraction of SiCp in aluminum metal matrix. It was also observed that the cutting forces are affected by dry turning machining operation. As result, high cutting forces were required for machining of high percentage of SiCp nano particles. The study also deals with the dispersion of nano particle & segregation of the particles near the grain boundaries due to grain growth.

HYPERVELOCITY PENETRATION AGAINST MECHANICAL PROPERTIES OF TARGET MATERIALS

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Universiti Pertahanan Nasional Malaysia and Universiti Malaysia Perlis

Abstract. This paper study the mechanical properties behavior of metal plates against hypervelocity penetration caused by shaped charge. Five different materials were used as target specimen fabricated from welded stacks of material plates, namely Rolled Homogeneous Armor (RHA), Hardox-500, mild steel, aluminum and brass. Specimens had undergone an initial monolithic test consist of tensile tests and microstructure observations, followed by series of hydrodynamics penetration blast tests using shape charge mechanism. Results from blast test shows that the least penetrated specimen is RHA (58mm) followed by Hardox-500 (92 mm), mild steel (110 mm), Brass (155 mm) and aluminum 238 mm). Comparing these with the specimen yield strength, tensile test results shows that Hardox-500 has higher yield strength (S_y) followed by RHA, mild steel, brass and aluminum, which are 1370 MPa, 1320 MPa, 280,221 and respectively, which are not inversely proportional to the penetration. However, the ultimate tensile strength (S_{ut}) where the RHA were the highest followed by Hardox-500, Mils steel, brass and aluminum, were inversely proportional with the depth of penetration. The penetration results also show consistence relation with energy absorption.

EFFECT OF HEXAMETHYLENETETRAMINE (HMT) CONCENTRATION ON THE PROPERTIES OF BORON DOPED ZNO NANOTUBES ARRAY FILMS AND THE PERFORMANCE OF DYE-SENSITIZED SOLAR CELL (DSSC)

L. Roza**,** I. Iwantono, G. Andika**,** A. A. Umar, M. Y. A. Rahman
Universiti Kebangsaan Malaysia and Universitas Riau

Abstract. This paper reports the effect of hexamethylenetetramine (HMT) concentration on the structural, morphological and optical properties of B-doped ZnO nanotubes arrays. B-doped ZnO nanotubes were employed as anode in dye-sensitized solar cells (DSSCs). The effect of these properties on the photovoltaic performance was also studied. B-doped ZnO nanotube arrays were prepared via hydrothermal technique on FTO substrate at constant concentration of zinc nitrate. The field emission scanning electron microscopy (FESEM) images indicate that the density and length of B-doped ZnO nanotubes increase with the concentration of HMT. However, the diameter decreases with the increase of HMT concentration. The J_{SC}, V_{OC}, FF and η of 1.48 mA cm^{-2}, 0.38 V, 0.39 and 0.224%, respectively have been obtained by the DSSC utilizing B-doped ZnO nanotube prepared at 0.06 M HMT.

MODIFICATION OF BITUMEN USING POLYACRYLIC WIG WASTE

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Universiti Malaysia Pahang

Abstract. This paper presents a study about the potential of polyacrylic wig waste (PAWW) as an additive in road micro surfacing (RMS). The idea is to mix the PAWW with bitumen to produce a polymer modified bitumen (PMB). The available highest quality grade of bitumen from the industry with the grade 80-100 mm penetration grade is the unmodified bitumen with PAWW or known as modacrylic fiber that has different percentages of Polyacrylic (PA) wig in each sample. In this study, 3 different ratios were tested which are 99:1, 96:4, and 93:7 %wt of unmodified bitumen to PAWW. The prepared samples were then tested by using the penetration test and softening point test. The results indicated that polymer modification improved the conventional properties such as penetration test and softening point test. The polyacrylic wig waste (PAWW) has potential to be used as additive in road micro surfacing (RMS).

FLEXURAL BEHAVIOR OF THE FIBROUS CEMENTITIOUS COMPOSITES (FCC) CONTAINING HYBRID FIBRES

M. Ramli, C. C. Ban and M. F. Samsudin
Universiti Sains Malaysia

Abstract. In this study the flexural behavior of the fibrous cementitious composites containing hybrid fibers was investigated. Waste materials or by product materials such as pulverized fuel ash (PFA) and ground granulated blast-furnace slag (GGBS) was used as supplementary cement replacement. In addition, barchip and kenaf fiber will be used as additional materials for enhance the flexural behavior of cementitious composites. A seven mix design of fibrous cementitious composites containing hybrid fiber mortar were fabricated with PFA-GGBS as cement replacement at 50% with hybridization of barchip and kenaf fiber between 0.5% and 2.0% by total volume weight. The FCC with hybrid fibers mortar will be fabricated by using 50 x 50 x 50 mm, 40 x 40 x 160 mm and 350 x 125 x 30 mm steel mold for assessment of mechanical performances and flexural behavior characteristics. The flexural behavior and mechanical performance of the PFA-GGBS with hybrid fiber mortar block was assessed in terms of load deflection response, stress-strain response, crack development, compressive and flexural strength after water curing for 28 days. Moreover, the specimen HBK 1 and HBK 2 was observed equivalent or better in mechanical performance and flexural behavior as compared to control mortar.

RECONFIGURABLE ANTENNA USING PLASMA REFLECTOR

M. T. Jusoh, M. Himdi, F. Colombel and O. Lafond
Universiti Pertahanan Nasional Malaysia

Abstract. This paper presents the feasibility study and design of plasma implementation in industrial, scientific and medical (ISM) communication band. A reflector antenna with rounded shaped is proposed to collimate beam in particular direction radiated by a quarter wave antenna operating at 2.4GHz. The simulations result has shown that by using plasma as the reflector elements, the gain, directivity and radiation patterns are identical with metal elements with only small different in the broadside direction. The versatility of the antenna is achievable by introducing electrical reconfigurable option to change the beam pattern.

FINE GRANULAR OF SHREDDED WASTE TYRE FOR ROAD CURB APPLICATION AS IMPROVISED ROAD FURNITURE

M. Vikneswaran, M. A. Yahya, M. A. Yusof and M. H. F. Radzi
Universiti Pertahanan Nasional Malaysia

Abstract. Solid waste management in Malaysia was still in a backward stage. Population growth, urbanization and rapid industrialization led to an increase in the solid waste generated by society. Solid waste management is one of the main problems faced by the community, especially in the city. Solid waste management costs of the collection, collecting, transporting waste to the landfill, is very high. The quantity of solid waste should be reduced in order to reduce government spending. Moreover, improper solid waste management caused negative impact on people and the environment. Method of recycling is one of the best alternative to reduce the number of solid waste. Therefore, this study was to identify methods of recycling used tires to be used in civil engineering. This study was conducted to determine the effectiveness and properties of rubber from used tires to be add in the street curbs design.

DEVELOPMENT AND MECHANICAL CHARACTERISATION OF GREEN BAMBOO COMPOSITES

A. Ali, W. K. Ng, F. Arifin, K. Rassiah , F. Othman, M. S. Hazin and M. M. H. Megat Ahmad
Universiti Pertahanan Nasional Malayasia and Politeknik Port Dickson

Abstract. In this study, a bamboo composite is developed using specific bamboo species known as Gigantochloa Scortechinii (Buluh Semantan), which can be found in Malaysia. In precise, the woven bamboo (WB) was formed from the culm fier composite with an average of 0.5 mm thickness and 5.0 mm width strip, is laminated with Wowen E Glass (WEG) and reinforced with epoxy (EP). The laminated was using a hand lay-up technique. The developed bamboo composites are then characterised comprehensively in the term of tensile, hardness, impact, fatigue and fracture test. It is found that the strength was équivalent with the existing steel alloy in term of tensile and fracture properties.

THE EFFECTS OF DIFFERENT HEAT TREATMENT ANNEALING ON STRUCTURAL PROPERTIES OF LAFE$_{11.5}$SI$_{1.5}$ COMPOUNDS

Y. N. A. Norizan and M. F. Md Din
Universiti Pertahanan Nasional Malaysia

Abstract. The cubic NaZn$_{13}$-type LaFe$_{13-x}$Si$_x$ based compounds have been studied systematically and has become one of the most interesting systems for exploring large MCE. Its magnetic properties are strongly doping dependent and provides many of advantage compare to other as magnetic materials for magnetic refrigerator application. In other to produce high quality of cubic NaZn$_{13}$-type structure, the structural properties of LaFe$_{11.5}$Si$_{1.5}$ compounds annealed at different temperature have been investigated. The LaFe$_{11.5}$Si$_{1.5}$ compounds was prepared by arc melting and annealed at two different heat treatment which are 1323 K for 14 days and 1523 K for 4 hour. The powder X-ray diffraction (XRD) shows that a short time and high temperature annealing process has benefits for the formation of the NaZn$_{13}$-type phase compared to a long time and low temperature annealing process. This is shown by the weight fraction of cubic NaZn$_{13}$- type structure increases from 80% for low temperature annealing to 83% for high temperature annealing. At the same time, high temperature annealing increase the main structure and decrease the impurity (α-Fe and LaFeSi). Furthermore, it can be clearly seen in the Rietveld refinement results that the lattice parameter is increase at the high temperature annealing because of more cubic NaZn$_{13}$ is formed at higher temperature.

POWER FACTOR REGULATION FOR HOUSEHOLD USAGE

N. G. Nik Daud, F. R. Hashim and M. H. Ahmad Tarmizi
Universiti Pertahanan Nasional Malaysia

Abstract. Power factor regulator technology has recently drawn attention to the consumer and to power generation company in order for consumers to use electricity efficiently. Controlling of power factor for efficient usage can reduce the production of power in fulfilment demands hence reducing the greenhouse effect. This paper presents the design method of power factor controller for household usage. There are several methods to improve the power factor. The power factor controller used by this method is by using capacitors. Total harmonic distortion also has become a major problem for the reliability of the electrical appliances and techniques to control it will be discussed.

PRELIMINARY DEVELOPMENT OF A WING IN GROUND EFFECT VEHICLE

R. Abidin, M. A. Ahamat, T. Ahmad, M. R. Saad and E. Hafizi
Universiti Pertahanan Nasional Malaysia and Universiti Kuala Lumpur

Abstract. Wing in ground vehicle is one of the mode of transportation that allows high speed movement over water by travelling few meters above the water level. Through this manouver strategy, a cushion of compressed air exists between the wing in ground vehicle wings and water. This significantly increase the lift force, thus reducing the necessity in having a long wing span. Our project deals with the development of wing in ground vehicle with the capability of transporting four people. The total weight of this wing in ground vehicle was estimated at 5.4 kN to enable the prediction on required wing area, minimum takeoff velocity, drag force and engine power requirement. The required takeoff velocity is decreases as the lift coefficient increases, and our current mathematical model shows the takeoff velocity at 50 m/s avoid the significant increase in lift coefficient for the wing area of 5 m^2. At the velocity of 50 m/s, the drag force created by this wing in ground vehicle is well below 1 kN, which required a 100-120 kW of engine power if the propeller has the efficiency of 0.7. Assessment on the stresses and deflection of the hull structural indicate the capability of plywood to withstand the expected load. However, excessive deflection was expected in the rear section which requires a minor structural modification. In the near future, we expect that the wind tunnel tests of this wing in ground vehicle model would enable more definite prediction on the important parameters related to its performance.

MAGNETIC ENTROPY CHANGE IN LAYERED $NDMN_{1.8}CU_{0.2}SI_2$ FOR MAGNETIC REFRIGERATOR APPLICATION

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Universiti Pertahanan Nasional Malaysia and Universiti Kebangsaan Malaysia

Abstract. Structural and magnetic properties of layered NdMn1.8Cu0.2Si2 have been investigated by high intensity X-ray and resolution neutron diffraction (3-450 K), specific heat, dc magnetization and differential scanning calorimetry measurements. Substitution of Cu for Mn leads to an increase in the lattice parameter a but a decrease in c at room temperature. Two magnetic phase transitions have been found for layered NdMn1.8Cu0.2Si2 with TN for the antiferromagnetic ordering of Mn-sublatttice and TC for the Nd-sublattice ferromagnetic ordering. TC increases significantly with increasing Cu content from 36 K at x=0 to 44 K at x=0.2. Moreover, it is found that the order of magnetic phase transition around TC consistence with first order magnetic transition for layered NdMn1.8Cu0.2Si2. The spontaneous magnetization found to decrease with the increase in Cu concentration which can be understood in the term of the dilution effect of Cu for Mn. The values of magnetic entropy change, $-\Delta SM$ around Tc decrease with increasing x from 27 J kg−1 K−1 for x=0 to 13 J kg−1 K−1 for x=0.2 under 0-5 T field. Refinement of neutron diffraction patterns for layered NdMn1.8Cu0.2Si2 confirms the magnetic states detected by magnetic study and also indicates that the lattice constants a and c show a distinct variation around Tc.

FEASIBILITY STUDY ON PARAFFIN-BASED FUELS FOR HYBRID ROCKET MOTOR APPLICATIONS

R. Abidin, M. A. Ahamat, T. Ahmad, M. R. Saad and E. Hafizi
Universiti Pertahanan Nasional Malaysia and Universiti Kuala Lumpur

Abstract. Wing in ground vehicle is one of the mode of transportation that allows high speed movement over water by travelling few meters above the water level. Through this manouver strategy, a cushion of compressed air exists between the wing in ground vehicle wings and water. This significantly increase the lift force, thus reducing the necessity in having a long wing span. Our project deals with the development of wing in ground vehicle with the capability of transporting four people. The total weight of this wing in ground vehicle was estimated at 5.4 kN to enable the prediction on required wing area, minimum takeoff velocity, drag force and engine power requirement. The required takeoff velocity is decreases as the lift coefficient increases, and our current mathematical model shows the takeoff velocity at 50 m/s avoid the significant increase in lift coefficient for the wing area of 5 m^2. At the velocity of 50 m/s, the drag force created by this wing in ground vehicle is well below 1 kN, which required a 100-120 kW of engine power if the propeller has the efficiency of 0.7. Assessment on the stresses and deflection of the hull structural indicate the capability of plywood to withstand the expected load. However, excessive deflection was expected in the rear section which requires a minor structural modification. In the near future, we expect that the wind tunnel tests of this wing in ground vehicle model would enable more definite prediction on the important parameters related to its performance.

QUALITY ASSURANCE FUNCTIONS IN A DIESEL GENERATOR ASSEMBLY UNIT: A PRACTICAL APPROACH

M. Y. Jamil
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Abstract. Generator expected life, reliability and integrity in service is directly linked to design and manufacturing performance in the factory. In order to verify this performance, users develop purchase technical specifications which include quality assurance tests that are required on all main generator components during the manufacturing process, as well as on the final product. These tests are in most of the cases based on international standards and Original Equipment Manufacturer (OEM) procedures but in some cases, users specify quality assurance tests that are not included in the OEM manufacturing quality assurance standards. This paper will focus on the Quality Assurance testing at the following stages in order to ensure the dispatch of defect free Generators to the end users. The theme of the paper is purely based upon the practical approach and this is concerned with the practical experience of the author gained during the course of his experience in a Diesel generator assembly unit. Following are the various stages at which Quality assurance steps have been established; Coming Inspections of the Fabricated items including Canopy, Skid, Silencer etc., Process inspections including Stage Wise Inspections at Coupling, Panel and Assembly stages, Inspection and Testing performed which include Sound Test, Load Test and Pre – Delivery (PDI) Inspections. This paper discusses each stage wise Quality checks which are being applied for improving plant operation, lower costs of re - works, Repetitive Supply of Delivery of Defect Free Generators to the Valuable Clients, Achievement of Technical Specifications as specified by the Clients, Enhanced Client's Satisfaction and better control over the Assembly Processes. This paper will contribute towards body of knowledge for the sake of benefit to the community involved in the assembly of Generators.