

Record 1 of 105

Title: The effect of temperatures and extraction time on bio oil extracted from banana peel wastes

Author(s): Hamid, HA (Hamid, H. A.); Masripan, NAB (Masripan, N. A. B.); Abdollah, MFB (Abdollah, M. F. B.); Hasan, R (Hasan, R.); Omar, G (Omar, G.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 1-2 **Published:** 2016

Abstract: Bio oil extracted from various part of edible and non-edible plants offer several potential applications such as a biodegradable lubricant. In this study, banana peels which known as waste and often ignored was subjected to solven extraction via soxhlet method. Moreover, the extraction of oil from banana peels wastes of *Musa aluminata balbisiana* (MBS) was performed and optimized. The effects of temperatures and extraction time were investigated in order to optimize the extraction conditions for achieving maximum oil obtained. The optimum conditions using n-hexane as a solvent of extractor was found at the temperatures of 68 degrees C and 7 hours of reaction times whereby the extraction recovery was 62.42% with 3.6 mL of oil obtained.

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ISBN: 978-967-0257-70-9

Record 2 of 105

Title: Field test of regenerative suspension system on an actual vehicle

Author(s): Jamil, JF (Jamil, J. F.); Abdullah, MA (Abdullah, M. A.); Mohan, AE (Mohan, A. E.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 3-4 **Published:** 2016

Abstract: The technology of hybrid and electric vehicle are rapidly developed in the past few years because the main resource of vehicle energy is not renewable which is known as fossil fuel. It will be depleted in the future. This research emphasizes the test of the energy regenerative suspension system (EReSS) that uses as the alternative energy resource for the vehicle. It can be used on the vehicle as it can produce voltage output for charging the vehicle battery or other electronic components. The EReSS is attached to the stock vehicle suspension system and the test is done on a road with low traffic situation with various conditions. The voltage produced by the EReSS is maximized by optimizing the resistor in the circuit of half bridge which converts the alternate current (AC) to direct current (DC). The maximum voltage produced by the EReSS during the test is recorded and discussed.

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Record 3 of 105

Title: The improvement and laboratory testing of regenerative suspension system

Author(s): Mohan, AE (Mohan, A. E.); Abdullah, MA (Abdullah, M. A.); Jamil, JF (Jamil, J. F.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 5-6 **Published:** 2016

Abstract: Nowadays, the requirement for more efficient vehicle is essential in the field of alternative energy and very crucial for automation industry. The aim of this paper is to ensure the enhancement of regenerative suspension system (EReSS) in order to obtain energy efficient vehicle (EEV). Accomplishment of laboratory testing was to ensure the improvement in the suspension system. Consequently, the output voltage can be increased if an improvement in the materials has been occurred. The results indicated that the proposed system can minimize the vibration's energy wastage and result in an effective vehicle in terms of electrical and electronic utilization

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Record 4 of 105

Title: Performance of compressed natural gas (CNG) engine with pre chamber

Author(s): Ali, MS (Ali, M. S.); Musthafah, MT (Musthafah, M. T.); Shafei, AMM (Shafei, A. M. Mohd); Khairil, AMT (Khairil, A. M. T.); Nor, NFM (Nor, N. F. M.); Bakar, RA (Bakar, R. A.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 7-8 **Published:** 2016

Abstract: Pre chamber is use to extend lean limit of mixture and improve combustion efficiency. Pre chamber used in this study was pre chamber without auxiliary fuel. Then, this pre chamber was applied to single cylinder compressed natural gas engine. The effects of pre chamber on CNG performance are increase in power and torque starting at engine speed 3000 rpm. However, disadvantage by the pre chamber had been discovered on the brake specific fuel consumption (BSFC). It caused the BSFC by CNG was higher than a CNG without pre chamber.

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Record 5 of 105

Title: Validation of automotive passive engine mount system

Author(s): Harun, MH (Harun, M. Hafiz); Sariman, MZ (Sariman, M. Z.); Yamin, AKM (Yamin, A. K. Mat); Yunos, R (Yunos, R.); Azhari, MA (Azhari, M. A.); Ahmad, F (Ahmad, F.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 9-10 **Published:** 2016

Abstract: Engine mount has been designed to improve the engine vibration by providing unwanted vibration isolation from engine to the driver. There are three types of engine mount systems which consist of passive, semi-active and active engine mount system. This study emphasizes on the validation of mathematical equation derived from Newton Second Law of Motion with real time experiment. The engine mount characteristic generated using a 3-degree of freedom (DOF) mathematical modelling

simulated in Matlab Simulink software. Finally, the mathematical model was verified by using experimental approach. The result from the experiment and simulation shows that the model is enables to generate the similar response as in the experimental result.

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Record 6 of 105

Title: Optimization of friction coefficient of kenaf/epoxy composites as an alternative friction material using Taguchi method

Author(s): Mustafa, A (Mustafa, A.); Abdollah, MFB (Abdollah, M. F. B.); Amiruddin, H (Amiruddin, H.); Shuhimi, FF (Shuhimi, F. F.); Tahir, NAM (Tahir, N. A. M.); Muhammad, N (Muhammad, N.); Kamal, SEM (Kamal, S. E. Mat); Ismail, N (Ismail, N.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 11-12 **Published:** 2016

Abstract: This paper introduces the application of Taguchi optimization methodology in optimizing the design factors for obtaining high friction coefficient of kenaf/epoxy composites under dry sliding condition. An orthogonal array of the Taguchi method was set-up and used to analyse the effect of the design parameters on the friction coefficient. Tribological testing was conducted using a pin-on-disc tribometer. For the highest friction coefficient, 45wt.% non-treated kenaf fiber sliding at 19.62N, 500rpm and 100 degrees C is found to be the optimized combination of levels of all the six control factors. The confirmation test proves that the optimized friction coefficient is within the range of friction coefficient of conventional friction material.

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ISBN: 978-967-0257-70-9

Record 7 of 105

Title: Application of waste chicken fat in base catalyzed (potassium hydroxide) biodiesel production

Author(s): Razak, NH (Razak, N. H.); Safari, MIAKM (Safari, M. I. A. K. M.); Merican, HA (Merican, H. A.); Ghafar, F (Ghafar, F.); Zulkafli, NI (Zulkafli, N. I.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 13-14 **Published:** 2016

Abstract: The objective of this research was to analyze the effect of temperature, catalyst ratio and methanol ratio on biodiesel yield from waste chicken fat. The optimum yield were 95.4% with 0.006 w/w catalyst and 0.3 w/w alcohol at 50 degrees C. The product density was 873.4 kg/m³, the iodine value, 117 g I/100g and the acid value, 0.561 mg KOH/g. The compositions of fatty acids were 0.22% of methyl laurate, 19.98% of methyl palmitate, 41.08% of methyl stearate and 0.17% of methyl linoleate. Consequently, the biodiesel obtained under these conditions had characteristics very similar to those described in the ASTM standards.

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ISBN: 978-967-0257-70-9

Record 8 of 105

Title: Brake insulator analysis in reducing internal brake squeal noise

Author(s): Abdullah, MA (Abdullah, M. A.); Efariani, AR (Efariani, A. R.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 15-16 **Published:** 2016

Abstract: Brake functions when two different materials are in contact to reduce a motion. Due to surface irregularity, this contact at high revolution and contact force produce irritating noise called brake squeal noise. This paper presents the study of introducing brake insulator into the brake assembly in order to reduce the noise. Different configurations of insulators are used in the Finite Element Analysis (FEA). The squeal is shown by positive real part of the baseline graph. The accompanied slip rate in the baseline model of the insulator increases the brake squeal noise significantly.

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Record 9 of 105

Title: Influence of tire stiffness and sprung mass on ride quality

Author(s): Saad, AM (Saad, A. Md); Salim, MA (Salim, M. A.); Harun, MH (Harun, M. H.); Mansor, MR (Mansor, M. R.); Akop, MZ (Akop, M. Z.); Musthafah, MT (Musthafah, M. T.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 17-18 **Published:** 2016

Abstract: Automobile ride quality is a vehicle characteristic of great importance. It is a factor that consumer is very sensitive to, and which can have a profound influence on passenger comfort. The purpose of this study is to investigate the effects of tire stiffness and sprung mass on ride quality. Numerical simulation is used by representing ideal physical of vehicle quarter car model into Bond Graph. By lowering tire stiffness, it reduces the worst frequency response due to external force but the natural frequency of the system remains the same. However, by increasing the sprung mass, it reduces the natural frequency of the system but the worst frequency due to external forces is comparably same.

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Record 10 of 105

Title: Driving behaviour analysis of young vehicle drivers

Author(s): Abdullah, MA (Abdullah, M. A.); Rahim, MAHA (Rahim, M. A. H. Abdul)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 19-20 **Published:** 2016

Abstract: Different driver carries different driving behaviour and style. The most dangerous behaviour is the aggressive behavior, normally for young drivers. This behaviour can cause danger to the driver and other people. The driving behaviour can be detected from the way they control the vehicle during cornering, through uneven road and during accelerating and decelerating. How they handle the vehicle can be seen from the values of roll, pitch and yaw moments and x, y, z accelerations. The driving behaviour can be identified and classified according to the data collected. Usually at a higher value of moments and accelerations, the vehicle was controlled by the driver with quite aggressive driving style. In this paper, a number of young vehicle drivers are selected to perform driving test. From the test data, they will be classified based on the range of values.

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Record 11 of 105

Title: Effect of hydrogen injection on diesel engine performance intake: Preliminary result

Author(s): Norani, MNM (Norani, M. N. M.); Tee, BT (Tee, B. T.); Zulfattah, MZ (Zulfattah, M. Z.); Saadun, MNA (Saadun, M. N. A.); Hussain, A (Hussain, A.); Mansor, MN (Mansor, M. N.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 21-22 **Published:** 2016

Abstract: In automotive industry, diesel engine knows as a compression ignition engine plus was a better performance compared to gasoline engines. However, it contributes to environmental problem by causing global emission. In order to reduce the emission, hydrogen injection has been introduced on diesel performance intake. Thus, this research was about analyzed the effect of hydrogen gas inside the intake of a single cylinder diesel engine. Two conditions with and without hydrogen will be analyzed by comparing the diesel fuel consumption on different rotational speed of the crankshaft. Based on the preliminary result, hydrogen injection to the diesel engine can saved the fuel up to 16.82% from 200RPM until 2000RPM.

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Record 12 of 105

Title: Influence of transient response on suspension damping

Author(s): Saad, AM (Saad, A. Md); Salim, MA (Salim, M. A.); Harun, MH (Harun, M. H.); Mansor, MR (Mansor, M. R.); Akop, MZ (Akop, M. Z.); Musthafah, MT (Musthafah, M. T.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 23-24 **Published:** 2016

Abstract: Suspension system is one the most important components that affects overall performance of a vehicle. Determination of proper suspension damping is crucial to improve ride quality. The purpose of this study is to investigate the effects of transient response on suspension damping. Numerical simulation is used by representing ideal physical of vehicle quarter car model into Bond Graph. By lowering suspension damping, it reduces magnitude of rapid acceleration of the vehicle when it hits a bump. But, it takes longer time for the response to die out. However, by increasing the suspension damping, it increases magnitude of rapid acceleration significantly.

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Record 13 of 105

Title: Experimental Investigation of engine performance and emission for biodiesel at various storage conditions

Author(s): Tamaldin, N (Tamaldin, N.); Mohamad, AS (Mohamad, A. S.); Humairak, Y (Humairak, Y.); Husin, MHK (Husin, M. H. K.); Abdollah, MFB (Abdollah, M. F. B.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 25-26 **Published:** 2016

Abstract: The aim of this paper is to evaluate the engine performance of high blending biodiesel. Biodiesel palm oil will be used as the main blending material. The types of biodiesel for this study are B7x, B8x and B9x. All biodiesel were blended and stored at three different storage conditions. Based on the best properties, one type of biodiesel is chosen to be tested to get the engine performance. Results, performance by using biodiesel B7x is slightly decreasing about 2-8% less of engine horse power and 4-10% less in torque. Biodiesel B7x can perform satisfactorily during diesel engine.

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Record 14 of 105

Title: Effect of storage duration on the fuel properties of different biodiesel blends

Author(s): Tamaldin, N (Tamaldin, N.); Harun, F (Harun, F.); Humairak, Y (Humairak, Y.); Husin, MHM (Husin, M. H. M.); Abdollah, MFB (Abdollah, M. F. B.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 27-28 **Published:** 2016

Abstract: In this paper, the impacts of biodiesel properties are identified according to the storage condition and weight percentage of the fuel in a period of time. The samples used are standard diesel (STD), B7x, B8x and B9x were stored for 5 weeks. There are three fuel properties being tested which are flash point, density and water content. All experiment carried out are according to respective ASTM standard. The properties changes of biodiesel were not significant throughout five weeks' time due to the short time of storage except for water content.

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Record 15 of 105

Title: The effect of increasing current to temperature of alternator

Author(s): Mazlan, RK (Mazlan, R. K.); Dan, RM (Dan, R. M.); Zulfattah, MZ (Zulfattah, M. Z.); Hamid, AHA (Hamid, A. H. A.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 29-30 **Published:** 2016

Abstract: Alternator is a major component in the charging system. Alternator act as main power source, providing current to power the electrical component in a vehicle. As more power demand, the more current is produced, and the more heat is generated. This heat has contributed an increase of under hood ambient temperature. An experiment has been done to investigate how the current and heat relate to each other. The car used is Proton Preve 1.6L Manual. The alternator has a rating of 12V/90A. The result shows that temperature increase exponentially with increase of current.

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Record 16 of 105

Title: Experimental study of noise level for car engines

Author(s): Rizainal, MR (Rizainal, M. R.); Salim, MA (Salim, M. A.); Saad, AM (Saad, A. Md); Mansor, MR (Mansor, M. R.); Akop, MZ (Akop, M. Z.); Musthafah, MT (Musthafah, M. T.); Rosszainily, IRA (Rosszainily, I. R. A.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 31-32 **Published:** 2016

Abstract: In all driving conditions, engine will continuously generate unwanted noise and vibration. Excessive noise may cause discomfort to the driver and passengers. The purpose of this study is to investigate engine noise in two different engine operating conditions; engine loading and unloading. Simple approach is used to examine the noise level which is by using sound intensity probe that is integrated to a software. Test has been carried at different engine speed for both engine operating conditions; loading and unloading. Results show that noise level is higher when engine in loading condition.

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Record 17 of 105

Title: Influence of halo and source/drain implant variations on the drive current in p-channel vertical double gate MOSFET

Author(s): Kaharudin, KE (Kaharudin, K. E.); Salehuddin, F (Salehuddin, F.); Zain, ASM (Zain, A. S. M.); Aziz, MNIA (Aziz, M. N. I. A.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 33-34 **Published:** 2016

Abstract: This paper describes an investigation on the influence of process parameters such as Halo and Source/Drain (S/D) implantation on drive current (I-ON) in p-channel vertical DG-MOSFET device was done by utilizing L-9 orthogonal array Taguchi method. The level of significance for each process parameters on I-ON were determined by using analysis of variance (ANOVA). The virtual fabrication and electrical characterization of the device were performed by using a process simulator (ATHENA) and a device simulator (ATLAS) respectively. This procedure was followed by Taguchi modeling to aid in optimizing the process parameters variation towards I-ON. Based on the final results, the most dominant factor that affecting I-ON value was found to be S/D implant energy with 99% of factor effects on signal-to-noise ratio (SNR). Meanwhile, the highest possible I-ON value was found to be 323.2 mA/ μm .

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Record 18 of 105

Title: Comparison of flow analysis between flat and ring plastic parts using moldflow software

Author(s): Ali, MAM (Ali, Mohd Amran Md); Khalik, MF (Khalik, Mohd Faizal); Ghazaly, MM (Ghazaly, Mariam Md); Abdullahl, Z (Abdullahl, Zulkeflee)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 35-36 **Published:** 2016

Abstract: The flat and ring plastic part were designed using Solidwoks software to produce solid parts. Then the solid parts were imported in Autodesk Moldflow Insight (AMI) to analyze warpage deflection, fill time and weldline for both parts. Simulation result shows that the deflection for the flat plastic part is higher than the ring plastic part by 0.1466mm due to the bigger of volume and contact surface area for the flat plastic part. Meanwhile, fill time shows that the ring plastic part is longer 0.0458s then the flat plastic part due to the reduction of flow area. Finally, ring plastic part obviously shows weldline mark at flow front area however no weldline is observed at flat plastic part surface.

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Record 19 of 105

Title: Study of thinning effect from deep drawing process on crash analysis

Author(s): Amman, RM (Amman, R. M.); Halim, MF (Halim, M. F.); Sivakumar, D (Sivakumar, D.); Abu-Shah, I (Abu-Shah, I.); Sulaiman, MS (Sulaiman, M. S.); Samekto, H (Samekto, H.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 37-38 **Published:** 2016

Abstract: This study presents the effect of thinning on crash analysis results of a circular cup shape formed from deep drawing process. Forming and crash simulation of a circular cup was performed using Explicit Radioss code simulation solver. Circular cup shape formed from deep drawing with and without thickness effect was used to conduct explicit dynamic crash simulation. The effect of material thickness change from stamping process was studied. It was found that thinning effect from stamping causes the structural part to have a weaker crash response.

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Record 20 of 105

Title: Design, simulation and analysis of disc rotor using anycasting software

Author(s): Anuar, NFBW (Anuar, N. F. B. W.); Jani, N (Jani, N.); Kamal, MRM (Kamal, M. R. M.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 39-40 **Published:** 2016

Abstract: This project describes about the design and simulation of disc rotor in sand casting by using AnyCasting software. The analysis of this study is filling time, solidification time and defects on the three mold designs. The selected design in this study is design 2 referring the present defect that happened on the riser part. The filling time for design 2 is 7.6648 seconds and solidification time is 1452.6 seconds.

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 21 of 105

Title: Linear and nonlinear dynamic model of a gantry crane system

Author(s): Jaafar, HI (Jaafar, H. I.); Mohamed, Z (Mohamed, Z.); Ahmad, MA (Ahmad, M. A.); Ghazali, R (Ghazali, R.); Kassim, AM (Kassim, A. M.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 41-42 **Published:** 2016

Abstract: This paper investigates linear and nonlinear dynamic models for a Gantry Crane System (GCS). The system is a Single Input Multi Output (SIMO) system which a trolley displacement and payload oscillation as the outputs. The GCS is modeled by using the Lagrange Equation and both system responses are observed and analysed. The fundamental differences between the linear and nonlinear equations are presented. This analysis is beneficial for the development of efficient controllers for a GCS.

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Conference Title: Mechanical Engineering Research Day (MERD)

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 22 of 105

Title: Finite Element Modelling of microscale and macroscale on deformation of composite material

Author(s): Fuad, AGA (Fuad, Ab Ghani Ahmad); Dan, RM (Dan, Reduan Mat); Shariff, MI (Shariff, M. I.); Tak, TJ (Tak, Tan Joon)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 43-45 **Published:** 2016

Abstract: Performance prediction is an important aspect in confirming the correct design specification of composite materials. Finite Element Modelling (FEM) approach enables to calculate stress and strain components of a structure for more realistic strength predictions. In this study numerical simulation is performed using FEM method to simulate composite materials through tensile test at micro and macro level. The geometric for tensile test were according to ASTM D3039 for GFRP and CFRP. Micromodelling of composites were simulated based on theory of Representative Volume Element (RVE). It is found that RVE able to predict deformation and mechanical properties extraction of composite in unidirectional.

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 23 of 105

Title: Performance analysis of neural network models for sustainable manufacturing practices (SMP) and economy performances

Author(s): Abu, NH (Abu, N. H.); Jaya, ASM (Jaya, A. S. M.); Muhamad, MR (Muhamad, M. R.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 46-47 **Published:** 2016

Abstract: This study presents a development of neural network model based on the single hidden layer with 10, 12 and 15 neurons in the hidden layer. 150 data of sustainable manufacturing practices (SMP) were divided into 70% for training (104 data), 15% for validation (23 data) and 15% for testing (23 data). Two performance measures are used to validate the model which is mean square error (MSE) and R valued. It shows that neural network model with 10 neurons in hidden layer give better performance and can be used to predict the target output of sustainability performance.

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Conference Title: Mechanical Engineering Research Day (MERD)

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 24 of 105

Title: Multiobjective optimization of injection moulding process parameters using Grey Fuzzy method

Author(s): Ali, MAM (Ali, Mohd Amran Md); Ali, NIM (Ali, Noorfa Idayu Mohd); Ghazaly, MM (Ghazaly, Mariam Md); Abdullah, Z (Abdullah, Zulkeflee); Yacob, S (Yacob, Suhaila)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 48-49 **Published:** 2016

Abstract: Grey fuzzy method is used to find the multiobjective optimization of injection moulding process parameters. Various responses results are calculated by GRA for getting grey relational coefficients. Then values are used as input in MATLAB software by using FIS. It is found that optimum parameters for deflection, volumetric shrinkage, and residual stress are mould temperature at level 1, melt temperature at level 3, injection time at level 1 and cooling time at level 1.

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 25 of 105

Title: Force optimization of the permanent magnet switching flux (PMSF) and switching reluctance (SR) actuators using Finite Element Analysis

Author(s): Yusri, I (Yusri, I.); Ghazaly, MM (Ghazaly, M. M.); Alandoli, EA (Alandoli, E. A.); Rahmat, MF (Rahmat, M. F.); Abdullah, Z (Abdullah, Z.); Ali, MAM (Ali, M. A. Md); Ranom, R (Ranom, R.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 50-51 **Published:** 2016

Abstract: This paper addresses the force optimization of a rotary motion type of electromagnetic actuator that compares two types of motor; i.e. the permanent magnet switching flux (PMSF) motor and the switching reluctance (SR) motor. The force optimization is accomplished by manipulating the actuator parameters using Finite Element Analysis (FEM). The best result was achieved by the permanent magnet switching flux (PMSF) actuator compared to the switching reluctance actuator (SR); i.e. 4.367 kN when the initial parameters are varied with the excitation current 2A.

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 26 of 105

Title: Force optimizations of a tubular linear reluctance actuator (TLRA) and tubular linear permanent magnet actuator with Halbach array (TLPM)

Author(s): Jamaludin, AH (Jamaludin, A. H.); Ghazaly, MM (Ghazaly, M. M.); Yahya, TA (Yahya, T. A.); Amran, AC (Amran, A. C.); Abdullah, Z (Abdullah, Z.); Ali, MAM (Ali, M. A. M.); Ali, NM (Ali, N. M.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 52-53 **Published:** 2016

Abstract: This paper presents a characterizing study of two novel electromagnetic actuators i.e. Tubular Linear Reluctance Actuator (TLRA) and Tubular Linear Permanent Magnet Actuator with Halbach array (TLPM). The study concentrated on the varying parameter i.e. the number of winding turns and the air gaps. The simulation of 3D FEM analysis is used to show the differences between two designs in force and the effects of parameters variations.

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 27 of 105

Title: Development of a RFID inter-office document's delivery system via mobile robot

Author(s): Ghazaly, MM (Ghazaly, M. M.); Soo, KY (Soo, K. Y.); Abdullah, Z (Abdullah, Z.); Yaacob, MR (Yaacob, M. R.); Ho, CC (Ho, C. C.); Ng, CY (Ng, C. Y.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 54-55 **Published:** 2016

Abstract: This paper presents an efficient method of a mobile robot navigation system in an indoor environment. The mobile robot able to reduce heavy lifting and the repetitive tasks by workers. However, the navigation of robot in an indoor environment is a challenging task due to the requirement to avoid obstacle when in motion. Therefore in this paper, the design and develop of a mobile robot for an inter-office environment using Radio Frequency Identification (RFID) tag is discussed. The motions of the mobile robot are validated using several the trajectory patterns. In addition, the mobile robot is able to avoid obstacles.

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Conference Title: Mechanical Engineering Research Day (MERD)

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ISBN: 978-967-0257-70-9

Record 28 of 105

Title: Optimization using L9 Taguchi method toward threshold voltage of 18nm gate length SOI p-channel MOSFET

Author(s): Aziz, MNIA (Aziz, M. N. I. A.); Salehuddin, F (Salehuddin, F.); Zain, ASM (Zain, A. S. M.); Kaharuddin, KE (Kaharuddin, K. E.); Hanim, AR (Hanim, A. R.); Hazura, H (Hazura, H.); Idris, SK (Idris, S. K.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 56-57 **Published:** 2016

Abstract: Silicon on insulator (SOI) technology is proven to effectively counter the short channel effect. In this paper, the characterization of 18nm Gate Length of SOI p-channel MOSFET has been studied according to the latest prediction of the International Technology Roadmap Semiconductor (ITRS). The optimization approach is mainly focused on the threshold voltage (V-TH) of device through L-9 Taguchi method. There are four process parameters were varied into three different levels in order to conduct nine set of experiments. At the end of the experiments, the best setting of the process parameters that have been predicted by Taguchi method were used for verification. The result shows VTH after optimization approaches is closer to the nominal value (-0.533V), which is well within the ITRS 2013 specifications.

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 29 of 105

Title: Structural design and analysis of autonomous guided vehicle (AGV) for parts supply

Author(s): Ab Razak, MS (Ab Razak, Mohd Suffian); Rasit, KHM (Rasit, Khairul Hazwan Mohd); Nuri, NRM (Nuri, Nur Rashid Mat); Rashid, MZA (Rashid, M. Z. A.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 58-59 **Published:** 2016

Abstract: The world economic growth rapidly and becomes very competitive. AGV is introduced to support the supply system, however the initial investment is very high and it cannot convince a certain company to invest such amount of money for the system. In this project, the focus research is more on a low cost, lightweight AGV development. Lightweight design leads to less energy consume to carry its body. The purpose of this study is design an AGV that to be used in parts supply using polyboxes. The structural strength analyses are performed through computer aided engineering (CAE) simulation.

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ISBN: 978-967-0257-70-9

Record 30 of 105

Title: Design strategy for concept design of hybrid bio-composite automotive anti-roll bar using TRIZ

Author(s): Mastura, MT (Mastura, M. T.); Sapuan, SM (Sapuan, S. M.); Mansor, MR (Mansor, M. R.); Nuraini, AA (Nuraini, A. A.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 60-61 **Published:** 2016

Abstract: In this study, development of concept design of hybrid bio-composite automotive anti-roll bar (ARB) has been performed using TRIZ as its design strategy. Using Contradiction Matrix and 40 Inventive Principles, TRIZ suggested the concept design of the automotive ARB could consist of ribs for the reinforcement and multi diameter of ARB's arms in order to reduce weight. The new design improved the stiffness by reduces the maximum displacement by 22.5%. Thus, TRIZ has suggested a new concept design that could satisfy the properties of the materials without affecting its functions and performance.

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Conference Title: Mechanical Engineering Research Day (MERD)

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 31 of 105

Title: Development of a rotary axis mechanism for wire EDM turning (WEDT)

Author(s): Akmal, M (Akmal, M.); Izamshah, R (Izamshah, R.); Kasim, MS (Kasim, M. S.); Hadzley, M (Hadzley, M.); Amran, M (Amran, M.); Ramli, A (Ramli, A.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 62-63 **Published:** 2016

Abstract: Wire electro discharge turning (WEDT) is a non-conventional machining process that takes advantage of electrical discharge machining (EDM) sparking phenomenon assisted by rotary axis. Incorporating the additional axis increase the wire electrical discharge machining (WEDM) capability for machining hardened and intricate cylindrical parts especially when conventional machining have failed to perform. This research emphasizes on the development of additional rotary axis mechanism in WEDT as well as evaluation for machining capabilities in blending of macro-micro feasible dimension and shapes.

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 32 of 105

Title: Optimal PID sliding surface for sliding mode control based on particle swarm optimization algorithm for an electro-hydraulic actuator system

Author(s): Soon, CC (Soon, C. C.); Ghazali, R (Ghazali, R.); Jaafar, HI (Jaafar, H. I.); Hussien, SYS (Hussien, S. Y. S.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 64-65 **Published:** 2016

Abstract: This paper presents the assessment on the sliding mode control (SMC) integrated with proportional-integral-derivative (PID) sliding surface which is optimized through particle swarm optimization (PSO) algorithm. The control scheme is established from the derived dynamic equation which stability is proven through Lyapunov theorem. In the evaluation of PID sliding surface, conventional Ziegler-Nichols (ZN) tuning method has been utilized to obtain the controller parameters and compared with the optimized controller parameters through PSO algorithm which is employed to the electro-hydraulic actuator (EHA) system to evaluate its positioning tracking performances. From the obtained simulation results, it can be concluded that the PSO tuning algorithm outperform the conventional ZN tuning method.

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ISBN: 978-967-0257-70-9

Record 33 of 105

Title: Experimental analysis of 3D gantry crane system via optimal PID and PD controller by PSO

Author(s): Hussien, SYS (Hussien, S. Y. S.); Ghazali, R (Ghazali, R.); Jaafar, HI (Jaafar, H. I.); Soon, CC (Soon, C. C.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 66-68 **Published:** 2016

Abstract: A 3D INTECO gantry crane system is used for lifting and moving loads horizontally, lowering and releasing the gripper to the original position. There are two main problems which occurred in the system which are positioning the desired position and minimize the payload oscillation. In order to overcome this problem, a controller is implemented. In this paper, a control strategy of PID and PD controller tuned by Particle Swarm Optimization (PSO) is presented. PID controller is used to control the trolley movement to reach at the precise desired position and PD controller is used to control the undesired oscillation from the payload while moving the load. The results shown that through the experimental platform, the trolley reached the desired position with low payload oscillation.

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ISBN: 978-967-0257-70-9

Record 34 of 105

Title: Strength and porosity of additively manufactured PLA using a low cost 3D printing

Author(s): Habeeb, HA (Habeeb, H. A.); Alkahari, MR (Alkahari, M. R.); Ramli, FR (Ramli, F. R.); Hasan, R (Hasan, R.); Maidin, S (Maidin, S.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 69-70 **Published:** 2016

Abstract: Nowadays, with rapid advancement in 3D printing, a relatively low cost 3D for polymer based printers using an open-source self-replicating prototype has increasingly been used in many applications. The printer variants can fabricate any complex parts. In this study, the tensile strength and porosity of PLA and its utilization

in 3D printing for standard usage of low cost 3D printers using open- source has been investigated. It was found that, the parts printed from a low cost 3D printer produce relatively acceptable tensile strength and porosity as those from mid-range commercial manufacturer.

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 35 of 105

Title: Optimization of warping deformation in open source 3d printer using response surface method

Author(s): Nazan, MA (Nazan, M. A.); Ramli, FR (Ramli, F. R.); Alkahari, MR (Alkahari, M. R.); Sudin, MN (Sudin, M. N.); Abdullah, MA (Abdullah, M. A.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 71-72 **Published:** 2016

Abstract: The purpose of this paper is to minimize the warp deformation that usually occurs in plastic part produced by open source 3D printer. The process involved 3D solid modeling design, 3D printing with coated adhesive applied on the printing platform, warping deformation measurement and statistical analysis. The optimization processes involved Design on Experiment (DOE) technique where Responses Surface Methodology (RSM) by using Minitab software was applied. The experiment produced the minimum result of warping deformation value when layer temperature, infill density, first layer height and other layer height is 192 degrees C, 13%, 0.20mm and 0.30mm respectively.

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ISBN: 978-967-0257-70-9

Record 36 of 105

Title: Dimensional inspection of 3D laser scanner, coordinate measuring machine and image processing

Author(s): Sued, MK (Sued, M. K.); Noh, MZM (Noh, M. Z. Mohd); Dimin, MF (Dimin, M. F.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 73-74 **Published:** 2016

Abstract: Measurement can be conducted either using contact or non-contact methods. Production components can be small, soft and fragile. Therefore a non-contact method such as 3D laser scanner is preferred due to no contact force and not affecting production time. This makes the technology tempting and has been widespread used by industries due to reverse engineering capability. However, the accuracy of the measurement is dependent on the quality of the digitization. Therefore, this study is to report dimensional measurement comparison between 3D laser scanner with a coordinate measuring machine (CMM) and image processing. The errors are calculated and the best measurement method is proposed. It is found that contact method using CMM produced the least error.

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ISBN: 978-967-0257-70-9

Record 37 of 105

Title: Studying air flow distribution in a tray dryer through CFD simulation

Author(s): Misha, S (Misha, S.); Mat, S (Mat, S.); Ruslan, MH (Ruslan, M. H.); Salleh, E (Salleh, E.); Sopian, K (Sopian, K.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 75-76 **Published:** 2016

Abstract: Application of tray dryer is widely used in agricultural drying because of its simple design and capability to dry products at high volume. However, the greatest drawback of the tray dryer is uneven drying because of poor airflow distribution in the drying chamber. Implementing the proper design of a tray dryer system may eliminate or reduce non-uniformity of drying and improves drying performance. This study investigates kenaf core drying uniformity in a tray dryer through Computational Fluid Dynamics (CFD) simulation. The result shows that, the higher the average air velocity above the product, the higher the drying rate.

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

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Record 38 of 105

Title: Evaluation of impact based energy harvesting using a piezoelectric ceramic disc

Author(s): Abdal-Kadhim, AM (Abdal-Kadhim, Ali Mohammed); Leong, KS (Leong, Kok Swee)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 77-78 **Published:** 2016

Abstract: This paper reports an impact based energy harvesting using a piezoelectric ceramic disc, whereby a useful electrical power is generated via the impact of the human weight on the piezoelectric plate transducer. A prototyping of a single human step piezoelectric plate based impact harvester consisting of a piezoelectric transducer was tested on a hydraulic pressing machine with variable forces and impact velocity. In this experiment a piezoelectric ceramic disc with a size of pallet 44mm in diameter and 10mm in thickness was able to generate an average output power of up to 14.5 μ W across a resistive load of 500K Ω when a force of 0.75 kN of force with a velocity of 600mm/min is applied on it.

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Record 39 of 105

Title: Performance analysis of portable power generator by using TEG module

Author(s): Johari, SH (Johari, Siti Halma); Pa, MFC (Pa, Mohd Faiz Che); Annuar, KAM (Annuar, Khalil Azha Mohd); Ahmad, S (Ahmad, Suziana); Zahari, M (Zahari, Madiha)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 79-80 **Published:** 2016

Abstract: This paper presents the development of portable thermoelectric power generator by using heat as a main source. The aimed groups of this project are hikers and campers those need a portable power generator that can charge their small electronic gadgets while doing their activity. The generation of electricity is based on the Seebeck Effect of Thermoelectric Generator (TEG) module. The developed power generator is consisting of TEG module, heatsink and boost converter. The hot side of the TEG module was mounted on an opposite of the heat source. Then, the heatsink is installed on the cold side of the module with a cooling fans to provide a forced air cooling. Boost converters are used to step up and constant the output voltage from TEG module. Result from the experiment shows that the power generator can produce constant output voltage of 5V and the handphone was successfully charged. This portable power generator can be an alternative power supply while the power source cannot be reached.

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Conference Title: Mechanical Engineering Research Day (MERD)

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ISBN: 978-967-0257-70-9

Record 40 of 105

Title: Peltier and seebeck efficacy of hot and cold air system for portable O-REF (oven & refrigerator) application

Author(s): Harun, MH (Harun, M. H.); Annuar, KAM (Annuar, K. A. M.); Halim, MFMA (Halim, M. F. M. A.); Hasan, MHC (Hasan, M. H. C.); Aras, MSM (Aras, M. S. M.); Yaakub, MF (Yaakub, M. F.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 81-82 **Published:** 2016

Abstract: The main motivation in using Peltier Module is due to the uniqueness of producing hot and cold air at the same time besides able to generate electricity using Seebeck Effect. The generating system theoretically can recycle the heat loss to produce additional electricity for other usage. The efficacy of this system tested using two types of experimental using Peltier and Seebeck Effect. Both experimental is conducted using 3 specific volumes; 1) 1000cm(3); 2) 4000cm(3); and 3) 9000cm(3). As a result, temperature for heating and cooling systems achieve around 14 - 56 degrees C while the voltage generated around 12V in 50 minutes.

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Conference Title: Mechanical Engineering Research Day (MERD)

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ISBN: 978-967-0257-70-9

Record 41 of 105

Title: Potential co-processing of coconut shell and sugarcane residue as a solid biofuel

Author(s): Mitan, NMM (Mitan, Nona Merry M.); Razimi, MNSA (Razimi, Mohd Nur Shafiq Ahmad)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 83-84 **Published:** 2016

Abstract: This research reported co-processing of coconut shell and sugarcane residue as a solid biofuel by briquetting process. The aim of the current research is to determine the optimum ratio between coconut shell and sugarcane residue for briquetting. Various ratios of coconut shell to sugarcane are 1:1, 1:3, 1:5 by weight. The briquettes were formed into cylindrical shapes. The carbonization process took place at 370 degrees C. Proximate analysis, compressive test and theoretical heating value are observed on the produced briquette. The results indicated that C 1:5 briquette has the lowest moisture content and highest theoretical heating value.

Accession Number: WOS:000380259100041

Conference Title: Mechanical Engineering Research Day (MERD)

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 42 of 105

Title: Application of limestone as based catalyst in transesterification of rubber seed oil in biodiesel production

Author(s): Zamberi, MM (Zamberi, M. M.); Safari, IAKM (Safari, I. A. K. M.); Razak, NH (Razak, N. H.); Ani, FN (Ani, F. N.); Abdollah, MFB (Abdollah, M. F. B.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 85-86 **Published:** 2016

Abstract: The effect of using natural limestone as heterogeneous catalyst on the transesterification of high free fatty acid rubber seed oil with methanol was carried out to produce a quality biodiesel. Affecting variables such as methanol to oil molar ratio and catalyst concentration were investigated. The catalyst was calcined at 900 degrees C and were characterized using XRD, SEM and XRF. The results revealed that the CaO catalyst derived from limestone was very clean, easy to used and can maintain a good catalytic activity after being used for several times and can reached up to 88.06% biodiesel yield.

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 43 of 105

Title: Energy audit and analysis in UTeM: Library

Author(s): Nasaruddin, AN (Nasaruddin, A. N.); Akop, MZ (Akop, M. Z.); Salim, MA (Salim, M. A.); Mansur, MR (Mansur, M. R.); Musthafah, MT (Musthafah, M. T.); Adrinata, M (Adrinata, M.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 87-89 **Published:** 2016

Abstract: This paper presents the study on auditing energy consumption at UTeM's main library. By investigating the building energy profile such as analysing previous utilities bill, using instrument and calculation using major energy consumption equation such as cooling load equation and sub-meter reading. The detail on part to be audit will give a perspective for what and how the energy audit will be performed. At the end of this paper is the recommendation for energy conservation step that can be implemented based on suggestion by the Energy Commission policies and Malaysian Standard along with the visitation to the case studies site. The result shows that the maximum power consumption per day is 2141.35 kWh and the minimum is 1912.28 kWh.

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi
ISBN: 978-967-0257-70-9

Record 44 of 105

Title: Separate analysis of wind speed and direction for Mersing, Malaysia

Author(s): Sanusi, N (Sanusi, N.); Zaharim, A (Zaharim, A.); Mat, S (Mat, S.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 90-91 **Published:** 2016

Abstract: This research is conducted purposely to study the effect of wind speed and wind direction in generating wind power. Although the scope is extensive, but this paper will only discuss on the density probability distribution, numerical and graphical presentation of both. A Weibull and finite mixture model of von Mises distribution is used in this paper to represent data of Mersing (Malaysia). The suitability of the distributions was examined by the coefficient determination of R-2. The analysis reveals that the selected models fit with the data.

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Conference Title: Mechanical Engineering Research Day (MERD)

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 45 of 105

Title: Study of breakdown behaviour of ester oil with suspended cellulose particles under direct current voltage

Author(s): Zainoddin, MHS (Zainoddin, M. H. S.); Zainuddin, H (Zainuddin, H.); Aman, A (Aman, A.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 92-93 **Published:** 2016

Abstract: Nowadays, ester oil has become a potential replacement for mineral oil due to biodegradable and renewable factors. Due to the increasing demand for High Voltage Direct Current (HVDC) system to meet the energy requirement, further studies on the performance of ester oil under Direct Current (DC) electric field is sensible. For an HVDC system, a phenomenon called dielectrophoresis (DEP) may occur if the oil-filled equipment such as the HVDC converter transformer is contaminated with suspended solid particles. This paper investigates the breakdown behavior of ester oil with the presence of DEP phenomenon under non-uniform DC electric field.

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 46 of 105

Title: Optimized guiding vane for propeller turbine

Author(s): Ab Razak, J (Ab Razak, J.); Musa, M (Musa, M.); Razak, MFA (Razak, M. F. Abdul)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 94-95 **Published:** 2016

Abstract: Small scale hydro turbine is used for off-grid villages near the river. Pico hydro is usually selected for this purpose. One the efficiency criteria for this turbine is the velocity of water intake to the blade. The water enters the propeller turbine via the guide vane. Several parameters of the guide vane, which include number of guide vanes, and attack, inlet and outlet angles, are simulated in computer fluid dynamic (CFD) software. The optimized guide vane is further tested with varied flow rate. The simulation result shows a significant increase of water velocity intake to the blades.

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Conference Title: Mechanical Engineering Research Day (MERD)

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 47 of 105

Title: A study on the potential of Peltier in generating electricity using heat loss at engine system

Author(s): Shalsam, NMH (Shalsam, N. M. H.); Harun, MH (Harun, M. H.); Yahaya, MS (Yahaya, M. S.); Annuar, KAM (Annuar, K. A. M.); Halim, MFMA (Halim, M. F. M. A.); Hasan, MHC (Hasan, M. H. C.); Yaakub, MF (Yaakub, M. F.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 96-97 **Published:** 2016

Abstract: In the era of globalisation, the electrical energy usage is the main priority in order to do our job and daily activity. Unfortunately, limited power supply for the electrical energy usage makes it hard to continuously provide electrical energy for 24 hours. By using Peltier device, it is possible to develop a portable generating system using heat loss in machines and vehicles. The generating system theoretically can recycle the heat loss to produce additional electricity for other usage. Generally, the objective of the generating system is to study on the potential of Peltier device to generate useful electricity for additional power supply using heat loss. This generating system can be applied on many types of machines and other type of mechanism such as vehicle that release heat loss. Therefore, the result obtain in term of voltage can be generated by the generating system. As a result, this system has higher efficiency which 12.59% compared to 6% using proper heat sink using the same module.

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ISBN: 978-967-0257-70-9

Record 48 of 105

Title: Flexible piezoelectric micro-power generator based on P(VDF-TrFE)

Author(s): Chow, KK (Chow, Khooon Keat); Kok, SL (Kok, Swee Leong); Lau, KT (Lau, Kok-Tee)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 98-99 **Published:** 2016

Abstract: In this paper, we have successfully demonstrated the fabrication of poly(vinylidene fluoride) trifluoroethyleneP(VDF-TrFE) thick films on flexible substrate using rod mayer method. The flexible piezoelectric transducer was able to generate a maximum output power of 0.552 mu Wat an external load of 1M Omega with a maximum peak voltage of 743mV when pinching between two fingers with a force of 5N.

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 49 of 105

Title: Effect of samarium concentration on the structural and electrical properties of (K, Na) NbO₃ thin films

Author(s): Azmi, NA (Azmi, Nurul Azuwa); Azlan, UA (Azlan, Umar Al-Amani); Abid, MA'M (Abid, Mohd Asyadi 'Azam Mohd); Abd Rashid, MW (Abd Rashid, Mohd Warikh); Hatta, MAM (Hatta, Maziaty Akmal Mohd)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 100-101 **Published:** 2016

Abstract: Potassium sodium niobate have been chosen as a new candidate to replace the usage of lead-based materials due to its excellent properties. However, volatilities of K and Na can affect the electrical properties. This problem can be minimized by adding a doping element into A-site ions which is Samarium. A simple sol-gel route was used to produce the thin films with different dopant concentrations. In this work, the structural and electrical properties were determined by using XRD and LCR meter, respectively. It was found that the structure of KNN had a tendency to change from orthorhombic to tetragonal phase, thus resulting in better electrical properties of the KNN thin films.

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ISBN: 978-967-0257-70-9

Record 50 of 105

Title: Failure analysis of two serial holes bolted joint hybrid composite

Author(s): Sivakumar, D (Sivakumar, D.); Salmi, NS (Salmi, N. S.); Selamat, MZ (Selamat, M. Z.); Daud, MA (Daud, M. A.); Tan, CF (Tan, C. F.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 102-103 **Published:** 2016

Abstract: This study investigates the effect of different geometry parameters to the behavior of bolted-joint hybrid composites. The hot compression method is used to fabricate the hybrid composite. The composites were fabricated with three layers of woven fibers which are two layers of woven glass fiber and a layer of woven kenaf fiber with polypropylene matrix making a composite panel. The nominal thickness of these composites is 3mm and the bearing test is done by using Universal Testing Machine. The test were conducted according to ASTM D5961. The results show the different geometry parameters affect the behavior of hybrid composites.

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Record 51 of 105

Title: Failure analysis on hybrid fiber reinforced plastics for bolted joint under geometric parameters effect

Author(s): Sivakumar, D (Sivakumar, D.); Chew, RM (Chew, R. M.); Selamat, MZ (Selamat, M. Z.); Daud, MA (Daud, M. A.); Tan, CF (Tan, C. F.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 104-105 **Published:** 2016

Abstract: In this study, glass fiber and kenaf reinforced thermoplastic hybrid composite were fabricated using compression method. The composite is layout in sandwich structure. Woven glass fiber is sandwiched in between woven kenaf fiber with polypropylene matrix. The nominal thickness of the composite is 3 mm. Bolted joint test was conducted according to ASTM D5961 using Universal testing machine. The results confirm geometric parameters affect the failure mode.

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ISBN: 978-967-0257-70-9

Record 52 of 105

Title: Thermoplastic matrix selection based on entropy method for importance weight of criteria

Author(s): Ishak, NM (Ishak, N. M.); Sivakumar, D (Sivakumar, D.); Mansor, MR (Mansor, M. R.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 106-107 **Published:** 2016

Abstract: The purpose of this study is to determine the importance weight of criteria for thermoplastic matrix selection that need to be considered in fibre metal laminate fabrication for car front hood using entropy method, where the information implied using the linguistic terms. The results showed that the tensile strength, impact strength and density are the essential criteria that need to be considered.

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 53 of 105

Title: Surface durability of oil palm fiber/epoxy composite at various temperatures

Author(s): Shuhimi, FF (Shuhimi, F. F.); Abdollah, MFB (Abdollah, M. F. B.); Kalam, MA (Kalam, M. A.); Masjuki, HH (Masjuki, H. H.); Mustafa, A (Mustafa, A.); Amiruddin, H (Amiruddin, H.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 108-109 **Published:** 2016

Abstract: The purpose of this work is to study the surface durability of Oil Palm Fiber/Epoxy (OPF/E) composite at different temperatures. The tribological test was carried out by using a pin-on-disc tribometer in dry sliding conditions. Surface durability was determined by the value of specific wear rate with respect to the temperature. The surface morphology was observed by scanning electron microscopy (SEM). It was found that 30 wt.% have high surface durability compared to 50 wt.% and 70 wt.% which can withstand at a maximum of 80 degrees C before transition to severe wear occur.

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ISBN: 978-967-0257-70-9

Record 54 of 105

Title: Estimation of corrugated cardboard strength using tensile test

Author(s): Ab Wahab, NB (Ab Wahab, N. B.); Arafah, A (Arafah, Ainul); Fukuzawa, Y (Fukuzawa, Y.); Nagasawa, S (Nagasawa, S.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 110-111 **Published:** 2016

Abstract: The corrugated cardboard is widely used in manufacturing industries as a packaging, transportation material and number of other applications. However, the strength of the corrugated cardboard as a structure is not well understood. The objective of this study is to propose and estimate the strength of corrugated cardboard using tensile test. As a result, new practical tensile test considering the glue bonding strength was proposed and the factory of these test method was investigated.

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ISBN: 978-967-0257-70-9

Record 55 of 105

Title: Influence of size particles of SLS glass on properties of sintered SBE reinforced glass waste composite

Author(s): Shamsudin, Z (Shamsudin, Z.); Salleh, N (Salleh, N.); Mustafa, Z (Mustafa, Z.); Bakar, MAA (Bakar, M. A. A.); Hasan, R (Hasan, R.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 112-113 **Published:** 2016

Abstract: The properties of sintered glass waste composite was investigated with two varying size particles of glass waste (SLS) at different loading of spent bleach earth (SBE). The composites were exposed to single step heat treatments in order to produce glass-ceramics condition. This study is focused on physical testing to measure the physical properties combined with microstructural analysis of the cross section surface using scanning electron microscopy (SEM). ASTM C373-88 analysis was used to assess the variability in density, porosity and water absorption. The results showed that finer size particles in all composition contributed better in physical properties. These properties slightly decreased linearly with increasing SBE loading for both particles sizes and was significantly reduced in 40% of SBE. Microstructure analysis indicated that the present of pores within the glass waste composite was dominated by agglomeration.

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ISBN: 978-967-0257-70-9

Record 56 of 105

Title: Comparative study of polypropylene composites reinforced with pineapple leaf fiber from Josapine and Sarawak cultivar

Author(s): Selamat, MZ (Selamat, M. Z.); Kasim, AN (Kasim, A. N.); Daud, MAM (Daud, M. A. M.); Yaakob, MY (Yaakob, M. Y.); Putra, A (Putra, A.); Sivakumar, D (Sivakumar, D.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 114-116 **Published:** 2016

Abstract: This paper presents the comparison of mechanical properties of two difference cultivar pineapple leaf fiber (PLF) (Josapine/PLFJ and Sarawak/PLFS) reinforced polypropylene (PP) (copolymers/PPC and homopolymer/PPH) composite as a function of fiber loading. The samples of PLFJ/PPC and PLFS/PPH composites were fabricated with 30, 40, 50, 60 and 70 wt.% PLF loading with 100 mm fiber length. The fabrication was made by compression molding techniques. The results revealed that composites utilizing PLFJ/PPC shows superior tensile properties as compared to the PLFS/PPH. However, there are no significant disparities observed in the density and hardness of both composites.

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Record 57 of 105

Title: Failure analysis on domestic pipeline

Author(s): Adzme, N (Adzme, N.); Razak, NH (Razak, N. H.); Muhammad, NS (Muhammad, N. S.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 117-118 **Published:** 2016

Abstract: Today, structural health monitoring is a major concern in the engineering community. Multisite fatigue damage, hidden cracks and corrosion in hard-to-reach locations are among the major flaws encountered in today's extensive diagnosis. In this research, the understanding of non-destructive testing (NDT), thermographic analysis was applied to locate defect as complementary analysis towards the failure analysis of a defect pipe through SEM technique an analysis on specimen morphology and topography.

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Record 58 of 105

Title: Variations in diameter of struts for micro-lattice structure manufactured using selective laser melting

Author(s): Hasan, R (Hasan, R.); Mines, RAW (Mines, R. A. W.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 119-120 **Published:** 2016

Abstract: This paper highlights the dimension of diameter for titanium alloy Ti-6Al-4V micro-lattice structure material with body-centered-cubic (BCC) struts' arrangement, manufactured using additive layer technology, which is selective laser melting (SLM). Direct measurements and simple count analysis were done on the material. Variations in diameters were averaged and the value was compared to that obtained from other formulations. The result shows that there are variations in struts' diameters of micro-lattice structure manufactured using SLM, which can affect the material's performance under load bearing capacity. The finding can be useful to the developments of both micro-lattice structure and additive layer technology researches.

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ISBN: 978-967-0257-70-9

Record 59 of 105

Title: Tensile performance of palm oil fiber metal laminate

Author(s): Hussain, F (Hussain, F.); Sivakumar, D (Sivakumar, D.); Daud, MA (Daud, M. A.); Selamat, MZ (Selamat, M. Z.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 121-122 **Published:** 2016

Abstract: The effects of palm oil fiber loading on tensile behavior on polypropylene based Palm Oil Fiber Metal Laminate (POFML) was investigated. The testing was conducted on Universal Testing Machine according to ASTM D3039. This type of hybrid materials was fabricated by hand lay-up technique using 2/1 configuration where the composite layer is located between two aluminum with 10wt%, 20wt%, and 30wt% and 40wt% fiber content. The results showed the tensile strength increased when fiber loading increase. However, POFML with 20% fiber loading showed a higher modulus of tensile property. The tensile behavior in this study mainly depends on fiber loading.

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ISBN: 978-967-0257-70-9

Record 60 of 105

Title: The effect of fiber length on the mechanical properties of pineapple leaf (PALF) fiber reinforced PLA biocomposites

Author(s): Fadzullah, SHSM (Fadzullah, S. H. Sheikh Md.); Mustafa, Z (Mustafa, Z.); Ramli, SNR (Ramli, S. N. R.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 123-124 **Published:** 2016

Abstract: This research work investigates the effect of fiber length on the mechanical performance of the pineapple leaf fiber (PALF) reinforced poly lactic acid (PLA) biocomposites. Two types of composite systems are considered, these being the short (fiber length of 30 mm) and continuous long pineapple leaf fiber (fiber length greater than 100 mm) reinforced composites. The corresponding fabrication routes are melt-mixing and compression molding via film stacking, respectively. The test samples with nominal thickness of 3 mm were cut to size and subjected to flexural testing via three-point bending set-up, as per ASTM D790. As expected, the continuous long pineapple

leaf fiber reinforced composites exhibit greater flexural strength and modulus, with flexural strength and modulus being 30% and 45% than those of the short fiber reinforced composites. These preliminary findings reveal the effect of fiber length on the overall performance of the composites studied.

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 61 of 105

Title: Kinetic study of boron diffusion in powder-pack boronizing

Author(s): Omar, NH (Omar, N. H.); Hasan, R (Hasan, R.); Masripan, NAB (Masripan, N. A. B.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 125-126 **Published:** 2016

Abstract: In this study, boronized properties of AISI 304 ball bearing was investigated using powder-pack boronizing method. The experiment was carried out in temperature range from 850 to 950 degrees C with durations 2 - 4 hours. Microstructure of boride layer revealed a smooth surface using SEM micrograph analysis. The thickness of boride layer varied from 17-140 μm while the hardness varied between 470-900 HV. The growth of kinetic rates were plotted using Arrhenius equation and the activation energy measured from the graphical calculation is 126 kJ/mol. From this study, a new knowledge on diffusion of boron atoms on spherical surface is established.

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Conference Title: Mechanical Engineering Research Day (MERD)

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 62 of 105

Title: Characterization of nanocarbon particles using nitrogen adsorption analysis: Isotherm, pore type, pore size and BET surface area

Author(s): Abidin, SZ (Abidin, S. Zainal); Mohamad, IS (Mohamad, I. S.); Hashim, AYB (Hashim, A. Y. Bani); Abdullah, N (Abdullah, N.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 127-128 **Published:** 2016

Abstract: In this research, the characterization of the porous material which is nanocarbon was investigated using nitrogen adsorption technique. The porosity existence of nanocarbon is analysed by using BET method. Then, the surface area is measured from diameter and depth of the existed pores. The BET surface area obtained shows that MWCNT-OH has the largest surface area due to high distribution of micropores and existence of non-porous pore in the sample.

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Conference Title: Mechanical Engineering Research Day (MERD)

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 63 of 105

Title: Fabrication of polymer lattice structure using additive manufacturing for lightweight material

Author(s): Hasan, R (Hasan, R.); Baharudin, MK (Baharudin, M. K.); Nasarud'din, MM (Nasarud'din, M. M.); Alkahari, MR (Alkahari, M. R.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 129-130 **Published:** 2016

Abstract: This paper reports on the development of polymer lattice structure as lightweight material manufactured using additive manufacturing technology, which is 3D printer. Models of 3D body-centered-cubic (BCC) lattice structure were developed using SolidWorks software for several geometries that match with the capability of CubePro 3D printer. Polymer lattice structure block with dimension 20x20x20 mm(3) has been successfully fabricated. The dimension of a unit cell for the lattice structure is within the range of 10(-3) meter. The realization of the polymer lattice structure using the 3D printer can contribute to further research in lightweight material with high load-bearing capacity.

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Conference Title: Mechanical Engineering Research Day (MERD)

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 64 of 105

Title: Mechanical performance of pineapple leaf fiber reinforced poly lactic acid (PLA) biocomposites

Author(s): Ramli, SNR (Ramli, S. N. R.); Fadzullah, SHSM (Fadzullah, S. H. S. M.); Mustafa, Z (Mustafa, Z.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 131-132 **Published:** 2016

Abstract: Poly lactic acid is a biopolymer that is easily processable and offers goods aesthetics. Biocomposites is prepared by combining poly lactic acid and pineapple leaf fibres (PALF). The aim of this study is to evaluate the mechanical performance of the biocomposites when the fibers are surface treated with alkaline solution (NaOH) prior to fabrication. The fiber length and loading for the composites are 30 mm and 30 wt. %, respectively. The composites were fabricated using a melt mixing process via a ThermoHaake machine before compression molded to produce composite plates with nominal thickness of 3 mm. At preliminary stage, a flexural testing as per ASTM D790 was carried out. As expected, the alkaline-treated composites exhibit much greater flexural strength and modulus in comparison to those of the untreated samples.

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Conference Title: Mechanical Engineering Research Day (MERD)

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 65 of 105

Title: The effect of coconut fiber towards impact characteristics

Author(s): Fizal, ARBA (Fizal, A. R. B. A.); Shamsudin, MA (Shamsudin, M. A.); Abdullah, MIHC (Abdullah, M. I. H. C.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 133-134 **Published:** 2016

Abstract: The aim of this study is to analyze the effect of the coconut fibre composition upon the energy and resilience characteristic. A series of four samples with composition of 15, 30, 45 and 60 vol.% of coconut fiber was prepared by mixing together with polyester resin and were tested using pendulum impact test machine. The energy and resilience were measured according to ASTM D-6110. The sample with 60 vol.% coconut fibre displayed the highest value of energy and resilience. This is due to the proper strength distribution by the fibre matrix. On top of that the coconut fibre itself behaved as a significant adhesion between the matrix and composite. As a conclusion, the higher composition of coconut fibre added to the composite resulted in better impact characteristic.

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 66 of 105

Title: Effect of sintering on the physical properties of porous beta-TCP scaffolds

Author(s): Ishak, NF (Ishak, N. F.); Mustafa, Z (Mustafa, Z.); Othman, R (Othman, R.); Fadzullah, SHSM (Fadzullah, S. H. Sheikh Md.); Sahab, ARM (Sahab, A. R. Mahamad)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 135-136 **Published:** 2016

Abstract: This research work investigates the effect of sintering temperatures on the physical properties of porous beta-tricalcium phosphate (beta-TCP) scaffolds produced via a template method. A polyurethane (PU) foam was immersed in beta-TCP slurry by using a roller infiltration method. The impregnated foam was subsequently sintered to 1400 degrees C, 1450 degrees C and 1500 degrees C. The sintered scaffolds were then characterized by X-ray diffraction (XRD) and scanning electron microscopy (SEM) for evaluation of crystalline phases as well as pore and surface morphology. An increase in sintering temperature reveal an increase in crystallinity as well as the lessening of pores and voids in the struts of the scaffold as a result of progressive sintering.

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ISBN: 978-967-0257-70-9

Record 67 of 105

Title: Optimization of compression moulding parameters for multi filler polymer composite using Taguchi method

Author(s): Jamil, NA (Jamil, N. A.); Selamat, MZ (Selamat, M. Z.); Hasan, R (Hasan, R.); Sahari, J (Sahari, J.); Daud, MAM (Daud, M. A. M.); Tahir, MM (Tahir, M. M.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 137-138 **Published:** 2016

Abstract: The purpose of this study is to determine the compression moulding parameters on Graphite (G) /Carbon Black (CB) /Carbon Fiber (CF) / Polypropylene (PP) composites through Taguchi method. L-9 Orthogonal Array with four factors and three levels has been choose as a DOE for composition of G/CB/CF/PP with weight percentage of 50/25/5/20. The electrical conductivity value was analysed through Taguchi Method using signal to noise (S/N) ratio to determine the optimum parameters. This result is important to fabricate the potential G/CB/CF/PP composites as conductive polymer composite (CPC), and also very useful for further application as bipolar plate (BP) for PEMFC.

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Conference Title: Mechanical Engineering Research Day (MERD)

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 68 of 105

Title: Experimental investigation on empty aluminium honeycomb under quasi-static lateral compression

Author(s): Chuli, AJ (Chuli, A. J.); Said, MR (Said, M. R.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 139-140 **Published:** 2016

Abstract: In the span of last decades, honeycomb structures gained more attention in the field of energy absorption. The honeycomb structures especially made of aluminium has been investigated experimentally, analytically and through simulation in order to study their behavior. In this paper, the honeycomb had undergone a lateral compression. It is found that the honeycomb compressed in x(1) direction produced higher collapse load value, mean crushing value and energy absorption value compared to the honeycomb compressed in x(2) direction.

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Conference Title: Mechanical Engineering Research Day (MERD)

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ISBN: 978-967-0257-70-9

Record 69 of 105

Title: Study of wheel rim impact test using finite element analysis

Author(s): Zainuddin, HB (Zainuddin, H. B.); Ali, MB (Ali, M. B.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 141-142 **Published:** 2016

Abstract: This study measures the impact energy absorbed experienced by the wheel rim under dynamic loading. Computational simulation is time saving, and in contrast the wheel impact experiments involve high cost including the manpower. Alloy wheel is widely used due to its excellent performance and appearance. Wheel rim is modelled using CATIA and imported to ABAQUS for further finite element analysis. Yield strength affects the energy absorbing capacity of a material. Aluminium 6061-T1 is found to have the greatest energy absorption value compared to the other materials.

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 70 of 105

Title: Characterization of grayscale of the MRI Images for articular cartilage

Author(s): Yew, WS (Yew, W. S.); Abd Latif, MJ (Abd Latif, M. J.); Saad, NHM (Saad, N. H. Mohd)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 143-144 **Published:** 2016

Abstract: Magnetic resonance imaging (MRI) is a non-invasive potential imaging method to diagnose the cartilage disorder. Degeneration of the articular cartilage has been recognized as the main cause of osteoarthritis (OA). Normally OA refers to the end-stage which is already incurable. Therefore, in this study, a noninvasive method is developed to characterize the grayscale of the MRI images for articular cartilage. To test this, bovine's humeral head cartilage samples (n=7) were selected as models. The primary findings from the results indicated that there was a significant difference in gray scale intensity of the MRI images on the articular cartilage. This could indicate that the composition in the articular cartilage could affect the grayscale of the articular cartilage. This results give a new perspective into the properties of the tissue.

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ISBN: 978-967-0257-70-9

Record 71 of 105

Title: Determination of dimple distribution for laser texturing process on cast iron surface

Author(s): Lazim, NAM (Lazim, N. A. M.); Hasan, R (Hasan, R.); Kamal, SEM (Kamal, S. E. M.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 145-146 **Published:** 2016

Abstract: The aim of this research is to determine the uniformity distribution of the micro dimples to be textured on cast iron surface by using laser surface texturing method. Distribution of dimples on the surface is important in reducing wear debris amount. Imaginary grid of dimple cell was calculated and certain distance between dimples was determined in order to be located on the surface of cast iron. A uniform dimple's distribution was calculated on the sample surfaces before textured by laser treatment method.

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Conference Title: Mechanical Engineering Research Day (MERD)

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 72 of 105

Title: The effect of PCB surface roughness on the reliability of the SAC405 lead free solder

Author(s): Dan, RM (Dan, R. M.); Hamid, AHA (Hamid, A. H. A.); McLaren, J (McLaren, J.); Zulkafli, NI (Zulkafli, N. I.); Mazlan, RK (Mazlan, R. K.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 147-148 **Published:** 2016

Abstract: The focus of this research is to investigate the surface roughness on the reliability of lead free SAC405 solder material. Surface roughness influences reliability where high reliability improves the bonds of the solder and the substrate. In this study, aluminium and copper substrate is used with 4 different types of surface roughness. Hardness testing is performed using nanoindenter on each of the substrate where the hardness is in increment with the surface roughness. It is discovered that the increase in surface roughness causes increase in wettability and formation of intermetallic compound thus increases the reliability of the solder.

Accession Number: WOS:000380259100072

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ISBN: 978-967-0257-70-9

Record 73 of 105

Title: Corrosion analysis of the cold work 316L stainless steel in simulated body fluids

Author(s): Mohamad, WMFW (Mohamad, W. M. F. W.); Selamat, MZ (Selamat, M. Z.); Bundjali, B (Bundjali, B.); Musa, M (Musa, M.); Dom, HM (Dom, H. M.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 149-150 **Published:** 2016

Abstract: The present paper deals with the characteristic of the corrosion failure of the cold work 316L stainless steel in the simulated body fluids. The steel has been cold rolled within the range of 10 to 50% reduction in thickness. The corrosion test was done for 7 days at a temperature of 37 degrees C by immersing the steel in a 0.9% NaCl and phosphate buffered saline (PBS) solution. It was found that the steel with a higher cold reduction tend to increase the corrosion resistance of more than 50% in both simulated environment.

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ISBN: 978-967-0257-70-9

Record 74 of 105

Title: Effect of agitation mechanism on the anodization process of titanium dioxide nanotube arrays

Author(s): Khairul, KA (Khairul, K. A.); Ismail, S (Ismail, S.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 151-152 **Published:** 2016

Abstract: Titanium dioxide, TiO₂ nanotubes were fabricated by anodization process of pure titanium substrate in ethylene glycol containing fluoride. The anodization process has been conducted with 2 different agitation mechanisms which are magnetic stirring, and air bubble. The morphology and the structure of the as-anodized TiO₂ was determined using field emission scanning electron microscope and Raman spectroscopy.

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Conference Title: Mechanical Engineering Research Day (MERD)

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ISBN: 978-967-0257-70-9

Record 75 of 105

Title: Experimental investigation of buckling behavior of cracked cylindrical shells subjected to axial compression

Author(s): Ifayefunmi, O (Ifayefunmi, O.); Kasiman, N (Kasiman, Norehan); Khan, HI (Khan, Hazrin Ibrahim)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 153-154 **Published:** 2016

Abstract: The aim of this experimental research work is to investigate the effect of axial crack length on the buckling behavior of cracked cylindrical shells subjected to axial compression loading. The crack on the cylindrical structures is assumed to be a percentage of the axial length of the cylindrical shell structure. The magnitude of the crack length-to-cylinder axial length is varied between 0.05 and 0.15. Cylindrical specimens are made from mild steel with radius-to-thickness ratio, ranging from 25 to 100. The axial length of the specimens was assumed to be constant. Results indicate that the crack length strongly affect the buckling behavior of the axially compressed cylinder. Also, it was revealed that the buckling load of the cylindrical specimens with high value of radius-to-thickness ratio is more sensitive to the effect of change in crack as compared to cylinder with low value of radius-to-thickness ratio.

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ISBN: 978-967-0257-70-9

Record 76 of 105

Title: The influence of boundary condition on the deformed shape of axially compressed cones

Author(s): Ifayefunmi, O (Ifayefunmi, O.); Chang, KL (Chang, K. L.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 155-156 **Published:** 2016

Abstract: The aim of this research work is to investigate the influence of boundary condition on the buckling load and deformed shape of axially compressed cone. Two boundary conditions are considered, they are: (i) fully clamped at the bottom and allowed to move in the axial direction at the top ends, and (ii) allow all displacement movement except axial direction at the bottom and restrict all movement at the top except axial direction. Cones were relatively thick with nominal wall thickness of 2 mm and the semi-vertex angle, beta is 15 degrees, hence their buckling behavior remains within the elastic-plastic range. The geometry of radius of bigger radius, $r(2)$, to radius of smaller radius, $r(1)$, ($r(2)/r(1) = 1.75$), and the ratio of radius-to-thickness ($r(2)/t$) was taken as 35. Results indicate that the change of boundary condition has a strong influence on both the buckling load and the deformed shape.

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ISBN: 978-967-0257-70-9

Record 77 of 105

Title: Effect of polypropylene type on G/CB/CNTs/PP composites properties as bipolar plate for PEM fuel cell

Author(s): Bairan, A (Bairan, A.); Selamat, MZ (Selamat, M. Z.); Sahadan, SN (Sahadan, S. N.); Malingam, SD (Malingam, S. D.); Mohamad, N (Mohamad, N.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 157-158 **Published:** 2016

Abstract: Investigation of the conductive polymer composites (CPCs) have been carried out using Graphite (G), Carbon Black (CB), Carbon Nanotubes (CNTs) and Polypropylene (PP) as a binder. While, two types of PP which are medium density (MD-PP) and low density (LD-PP) were mixed with multi filler by using a ball mill. The comparison of PP with respect to the resulting electrical conductivity and mechanical properties were investigated. Results indicate that CNTs was dispersed better in MD-PP than LD-PP would cause better electrical conductivity and mechanical properties of G/CB/CNTs/PP composite bipolar plate which are exceeded of the U.S. Department of Energy (DOE) requirement.

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ISBN: 978-967-0257-70-9

Record 78 of 105

Title: Effect of molding temperature on properties of graphite/stannum/polypropylene composites

Author(s): Masron, F (Masron, F.); Selamat, MZ (Selamat, M. Z.); Tahir, MM (Tahir, M. M.); Daud, MAM (Daud, M. A. M.); Sahari, J (Sahari, J.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 159-160 **Published:** 2016

Abstract: The great efforts have been made over the past decades in developing the advance PEMFC technology especially for bipolar plate sector. Unfortunately, factors such as durability and cost of bipolar still remain as the major barrier to commercialization of high efficiency Polymer Electrolyte Membrane Fuel Cell. In this study, Graphite/Stannum/Polypropylene composite has been fabricated by compression molding process with several different temperatures (170 to 180 degrees C), several weight percentage of Stannum (10 to 20 wt%) and have be tested with several mechanical and electrical tests. The result shows that the temperature of 175 degrees C with 15 wt% of Stannum give the best properties.

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ISBN: 978-967-0257-70-9

Record 79 of 105

Title: Analysis of impact duration from Charpy impact signal

Author(s): Said, NBM (Said, N. B. Muhammad); Ali, MB (Ali, M. B.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 161-162 **Published:** 2016

Abstract: This paper presents the reviews on impact duration from impact signal due to Charpy test. Charpy impact test is conducted at different material with different thickness but at the same of striker velocity. Impact signal is obtained from strain gauge that has been installed to striker and connected to high frequency data acquisition system. The signal is then analyzed by using software of SoMat eDaQ to identify the time period during impact occurs on materials before fractured. The impact duration from experiment is correlated and compared to the theory or previous study. The result from experiment indicates that Aluminium 6061-T6 has higher impact duration compared to Carbon steel 1050 and it was increased with thickness.

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Conference Title: Mechanical Engineering Research Day (MERD)

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 80 of 105

Title: Cure characteristics and tensile properties of natural rubber vulcanizates modified by tapioca starch

Author(s): Mazliah, M (Mazliah, M.); Mohamad, N (Mohamad, N.); Jeefferie, AR (Jeefferie, A. R.); Effendy, AMH (Effendy, A. M. Hairul)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 163-164 **Published:** 2016

Abstract: This study focusing on cure characteristics as well as tensile properties of natural rubber (NR) vulcanizates modified with tapioca starch as biodegradability agent. The samples were prepared by melt compounding via a Haake internal mixer. The tapioca starch was varied from 0, 5, 10, 20, 40, and 60 phr in the formulation. Increasing tapioca starch loading was observed to accelerate the curing process meanwhile increases the crosslinks density which depicted by M-H-M-L value. Furthermore, the additional of tapioca starch up to 20 phr increased the elongation of break of the vulcanizate.

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Conference Title: Mechanical Engineering Research Day (MERD)

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 81 of 105

Title: A preliminary study of greyscale intensity and deposited electrospun fibres using image analysis technique

Author(s): Long, FC (Long, F. C.); Nurfaizey, AH (Nurfaizey, A. H.); Daud, MAM (Daud, M. A. M.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 165-166 **Published:** 2016

Abstract: The amount of deposited electrospun fibres is difficult to measure due to their extremely small size and mass. In this study, a new method using image analysis technique to predict the amount of deposited fibres is proposed. It is hypothesized that the amount of deposited fibres can be predicted by measuring the greyscale intensity of a sample. Samples were produced and scanned to 8-bit greyscale images and ImageJ software was used to analyze the samples. Preliminary results showed that the greyscale intensities has the potential to be used for measuring the amount of deposited electrospun fibres.

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Conference Title: Mechanical Engineering Research Day (MERD)

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 82 of 105

Title: Effect of load on friction and wear of banana peel as an additive

Author(s): Basironasiron, J (Basironasiron, J.); Masripan, NAB (Masripan, N. A. B.); Abdollah, MFB (Abdollah, M. F. B.); Husna, AH (Husna, A. H.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 167-168 **Published:** 2016

Abstract: Banana peel is a natural additive which can be used as an additive in the engine oil that can be promotes as a sustainable material development via the usage of renewable resource. In this paper, the preliminary study on the friction and wear of banana peel was mixed into paraffin oil carried out using four ball tester at different load and temperature. Ultrasonic homogenizer was used to mix the banana peel in paraffin oil. Wear scar diameter was measured using inverted microscope. As a yield, the addition of banana peel into paraffin oil has reduced the friction but also increases the wear at different load and temperature.

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ISBN: 978-967-0257-70-9

Record 83 of 105

Title: Friction and wear characteristic of different natural oil-based lubricants with carbon nanotubes as additive

Author(s): Yong, KF (Yong, K. F.); Tee, BT (Tee, B. T.); Abdollah, MFB (Abdollah, M. F. B.); Mohamad, IS (Mohamad, I. S.); Chong, CT (Chong, C. T.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 169-170 **Published:** 2016

Abstract: The advantages of natural oil-based lubricant are sustainability and eco-friendly. It is important to study their tribology properties as alternative mineral oils as lubricant. This work investigates the prospects of natural oil-based lubricant for automotive applications in contrast to the available conventional lubricant. The experiment is conducted to obtain the friction and wear characteristics by using four-ball tester set-up. The natural oil based lubricants involved in this study are refined glycerin and oleic methyl ester with CNT as additive. The results of friction and wear scar diameter for both types of lubricant were shown and compared in this work. From the experiment, refined glycerin with 1% CNT is found to have better friction reduction compared with refined glycerin.

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Conference Title: Mechanical Engineering Research Day (MERD)

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ISBN: 978-967-0257-70-9

Record 84 of 105

Title: Effect of duration time of homogenization and sonication on stability of MWCNT-OH in ethylene glycol and deionized water

Author(s): Abdullah, A (Abdullah, A.); Mohamad, IS (Mohamad, I. S.); Hashim, AYB (Hashim, A. Y. Bani); Abdullah, N (Abdullah, N.); Abidin, SZ (Abidin, S. Zainal)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 171-172 **Published:** 2016

Abstract: The limitation of thermal properties in the conventional fluid like ethylene glycol and deionized water can be improved by adding carbon nanotube (CNT) in the solution. However, the dispersion and stability of nanofluid is still a major concern since CNT is hydrophobic. In this research, functionalized multiwalled carbon nanotube (MWCNT-OH) were used to formulate a nanofluid with additional of polyvinylpyrrolidone (PVP) as dispersing agent and ethylene glycol and deionized water as

base fluid. In order to inspect the optimum duration time for ultrasonic homogenizing process which can lead the nanofluid to achieved highest stability, the mixture were inspected at five series of time (1, 3, 5, 10 and 15) minutes. The results show at one minute of synthetisation process of nanofluid already give the stability oft nanofluid.

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Conference Title: Mechanical Engineering Research Day (MERD)

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ISBN: 978-967-0257-70-9

Record 85 of 105

Title: Thermal conductivity enhancement of functionalized multiwalled carbon nanotube and carbon nanofiber based nano-coolant

Author(s): Manap, NSNA (Manap, N. S. N. Abdul); Yunus, SSM (Yunus, S. S. Mohd); Mohamad, IS (Mohamad, I. S.); Husin, MHM (Husin, M. H. Mohd)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 173-174 **Published:** 2016

Abstract: Small size and ability to govern high thermal conductivity are the main factor why nanoparticles based coolant has becoming preferable coolant. On this paper, two types of nanocarbon particles were used as a basic material in deionized water named functionalized multiwalled carbon nanotube based nano-coolant (NC1) and carbon nanofiber based nano-coolant (NC2). The weight ratio of the nanocarbon particles is 0.1 wt%, 0.2wt% and 0.3wt% being mixed with deionized water and polyvinylpyrrolidone (PVP). Next, thermal conductivity of NC1, NC2 and standard deionized water (as a reference) was investigated at temperature ranging from 6 degrees C to 40 degrees C. The results show that the thermal conductivity value of NC1 and NC2 are slightly higher than the standard deionized water and increased against the increment of temperature. It also revealed that NC2 with 0.3wt% of CNF at temperature 40 degrees C gives the highest thermal conductivity with a value of 0.661 W/m.K.

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 86 of 105

Title: Comparison for humidity absorption using various silica gel in experimental chamber

Author(s): Damanhuri, AAM (Damanhuri, A. A. M.); Zahmani, QF (Zahmani, Q. F.); Ibrahim, A (Ibrahim, A.); Mokhtar, SN (Mokhtar, S. N.); Sulaiman, SN (Sulaiman, S. N.); Majid, MRA (Majid, M. R. A.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 175-176 **Published:** 2016

Abstract: Air conditioning are used to absorb humidity. Improper humidity control could affect mold and bacteria growth inside the building. This experiment compare 4 types of desiccant silica which white/ non indicating silica gel, blue indicating silica gel, orange indicating silica gel and calcium chloride. Two sealed experimental chamber (0.125m(3)) were used which connected by pipeline. Silica gel are located inside the connection pipelines and result comparison were measured on how effective these silica gel to absorb and reduce humid air by using humidity sensor. Calcium chloride significantly shows the most effective silica gel in absorption of humidity compare to other three types. However, at certain saturated content, solid silica gel of calcium chloride will transform to liquid form. Further investigation are needed to study effectiveness of silica gel for application in real environment either in cases of performance and safety consideration.

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Record 87 of 105

Title: Preparation and characterization of form-stabilized paraffin/polycaprolactone (PCL) composites as phase change materials

Author(s): Aludin, MS (Aludin, M. S.); Akmal, SS (Akmal, S. Saidatul); Rosiyah, Y (Rosiyah, Y.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 177-178 **Published:** 2016

Abstract: Paraffinic Phase Change Materials (PCM) possess desirable properties to make it suitable for thermal energy storage applications. However, paraffin has been reported to leak out during the melting process. In this study, composites were prepared by dissolving paraffin and polycaprolactone (PCL) at varied mass compositions in chloroform and then purified through precipitation techniques. The leakage test was conducted by placing the composite samples on a set of four-layer filter papers and left in a furnace at 90 degrees C for 1 hour. By incorporating PCL into paraffin phase, the leakage percentage was drastically reduced. The PCL polymer matrix in the composites may have trapped the paraffin molecules during melting process thus prevent it from leaking.

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ISBN: 978-967-0257-70-9

Record 88 of 105

Title: Investigation of surface breakdown on various solid insulation immersed in ester and mineral oils under ac stress

Author(s): Zainuddin, H (Zainuddin, H.); Norhan, SN (Norhan, S. N.); Othman, NA (Othman, N. A.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 179-180 **Published:** 2016

Abstract: Liquid-solid interface is common in high voltage (HV) insulation system. Creepage discharge is a phenomenon that usually occurs along the liquid-solid interface that may cause damage to the surface of solid insulation. This paper presents the effect of various types of solid insulation immersed in liquid insulation on the surface breakdown under AC voltage. In this study, surface discharge experiments were conducted on Epoxy Resin G10, Low Density Polyethylene (LDPE), High Density Polyethylene (HDPE), and Bakelite immersed in Palm Fatty Acid Ester Oil (PFAE) and Mineral oil. Needle-bar method was chosen for the electrode configuration. The results suggest that permittivity mismatch between liquid and solid insulation is an influential factors in creepage discharge among similar materials with different density.

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ISBN: 978-967-0257-70-9

Record 89 of 105

Title: Turbulence kinetic energy analysis of a single cylinder engine

Author(s): Khairil, AMT (Khairil, A. M. T.); Musthafah, MT (Musthafah, M. T.); Salimi, MA (Salimi, M. A.); Mansor, MR (Mansor, M. R.); Akop, MZ (Akop, M. Z.); Saad, AM (Saad, A. M.); Shafei, AMM (Shafei, A. M. Mohd)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 181-182 **Published:** 2016

Abstract: In the paper show the study of time dependent and turbulence flow inside a cylinder of an alternative engine through the simulation investigation of the distribution of the turbulence kinetic energy in whole chamber. This investigation is carried out during at intake valve. CFD is used to predict the flow behavior in the single cylinder engine. Turbulence model of the inlet air in cylinder has bigger effect into the performance of the engine. Therefore, contours of Turbulence Kinetic Energy are presented to support results. From the results, it is found that the lower valve lifts had better turbulence kinetic energy value.

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

ISBN: 978-967-0257-70-9

Record 90 of 105

Title: Friction curve analysis of steel lubricated with jatrophia oil

Author(s): Lubis, AMHS (Lubis, A. M. H. S.); Sudin, MB (Sudin, M. B.); Ariwahjoedi, B (Ariwahjoedi, B.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 183-184 **Published:** 2016

Abstract: Sliding friction has played a role in many mechanical components such as engines, clutch & brakes, bearings etc. Metal-to-metal contact in sliding motion could results in friction and wear to the metal surfaces. In order to avoid high friction, lubricants are commonly applied to the contacting surface. Although still need to be explored, explanation related to friction process via friction curve is seems to be forgotten. Analysis on the friction curve over the sliding time or sliding distance is important to understand any events during sliding friction. This work is subjected to analyze friction curve of steel lubricated with jatrophia oil obtained from four ball-test and propose a sliding friction mechanism under this condition. The friction curve was obtained by four ball testing method under ASTM 4172 method. It is concluded that several friction transition taken place during the sliding friction can be related to the process occurs between the contact asperities.

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ISBN: 978-967-0257-70-9

Record 91 of 105

Title: Simulation on comparison of pressure medium in hydraulic hybrid system

Author(s): Sabamddin, SA (Sabamddin, Saiful Akmal); Yusof, AA (Yusof, Ahmad Anas); Saadun, MNA (Saadun, Mohd Noor Asril)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 185-187 **Published:** 2016

Abstract: Natural concerns of fire and safety in hydraulic system promote the uses of water-based hydraulic hybrid system. The main focus of this paper is to simulate the potential of using water hydraulic technology in hydraulic hybrid systems. The research will include an extensive study on the mathematical modeling and simulation by using Matlab/Simulink to determine the feasibility of water compared to oil SAE-30.

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ISBN: 978-967-0257-70-9

Record 92 of 105

Title: An experimental study on relation of nonlinearity and transduction coefficient of an electromagnetic energy harvester

Author(s): Low, PS (Low, P. S.); Ramlan, R (Ramlan, R.); Muhammad, NS (Muhammad, N. S.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 188-189 **Published:** 2016

Abstract: This paper brings about the study of relationship between the degree of nonlinearity and transduction coefficient of an electromagnetic energy harvesting device. The device that exhibit softening nonlinear characteristic is used to perform dynamic test and the transduction coefficient, K across the resonance frequency range is obtained through the relationship of $K = V/v$ where.. is the voltage generated per unit of relative velocity, v. Experimental results show that the performance of the transduction coefficient increases as the degree of nonlinearity increases.

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ISBN: 978-967-0257-70-9

Record 93 of 105

Title: Simulation study of high-rise structure model on earthquake movement

Author(s): Kamal, MNM (Kamal, M. N. Mustafa); Salim, MA (Salim, M. A.); Saad, AM (Saad, A. Md); Mansor, MR (Mansor, M. R.); Akop, MZ (Akop, M. Z.); Musthafah, MT (Musthafah, M. T.); Rosszainily, IRA (Rosszainily, I. R. A.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 190-191 **Published:** 2016

Abstract: This paper represents a simulation study of high-rise structure model by exerting horizontal vibration. Three-level of high-rise structure is chosen by referring to Ranau earthquake in 2015. Three analyses were conducted namely stress analysis, strain analysis, and displacement analysis. These analyses were selected as important criteria of horizontal vibration effect on the structure, and finally illustrates the structural behavior of the model. Maximum concentrated stress, maximum strain, and extreme displacement have been recorded. Finally, the conclusion was made, in which all the important criteria were positively proportional to the amount of horizontal vibration energy.

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ISBN: 978-967-0257-70-9

Record 94 of 105

Title: Enhancement on acoustical performance of reed 'Imperata Cylindrica'

Author(s): Khair, FA (Khair, F. A.); Putra, A (Putra, A.); Nor, MJM (Nor, M. J. M.); Selamat, MZ (Selamat, M. Z.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 192-193 **Published:** 2016

Abstract: Common established work on finding the alternative sound absorbing materials are mostly focused on fibrous type of acoustic absorber. Here, the hollow structure of natural reed is utilized as non-fibrous acoustic absorber. This paper study on the acoustic performance of reed when covered with fabric. The sound absorption coefficient is measured using impedance tube method. Result shows that covering sample with fabric enhanced the absorption coefficient above 0.9 for both small and large diameter of length 2 cm and 3 cm.

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Record 95 of 105

Title: A simulation study on the modal analysis of perforated plates

Author(s): Ismail, AY (Ismail, A. Y.); Ahmad, A (Ahmad, A.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 194-195 **Published:** 2016

Abstract: This paper presents a comprehensive modal analysis study of perforated plates with micro and macro size holes as one of the most important aspects in engineering vibration point of view. The Finite Element Method (FEM) in SolidWorks environment is employed to simulate the phenomena and visually present the results. It is found that the presence of holes apparently shifts the natural frequency gradually towards the lower value. As the holes size increases, the natural frequency is proportionally reduced.

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Record 96 of 105

Title: Nonlinear behavior of a plate with an arbitrarily orientated crack

Author(s): Ismail, R (Ismail, R.); Cartmell, MP (Cartmell, M. P.); Apandi, NSR (Apandi, N. S. R.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 196-197 **Published:** 2016

Abstract: This paper presents a nonlinear analysis for a thin isotropic plate containing an arbitrarily orientated surface crack. The governing equation of motion of the plate model with enhanced crack modelling and subjected to transverse harmonic excitation is proposed to represent the vibrational response of the plate and is based on classical plate theory into which a developed crack model has been assimilated. An approximate solution method based on the perturbation method of multiple scales is applied and the nonlinear behavior of the cracked plate model is investigated from the amplitude-frequency equation. It is found that the nonlinear characteristics of the cracked plate structure can be greatly affected by the orientation of the crack in the plate.

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ISBN: 978-967-0257-70-9

Record 97 of 105

Title: Practical controller for positioning control of X-Y ballscrew mechanism

Author(s): Hee, WK (Hee, W. K.); Chong, SH (Chong, S. H.); Foo, JE (Foo, J. E.); Amran, AC (Amran, A. Che)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 198-199 **Published:** 2016

Abstract: This paper describes the evaluation of a practical controller performance for point-to-point positioning motion using a X-Y ballscrew mechanism. The proposed controller is Continuous Motion Nominal Characteristic Trajectory Following (CM NCTF) controller which is easy to design and having a simple control structure. The performance of the CM NCTF controller is compared with the PI-D controller, which have similar control structure. The experimental result proved that the CM NCTF controller has better positioning performance in point-to-point motion.

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Conference Host: Univ Teknikal Malaysia Melaka. Kampus Teknologi

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Record 98 of 105

Title: Radiation efficiency of single beam-stiffened plate

Author(s): Lim, KH (Lim, K. H.); Putra, A (Putra, A.); Ramlan, R (Ramlan, R.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 200-201 **Published:** 2016

Abstract: Beam-stiffened method had been used widely in controlling noise problem. However the effect of this technique has not been fully studied and may cause undesired results. This paper studies how different point forces location affect the sound radiation efficiency from beam-stiffened plate. Hybrid mathematical model which comprised of a semi-analytical model and FE model is used to conduct this study. Radiation efficiency by 8 points force location and average radiation efficiency over 8 points force location from single beam-stiffened plate are presented. Besides, range of radiation efficiency variation using 10 and 90 percentile is also presented.

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Record 99 of 105

Title: Natural coir fiber and kenaf fiber as multilayer sound absorber

Author(s): Lim, ZY (Lim, Z. Y.); Putra, A (Putra, A.); Nor, MJM (Nor, M. J. M.); Yaakob, MY (Yaakob, M. Y.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 202-203 **Published:** 2016

Abstract: This paper studies the sound absorption performance of multi-layered natural fibers, particularly coir fiber and kenaf fiber. The effect brought by different layer arrangement these porous materials are studied and it is found that under the same thickness, the low frequency sound absorption is enhanced when kenaf fiber is layered as the first layer to receive the incidence sound. With kenaf fiber layered at the second layer, better absorption performance is seen at high frequency.

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Record 100 of 105

Title: Positioning control of ball screw mechanism with disturbance observer

Author(s): Foo, JE (Foo, J. E.); Chong, SH (Chong, S. H.); Hee, WK (Hee, W. K.); Loh, SL (Loh, S. L.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 204-205 **Published:** 2016

Abstract: In this paper, a disturbance observer with PD controller (PDDO) is proposed to improve the positioning performance of the ball screw mechanism that is subjected to nonlinearities. The tracking performance of the PDDO controller is examined and compared with a PID controller experimentally. The PDDO controller displays better tracking performance than the PID controller.

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Record 101 of 105

Title: PID control of vertical pneumatic artificial muscle system

Author(s): Tan, MH (Tan, M. H.); Chong, SH (Chong, S. H.); Tang, TF (Tang, T. F.); Shukor, AZ (Shukor, A. Z.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 206-207 **Published:** 2016

Abstract: Pneumatic Artificial Muscle (PAM) overcome the other common actuators as it has higher power-to-weight ratio. However, the air compressibility and lack of damping ability of PAM brings dynamic delay to the pressure response and causes oscillatory motion to occur. It is not easy to realize the motion with high accuracy and high speed due to all the non-linear characteristics of pneumatic system. A PID control using Ziegler Nichols method for a PAM system in vertical axis to control the tracking motion of the PAM is proposed in this paper. The effectiveness of the proposed control algorithm is demonstrated through experiments.

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Record 102 of 105

Title: Identification of noise in room due to HVAC system

Author(s): Cheah, YM (Cheah, Y. M.); Putra, A (Putra, A.); Ramlan, R (Ramlan, R.); Muhammad, N (Muhammad, N.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 208-209 **Published:** 2016

Abstract: This paper presents noise measurement and noise mapping for two lecture rooms. The results reveal that the background noise level of the empty lecture rooms has exceeded the recommended limit by ANSI 12.2-2008 [1], i.e. above 35 dB(A) due to excessive noise radiated from the structure-borne source coming from the VAV system above the ceiling. Two lecture rooms at the Kampus Teknologi in Universiti Teknikal Malaysia Melaka were used as the case study.

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Record 103 of 105

Title: Dynamic analysis of laminated rubber-metal spring using finite element method

Author(s): Norfarizan, S (Norfarizan, S.); Putra, A (Putra, A.); Salim, MA (Salim, M. A.); Ramlan, R (Ramlan, R.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 210-211 **Published:** 2016

Abstract: Laminated rubber-metal spring (LRMS) is widely applied in buildings, vehicles and to protect sensitive equipments. In this study, the dynamic performance of such isolator was analyzed. The dynamic analysis was carried out using finite element method. Five models of rubber based isolators with different number of interlayer metal plates was analyzed using Abaqus 6.10 software. Transmissibility ratio was determined from the displacement changes of isolators. The results show the rubber bearing with embedded metal plate layers can improve the transmissibility ratio at high frequency.

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ISBN: 978-967-0257-70-9

Record 104 of 105

Title: Experimental investigation of surface roughness using ultrasonic assisted machining of hardened steel

Author(s): Azlan, R (Azlan, R.); Izamshah, R (Izamshah, R.); Hadzley, M (Hadzley, M.); Kasim, MS (Kasim, M. S.); Arfauz, M (Arfauz, M.); Akmal, M (Akmal, M.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 212-213 **Published:** 2016

Abstract: Machining of hardened mould and die material is a very challenging process due to the high strength of the materials. Rough machined surface and premature tool wear are some of the issues that are related when machining with this material. On the other hand, ultrasonic assisted machining (UAM) technique has proven to improve the machined surface and tool life especially for brittle materials such as glass and quartz. Based on the capabilities of UAM technique and to overcome the problem owned by a conventional milling method, this paper evaluate the UAM technique for machining hardened AISI D2 material with the aim to improve the machined surface. Experiments of ultrasonic assisted milling were conducted to investigate the surface roughness of machines surface during slot milling cutting operation. From the conducted investigation, surface roughness values was improved from 0.60 mm (non ultrasonic) to 0.26 mm (ultrasonic) at 37 m/min (cutting speed), 65 mm/min (feed rate) and 0.4 mm (depth of cut). The results from the macroscopic observation shows that the machine surface of slot milling cutting by UAM appeared to be very smooth with consistent scaly and structured.

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ISBN: 978-967-0257-70-9

Record 105 of 105

Title: Mathematical modeling on sound absorption of oil palm empty fruit bunch fibers

Author(s): Or, KH (Or, K. H.); Putra, A (Putra, A.); Selamat, MZ (Selamat, M. Z.)

Edited by: BinAbdollah MF; BinSalim MA; Tuan TB

Source: PROCEEDINGS OF MECHANICAL ENGINEERING RESEARCH DAY 2016 **Pages:** 214-215 **Published:** 2016

Abstract: Oil Palm Empty Fruit Bunch (OPEFB) fibers is an agricultural waste which is available in abundance quantity in Malaysia. This paper discusses the analytical approach used to estimate the sound absorption curve of Oil Palm Empty Fruit Bunch (OPEFB) fibers. Experimental measurement is done by using impedance tube testing to obtain the sound absorption coefficient. The results from the experimental works are validated by comparing with Delany-Bazley model. It is found that the Delany-Bazley model can be used to predict the sound absorption coefficient of OPEFB fibers.

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