

Table of Contents

Preface, Foreword and Committees

Chapter 1: Advanced Mechanical and Manufacturing Design Technology

Nonlinear System Identification of Floating Structures Using Time-Varying ARX-Based Volterra Model	
E. Yazid, M.S. Liew, P. Setyamartana, V.J. Kurian and C.Y. Ng	3
Fabrication Process of Polymer Nano-Composite Filament for Fused Deposition Modeling	
R.H.A. Haq, M.S. bin Wahab and N.I. Jaimi	8
Railway Dynamics Analysis Using Lego Mindstorms	
M.A. Abdullah, F.R. Ramli and C.S. Lim	13
Design and Enhancement of Radiofrequency Cannula (RC) for Chronic Pain Management	
S. Kamaruddin, W.Y. Way and A.H. Mohamed	18
Topology Optimization of Beam Structures with Various End and Loading Conditions	
D.E. Woldemichael, J.J. Lai and D. Sujan	22
Short Review: Role of Metal Oxides as Filler in Polysiloxane Sheet Composite	
S.M. Yahya, A. Azmi, M.I. Idris, M.Z. Yunus, S. Mahzan, S. Ahmad and H. Taib	27
Occupant Kinematic Study in Safe Bus Superstructure	
M. Bin Yusof and M.A.A. Bin Afripin	32
A Novel Design of Car Wiper Using Compliant Mechanism Method	
M.N. Ahmad, K. Mat and W.M.W. Muhamad	39
CFD Application in Resistance Analysis for Advanced Semi-SWATH Vehicle	
A. Ali, A. Maimun and Y.M. Ahmed	44
Thermo-Mechanical Stress Analysis in Electronic Packaging with Continuous and Partial Bond Layer	
D. Sujan, T.K. Piaw and D.E. Woldemichael	50
Evaluation of FDM Pattern with ABS and PLA Material	
M.N. Hafsa, M. Ibrahim, M.S. Wahab and M.S. Zahid	55
Ergonomic Design of CNC Milling Machine for Safe Working Posture	
H. Isa, M.A. Rahman, H. Hazmilah, H. Sihombing, A. Saptari, A.B. Baharudin and A. Syaheera	60
Micro-Scale Abrasion of WC-Based Coatings with Different Abrasive Type	
K. Zakiah, P.H. Shipway and K.T. Voisey	65
Magnesite Effect to the Alumina Sintering for Heat Sink Application	
N.H.M. Nor, M.H. Ismail, N.A. Abu Kasim, W.D. Teng and M.I.I. Idris	70
Sintering of Alumina-AIN System for Heat Sink	
N.H.M. Nor, I. Muhammad Hussain, N.A. Abu Kasim, W.D. Teng and M.K. Idham	76
Gravity Effects on the Density of Laminated Composite due to the Differences in Angle Cured	
M.Y. bin Yaakob, T.T.T. Jennise, H. Sihombing, Q. Ahsan, S.T.W. Lau and M.I. bin Ghazali	81
Water Absorption and Thickness Swelling of Laminated Composite after Cured at Different Angle	
M.Y. bin Yaakob, T.T.T. Jennise, H. Sihombing, N. Mohamad, S.H. Yahaya and M.Y.A. Zalkis	86
Simulation of Ironing Process for Earring Reduction in Sheet Metal Forming	
A.D. Anggono and W.A. Siswanto	91
Dimensional Accuracy Evaluation of Rapid Prototyping Fused Deposition Modeling Process of FDM200mc Machine on Basic Engineering Profiles	
Z.A. Latiff, M.R.A. Rahman and F. Saad	96
Tensile Properties of Angle Cured Laminated Composites Structures under Gravity Effects	
M.Y. bin Yaakob, T.T.T. Jennise, H. Sihombing, M.R. bin Said, U. Nirmal and M.M.H. Megat Ahmad	101

Chapter 2: Alternative Energy and Green Energy

CFD Analysis of Circle Grid Fractal Plate Thickness on Turbulent Swirling Flow B. Manshoor, I.B. Zaman, M. Jaat and A. Khalid	109
Steady - State Potential Energy Recovery Modeling of an Open Cathode PEM Fuel Cell Vehicle I.A. Zakaria, M.R. Mustaffa, W.A.N. Wan Mohamed and A.M.I. Mamat	114
Techno-Economic Analysis of an Alkali Catalyzed Biodiesel Production Using Waste Palm Oil D.S. Patle and Z. Ahmad	120
Mono-Gas Fuelled Engine Performance and Emissions Simulation Using GT-Power M.Y. Ismail, A.J. Alimin and S.A. Osman	125
Influence of 1-Butanol Additives on Palm Biodiesel Fuel Characteristics and Low Temperature Flow Properties O.M. Ali, R. Mamat and C.K.M. Faizal	130
Characterization of Blended Biodiesel Fuel Properties with Small Portion of Butanol as a Fuel Additive O.M. Ali, R. Mamat and C.K.M. Faizal	137
Exergy Analysis of a Micro-Gas Turbine Fueled with Syngas H. Sadig, S.A. Sulaiman and I. Idris	142
Unsteady Magnetohydrodynamic Free Convection Flow of a Radiative Fluid Past an Infinite Vertical Plate with Constant Heat and Mass Flux M. Narahari, S. Tippa and R. Pendyala	149
Investigation of Evacuated Tube Collector Performance at High Temperature Mode Using TRNSYS Simulation Model B.H. Ali, S.I. Gilani and H.H. Al-Kayiem	155
The Comparison of Preheat Fuel Characteristics of Biodiesel and Straight Vegetable Oil A. Khalid, N. Mustaffa, B. Manshoor, H. Zakaria, A.J. Alimin, A.M. Leman and A. Sadikin	161
Effects of Calcination Factors on the Composite Cathode Powder LSCF-SDC Carbonate by Using Dry Milling M.S.A. Bakar, M.F. Kamaruddin, S. Ahmad, H.A. Rahman, H. Basri and A. Muchtar	167
Simulation and Optimization of a Stand-Alone Sustainable Renewable Energy System A.S. Tijani, K.M. Ridzuan Ku Suid and Y. Yatim	172
Identification of Biodiesel Composites from Waste Cooking Oil Using Gas Chromatographic Method N.H. Abdullah, H. Sulaiman and W. Sani	177
Experimental Investigation of Thermal Conductivity of Paraffin Based Nanocomposite for TES L.O. Afolabi, H.H. Al-Kayiem, A.T. Baheta and S.C. Lin	181
Numerical Simulation of Integrated Impingements Cooling Structure: Heat Removal at the Impingement and Pin Surfaces S.R. Atan and H. bin Salleh	186
Effect of Water Content and Tween 80 to the Stability of Emulsified Biodiesel A. Aziz, A. Jusoh, R. Mamat and A.A. Abdullah	191
Synthesis and Property Study of Multi-Doped LaGaO₃ for SOFC Application R.C. Biswal and K. Biswas	196
Investigate Jatropha Oil as New Source of Lubricant Oil I. Golshokouh, S. Syahrullail, S. Shariatmadari and F.N. Ani	201
Performance Study of Activated Carbon – Hydrofluoro Olefin Based Adsorption Cooling System K. Habib	206
Performance Analysis of Photo Voltaic Trombe Wall for Tropical Climate K. Irshad, K. Habib, N. Thirumalaiswamy and A.E.A. Elmahdi	211
Lumped Components Modeling of Double Pass Solar Collector with Porous Matrixes M.W. Kareem, K. Habib and S.I. Gilani	216

Experimental Investigation on Biodiesel-Ethanol-Diesel Blends Operating with a Diesel Engine	
M.H. Mat Yasin, R. Mamat, A.M. Leman, A. Khalid and N. Tamaldin	221
Mathematical Modeling for the Regenerator of Liquid Desiccant Air-Conditioning System	
M.A. Wassan, K. Habib and S.B. Hassan	226
Biodiesel Production from Palm Oil in a Millichannel Reactor	
W.N. Wan Ab Rashid, Y. Uemura, K. Kusakabe, N.B. Osman and B. Abdullah	232
Air Conditioner Unit with Thermal Energy Storage by Open Loop System	
I. Supardi, Z. Noranai and M.Z.M. Yusof	237
Design and Fabrication of a Dual Powered Mini Pelletizer	
Y.M. Sonkhaskar, V.S. Deshpande and J.P. Modak	242
A Study of a Multi-Stage Downdraught Evaporative Cooling Device Using CFD to Assess the Effect of the Primary Inlet to Mixing Stack Area Ratio: Preliminary Work to Establish the Baseline Performance of the Device	
S. Sarjito and D. Marchant	248
Vertical Axis Wind Turbine with Magnetic Levitation Principle	
W.K. Loon, A.M. Najib and F. Azni Jafar	255
Overview Effect of Biodiesel Storage on Properties and Characteristics	
H. Zakaria, A. Khalid, M.F. Sies and N. Mustaffa	260
Review of the Investigation of Fuel-Air Premixing and Combustion Process Using Rapid Compression Machine and Direct Visualization System	
M. Jaat, A. Khalid, B. Manshoor, S.M. Basharie and H. Ramsy	265
Simulation Study on the Performance of Vertical Axis Wind Turbine	
N.A. Samiran, A.A. Wahab, M. Sofian and N. Rosly	270
National Renewable Energy Policy and Action Plan: Highlights and Updates	
K. Abdullah	275
Green Pedestrian and Cyclist way for Sustainable Campus: Case Study at Universiti Tun Hussein Onn Malaysia	
M.S. Yusof, Z. Said and A.W.A. Zaki	280
Preheated Biodiesel Derived from Vegetable Oil on Performance and Emissions of Diesel Engines: A Review	
N. Mustaffa, A. Khalid, M.F. Sies, H. Zakaria and B. Manshoor	285
Performance and Emissions of Preheated Biodiesel on a Compression Ignition (CI) Engines	
N. Mustaffa, A. Khalid, M.F. Sies, H. Zakaria and B. Manshoor	291
A Review of the Concept of Fuel-Water Internally Rapid Mixing Injector in Burner System	
M.F. Sies, N. Mustaffa, H. Zakaria, H. bin Salleh, B. Manshoor and A. Khalid	296
Development of the Premixing Injector in Burner System	
M.F. Sies, N. Mustaffa, H. Zakaria, H. bin Salleh, B. Manshoor and A. Khalid	302
The Efficiency Enhancement on the Direct Flow Evacuated Tube Solar Collector Using Water-Based Titanium Oxide Nanofluids	
M. Mahendran, T.Z.S. Ali, A. Shahrani and R.A. Bakar	308
Effect of Storage Temperature and Storage Duration on Biodiesel Properties and Characteristics	
H. Zakaria, A. Khalid, M.F. Sies, N. Mustaffa and B. Manshoor	316
The Effects of Injection Parameters on the Performance of Common Rail Light Duty Engine Fueled with Palm Oil Biodiesel	
M.A. Abdullah, F.N. Ani and M. Hassan	322
Technical-Economic Analysis of Steam Double Effect Absorption Chiller-Heaters Equipped with Solar Heat Pipe System	
M.K. Assadi, H.A. Armaki and M.Z. Del	327

Chapter 3: Aeronautical and Aerospace Engineering

Spin-Off Maneuvers of Flexible Satellite Using PD Based Constant-Amplitude Inputs	
P. Setyamartana, R.B. Razali and A. Zainuddin	337
The Development of a Small Solar Powered Electric Unmanned Aerial Vehicle Systems	
P. Rajendran and H. Smith	345

Numerical Simulation of a High-Aspect-Ratio Wing Using High Fidelity Aero-Structural Coupled Method Z.H. Wang, M.Y. Lv, J.H. Meng and G.Q. Tao	352
Two Dimensional Compressible Flow Analysis over a Generic Cruise Missile Model H.T.M. Elkamel, B. Basuno and A.M. Alakashi	358
On the Determination of Longitudinal Transfer Function of the Cessna - 182 Aircraft Model A.E. Al Aian, B. Basuno and Z. bin Omar	363
Experimental Determination of the Moment of Inertias of USM e-UAV M.H. Junos, N. Mohd Suhadis and M.M. Zihad	368
Cost Analysis of a Hybrid Airship Vehicle for Cargo Delivery M.I. Mahzan and M. Sallehuddin	373
Ground Viscous Effect on Aerodynamics of a Compound Wing with Different Reynolds Number S. Jamei, A. Priyanto, A. Maimun, M.M. Tofa, N. Azwadi and S. Mansor	379

Chapter 4: Engineering Education in Mechanical and Manufacturing

The Importance of Programming Paradigms to Manufacturing Engineering Graduates: A Case Study from International Islamic University Malaysia Graduates M.A. Fauri Fauzi, D.A.Z. Zuhud and H. Husin	387
Development of Course Management and Monitoring System as a Quality Tools in Engineering Education N.H. Muhd Nor, M.A. Azlan, S.C. Kiong, F. Mohamad, A.E. Ismail, A. Kasmin, M.F. Ahmad and Y. Seiji	395
Design and Optimisation of Pressure Vessel Using Metaheuristic Approach S. Hassan, K. Kumar, C.D. Raj and K. Sridhar	401

Chapter 5: Ecological Vehicles and Automotives

Investigation of Intake Flow Rate and Swirl Motion of SI Engine S. Suhaيمي, R. Mamat, A.A. Abdullah, A. Aziz and N.R. Abdullah	409
Analysis of Diesel Engine Performance Fueled with Waste Cooking Oil N.A. Ramlan, M.H. Hamzah, N.F. Jaharudin, A.A. Abdullah and R. Mamat	418
Performance of Diesel Engine Operating with Waste Plastic Disposal Fuel M.H. Hamzah, A.A. Abdullah, A. Sudrajat, N.A. Ramlan and N.F. Jaharudin	423
Design of New Ecological Combustion Engine with Double Potential Power Output I. Harianton, A. Ruswandi and M. Nurdin	428
Study on Particulate Matter (PM) Emissions of Diesel Engine Using Palm Oil Methyl Ester N.F. Jaharudin, A.A. Abdullah, A.F. Yusof, R. Mamat, N.A. Ramlan and M.H. Hamzah	433
The Efficacy of Local Exhaust Ventilation (LEV) System Controls on Aerosols Exposures during Aluminium Cans Production B.N.D. Pagukuman, A.M. Leman and M.Z.M. Yusof	438
An Investigation of Supercharged Air Filter System on the Performance of a Spark Ignition Engine S. Zain and S.M. Fazri	443
Distribution of Two-Stage Direct Injection CNG-Air Mixture near Lean Limit Using CFD M. Fawzi, B. Manshoor, Y. Kidoguchi and Y. Nada	448
Stress Analysis on an Automotive Crankshaft under Mixed Mode Loading N. Nikabdullah, R. Alebrahim, S.S.K. Singh, M.I. Ismail and M.A.A. Bakar	453

Chapter 6: Fluid Mechanics and Heat Transfer

Numerical Study of Turbulent Heat Transfer in Annular Pipe with Sudden Contraction H. Togun, T. Abdulrazzaq, S.N. Kazi, A. Badarudin and M.K.A. Ariffin	461
Leakage Detection in Pipeline Using Synchrosqueeze Wavelet Transform M.M. Amin, A. Hadi and M.F. Ghazali	467

Drying Characteristics of Several Agricultural Product: Effect of Drying Temperature M.N. Farhan, M.F. Mohideen Batcha and S. Sabudin	472
Numerical Investigation on the Effect of Down Stand Structure in Fire Compartment on Smoke Contamination Atrium Upper Balconies S.A. Hasnain, M.S. Nasif, W. Pao and R. Al-Waked	480
Visual Study of Hollow Cone Water Spray Jet Breakup Process at Elevated Temperatures and Pressures M.Y. Naz, S.A. Sulaiman, B. Ari-Wahjoedi and K.Z. Ku Shaari	485
Meshless Local B-Spline Basis Functions-FD Method and its Application for Heat Conduction Problem with Spatially Varying Heat Generation M.I.P. Hidayat, B. Ari-Wahjoedi, P. Setyamartana, P.S.M. Megat Yusoff and T.V.V.L.N. Rao	490
Recent Trends of Impingement Cooling System Enhancement for Gas Turbine M.F. Bin Abas, A. Aslam, H. bin Salleh and N.A. Bin Nor Salim	496
Pressure Drop and Heat Transfer Characteristics of Louvered Fin Heat Exchangers S.H. Amirnordin, H.D. Djamal, M. Norani Mansor, A. Khalid, M.S. Suzairin and V.R. Raghavan	500
CFD Study on the Effects of Nozzle Number on Turbulent Flow and Energy Separation in a Ranque-Hilsch Vortex Tube N. Bej and K.P. Sinhamahapatra	505
Simulations on Modified Burner Configuration Using CFD A. Chai	510
Experimental Investigation on the Effect of Orifice Diameter and Inlet Pressure to the Ranque-Hilsch Vortex Tube Performance N. Ismail, W. Wirachman and M.F. Remeli	515
Effect of Nozzle Type on Spray Drift in Banding Application N.S. Hassen, N.A.C. Sidik and J. Md Sheriff	520
Investigation of Flow Uniformity and Pressure Recovery in a Turning Diffuser by Means of Baffles N.H. Nohseth, N. Nordin, S. Othman and V.R. Raghavan	526
Two Phase Flow Modeling of the Interior Ballistics for a Naval Medium Caliber Gun with Guided Projectile H. Elsadek, X.B. Zhang, M.M. Rashad and C. Cheny	531
Heat Transfer Enhancement in Microchannel Using Nanofluids K.A. Fadzin and A. Lee	536
Investigation of Phasing on Synthetic Jet Actuator Arrays J.J. Goh and A. Lee	541
Tube Bank with Integral Wake Splitter Performance at Reynolds Number 5000 to 50000 S.M. Seri, Z.A. Abdul Karim, M.F.M. Batcha and V.R. Raghavan	546
Prediction of Particle Impact on an Archimedes Screw Runner Blade for Micro Hydro Turbine M.A.N. Mutasim, N.S. Azahari and A.A.A. Adam	552
Numerical and Qualitative Analysis of a Single Particle Behavior in a Shear Driven Flow in Equilateral Triangular Cavity M.A.N. Mutasim, N. Ali, M.S. Idris and A.N. Oumer	557
Experimental Study on the Effect of Different Speed Using Pin on Disc Tribotester S. Syahrullail and N. Nuraliza	562
Effect of Baffle Opening Position to the Flow Distribution in a Servco Fume Cupboard M.A.A. Omar, W. Wisnoe and A. Bakri	566
Simulation of Room Airflow Using Comsol Multiphysics Software A. Asmi, J.C.P. Putra and I.A. Rahman	571
Mechanical Growth of Labyrinth Seal S. Das and H.T. Toh	578
Numerical Investigation of the Heat Distribution in an Annular Diffuser Equipped with Twisted Rectangular Hub E.S. Shukri, W. Wirachman and R. Zailani	582
Investigation on Characteristics Behavior on Aerosol Spray at Exit Nozzle Based on ANSYS-CFX Simulation N.Z. Asmuin and A. Ramlan	587

Two-Phase Flow Interior Ballistics Model of Naval Large Caliber Guided Projectile Gun System	
M. M. Rashad, X.B. Zhang, H. El Sadek and C. Cheng	592
The Performance of Turning Diffusers at Various Inlet Conditions	
N. Nordin, Z.A. Abdul Karim, S. Othman and V.R. Raghavan	597
An Assessment of Turbulence Models in Simulating a Synthetic Jet	
G.G. Gomang and A. Lee	603
Flow Separation Prediction in a Single-Phase Flow in an Inline Tube Bundles	
A. Sadikin and N.M. Isa	608
Two-Phase Flow Pressure Drop Model for a Shell Side of a Shell of Heat Exchanger	
A. Sadikin and N.Z. Asmuin	613
Investigation on the Turbulence Models Effect of a Coal Classifier by Using Computational Fluids Dynamics	
N.M. Isa, A.N.K. Ahmad Fara and N.Z. Asmuin	617
Heat Transfer of Aluminium-Oxide Nanofluids in a Compact Heat Exchanger	
F.M. Nasir, M.H. Bahari and Y. Aiman	622

Chapter 7: Manufacturing Analysis, Simulation and Modelling

Influence of Manufacturing Process on Stress Distributions in Mechanical Parts	
Z. Poruba and J. Szweda	631
Drying Comparison of Nonhygroscopic and Hygroscopic Materials	
Z. Harun, T.C. Ong and R. Ahmad	637
Surface Integrity of a High Speed Milling FC300 Gray Cast Iron	
A.B. Mohd Hadzley, M.R. Nurul Fatin, R.A. Raja Izamshah, N.I.S. Hussein, A. Siti Sarah and Sivarao	642
Prediction of Mechanical Properties of Al-Based FGM Crash Box Fabricated by Heat Treatment Process	
S. Jamian and M.R. Zainal Abidin	647
Hybrid Bat-BP: A New Intelligent Tool for Diagnosing Noise-Induced Hearing Loss (NIHL) in Malaysian Industrial Workers	
N. Mohd Nawi, M.Z. Rehman, M.I. Ghazali, M.N.B. Yahya and A. Khan	652
Modelling and Simulation for Optimum Design and Analysis of Riser in Sand Casting with Experimental Validation	
B.E. Narkhede, C.M. Choudhari and S.K. Mahajan	657
A Study of Energy Absorption Performances of Pultruded Composites under Quasi-Static Compressive Loadings	
S.H. Masran, A.E. Ismail and M.F. Marian	662
The Development of New STEP-NC Code Generator (Milling STEP Coder)	
N. Kassim, Y. Yusof, N.M. Nawi and M.Z. Awang	667
Investigating the Flexibility of a Hybrid Manufacturing System Using Simulation Approach	
P.Y. Chang	672
Simulation Analysis of Non-Linear Fuzzy PID Temperature Controller	
L.Y. Ang and F. Azni Jafar	677
Analysis of Human Emotion State in Collaboration with Robot	
F. Azni Jafar, N. Abdullah, N. Blar, M.N. Muhammad and A.M. Kassim	682
Contour Optimization of an Inductor Using Taguchi Method	
K.K. Boo, O. Mark and T. Nagarajan	688
Finite Element Analysis for the Tube Sinking Process of the Micro Ti-0.2Pd Tube	
S.K. Hong, J.J. Kang, J.D. Kim, H.K. Kim, S.Y. Lee and C.H. Park	693
Dynamic Analysis of Micro-Milling Machine	
S. Hassan, E.A. Rahim, Z. Mohid and N.M. Warap	699
Process Parameter Optimization for Better Hydro-Forming Performance of a Trailing Arm Tube	
S.Y. Lin and H.Y. Liao	704
Characterization and Rheological Studies on Ready-Made Feedstock of Stainless Steel 316L in Metal Injection Molding (MIM) Process	
N.H. Mohamad Nor, M.H. Ismail, N.A. Abu Kasim, N. Muhamad and M.A. Taib	709

Feasibility Study of Additive Manufacturing Technology Implementation in Malaysian Automotive Industry Using Analytic Hierarchy Process S.L. Rahim and S. Maidin	715
Numerical Analysis of Laser Heating for Laser Assisted Micro Milling Application Z. Mohid, N.M. Warap, S. Hassan, M.I.S. Ismail, R. Ibrahim and E.A. Rahim	720
Failure Analysis of Conveyor Chain Links: A Case Study N.I. Haris, M.S. bin Wahab and A. Talip	725
Determination of Heat Flux Intensity Distribution and Laser Absorption Rate of AISI D2 Tool Steel Z. Mohid, N.M. Warap, M.I.S. Ismail, R. Ibrahim and E.A. Rahim	730
The Computer Modeling of the Textile Material J. Podešva	735
Establishment of Process Capability of Machine Centre Drilling Using Multiple Regression Analysis M.A. Rahman, R.I.F. Elfi, A.B. Baharudin, A.M. Najib, A. Saptari, N.I.S. Hussein and H. Isa	740
Optimization of Axial Rake Angle for Face Milling Using Taguchi Method and Finite Element Analysis M.R. Ibrahim, A.R. Abd. Kadir, M.S. Omar, M.H. Osman, S. Sulaiman, M.A. Razak and A.B. Abdullah	746
A Combinational Approach for Experts of Committee Machine in Wire Bonding Problem Solving S.J. Golestaneh, I. Napsiah, M.K.A.B. Mohd Ariffin, S.H. Tang, H.M. Naeini, A.A. Maghsoudi and Z. Firoozi	751

Chapter 8: Manufacturing Systems and Automation

A Squeegee Coating Apparatus for Producing a Liquid Crystal Based Bio-Transducer C.F. Soon, Z.P. Goh, L.C. Ku, T.T. Lee and K.S. Tee	759
Digital Object Memory Integration into Indirect Surface Roughness Measurement in Turning T. Aruväli and T. Otto	764
Integration of Value Stream Mapping with RFID, WSN and ZigBee Network A. Ahmed, K. Hasnan, B. Aisham and Q. Bakhsh	769
A Window Climbing Robot A. Chai, H.S. Jo and N.M. Nasiri	774
Interpreter for Open Architecture CNC System: A Conceptual Model K. Latif and Y. Yusof	779
Recent Developments in Contra-Flow Crawler in Pipeline M.A.M. Haniffa and F.M. Hashim	784
Numerical Simulation to Investigate the Effect of Non Newtonian Properties of Blood on Wall Shear Stress in Diseased Artery M. Yunus, A.S. Shuib and H. Fawad	789
Algorithm to Detect Roundabout Environments for Mobile Robot Based on Laser Range Finder and Camera M.A.H. Ali, M. Mailah, T. Howe Hing and M.A.B.A. Rahim	796
Hardware-in-the-Loop Simulation for Active Force Control with Iterative Learning Applied to an Active Vehicle Suspension System R. Rosli, M. Mailah and G. Priyandoko	801
AFC Motor Control Using Low Cost and Mobile Data Acquisition System with dsPIC30 Microcontroller and Lubin Kerhuel Blockset for MATLAB/Simulink S. Abdullah, M. Mailah and H.H. Tang	806

Chapter 9: New Materials and Advanced Materials

Effect of NH₃ on Structural and Optical Properties of SiO₂-CuO Core-Shell Nanostructure M.A. Salim, H. Misran, S.Z. Othman, N.N.H. Shah, N.A.A. Razak and A. Manap	813
Fouling Characterization of Polysulfone-Grafted-Methyl Methacrylate Membrane M.Z. Yunus, Z. Harun, H. Basri, H. Taib and A.F. Ismail	819

Characterization of Nickel-Zinc Ferrite Powder Prepared via Sol-Gel Technique in between 100 MHz to 2 GHz	
S.K. Yee, S.C. Kiong and Z.b.M.J. Mohd	824
Evolution of Globular Microstructures during Direct Partial Re-Melting Experiment of AISI D2 Tool Steel	
M.N. Mohammed, M.Z. Omar, J. Syarif, Z. Sajuri, M.S. Salleh and K.S. Alhawari	829
Investigation in Optimization Process Parameter of $\text{CaCu}_3\text{Mn}_4\text{O}_{12}$ via Sol-Gel Synthesis	
A. Nurulhuda, A. Rafidah, A. Azrina, Y. Suhaila, I.S. Anwar and A.R.M. Warikh	834
Effect of Mish Metal Cerium Addition on Fluidity of Aluminum Eutectic Silica Alloys - LM6	
M.B.A. Asmael, R. Ahmad and A. Ourdjini	839
A Review: Effect of Sintering Method on the Decomposition of Hydroxyapatite and Density of Hydroxyapatite Zirconia Composites	
C.H. Leong, A. Muchtar, C.Y. Tan and M. Razali	843
Mechanical Properties of Kevlar Reinforcement in Kenaf Composites	
N.H. Bakar, K.M. Hye, A.S. Ramlan, M.K. Hassan and A. Jumahat	847
Basalt Fabric-Electrospun Nanofiber-Based Composite Laminates	
I.D.G.A. Subagia, L.D. Tijing and Y.J. Kim	852
Properties and Survival Rate of all Ceramics Dental Crown: A Review	
K.Y. Theng, M. Andanastuti, M.M. Aboras, N. Yahaya and M.J. Ghazali	857
Development of the Shape Functions for Fatigue Test Using Digital Image Correlation	
K.S. Wei, S. Karuppanan and A.A. Wahab	862
The Effects of Solution Movement to the Microstructure and Size of Nickel Plating on Titanium Surface by High Speed Direct Nanocrystalline Plating	
N. Zaimah, M.S. Hussain and L. Masrur	867
Experimental and Theoretical Analysis on Thermal Conductivity of Fired Clay Bricks Incorporated with Cigarette Butts	
N.A. Sarani and A. binti Abdul Kadir	872
Effect of Sintering Temperature on the Physical Properties of Titania-Alumina-Silver Nitrate Foam	
S. Ahmad, N.H. Halim, H. Taib and Z. Harun	877
The Effect of Microstructure and Mechanical Properties of Aluminium Aa6061 before and after Heat Treatment Using TIG	
R. Ahmad and S.S. Abdulmalik	881
Effects of SiO_2 Particles in Mechanical Properties of Iron Composite	
A. Amir and O. Mamat	886
Multilayer of Ni/Cu Coating Produced via Electroplating Process	
S.S. Jikan, S.S. Abdullah, M.H. Ismail, N.A. Ismail and N.A. Badarulzaman	891
Fabrication of Chemically Treated Natural Fibre Reinforced Polymer Matrix Composites and Measurement of its Sound Absorption Coefficients to Regulate Industrial Noise	
E. Jayamani, P. Ezhumalai, S. Hamdan and M.R. Rahman	896
Investigation on Sound Absorption Coefficients of Betel Nut Fiber Reinforced Polymer Matrix Composites	
E. Jayamani, P. Ezhumalai, S. Hamdan and M.R. Rahman	901
Biosorption of Pb(II) and Zn(II) in Synthetic Waste Water by Watermelon Rind (<i>Citrullus lanatus</i>)	
M.F.H. Azizul-Rahman, A.A. Mohd-Suhaimi and N. Othman	906
Study on Layer Fabrication for 3D Structure of Photoreactive Polymer Using DLP Projector	
K. Khairu, M. Ibrahim, S. Hassan, H. Hehsan, A. Kasmin and E. Fazial	911
Fabrication of Multilayer $\text{ZnO}/\text{TiO}_2/\text{ZnO}$ Thin Films with Enhancement of Optical Properties by Atomic Layer Deposition (ALD)	
R. Hussin, K.L. Choy and X.H. Hou	916
Potassium Bromide as Space Holder for Titanium Foam Preparation	
F. Mat Noor, M.I.M. Zain, K.R. Jamaludin, R. Hussin, Z. Kamdi, A. Ismail, S. Ahmad and H. Taib	922
Growth of Bamboo-Shaped Carbon Nanostructures on Carbon Fibre by Chemical Vapor Deposition	
M.N. Mohamed Hatta, F. Xu, Y.D. Xia and Y.Q. Zhu	927

Recycled PP/HDPE Blends: A Thermal Degradation and Mechanical Properties Study T.I.T. Noor Hasanah, D.C. Wijeyesekera, A.J.M.S. Lim and B. Ismail	932
The Strength of Fly Ash-Bottom Ash (FA-BA) Mixtures as Backfill Material in Ground Improvement Works A.R.b.H. Awang, W.H.b.W. Mansor and A.Y. Bin Mohamad	937
A Review of Polypropylene Nanoclay Nanocomposites: Preparation, Properties and Applications M.H. Othman, H. Sulaiman and M.S. bin Wahab	944
Influence of Calcination on the Properties of $\text{La}_{0.6}\text{Sr}_{0.4}\text{Co}_{0.2}\text{Fe}_{0.8}\text{O}_{3-\delta}$-Samarium Doped Ceria Carbonate H.A. Rahman, A. Muchtar, N. Muhamad and H. Abdullah	949
The Influence of Metallic Addition on Fluidity of Aluminum (LM6) Alloy R. Ahmad, R. Sadeghi, M.B.A. Asmael, H. Mohamad, Z. Harun and H. Sulaiman	954
The Effect of Metallic Addition on Mechanical Property of Aluminum (LM6) Alloy R. Ahmad, M.B.A. Asmael, R. Sadeghi, H. Mohamad, Z. Harun and H. Sulaiman	958
The Effect of Yarn Linear Density on Mechanical Properties of Plain Woven Kenaf Reinforced Unsaturated Polyester Composite M.P. bin Saiman, M.S. bin Wahab and M.U. Wahit	962
Effect of Water Absorption on Mechanical Properties of Kenaf and Kenaf Hybrid Polyester Z. Salleh, K.M. Hyie, M.N. Berhan, Y.M. Taib, N.R. Nik Roselina and A.R.M. Razib	967
Tool Wear in Machining AlSi/AlN Metal Matrix Composite 10 Wt% Reinforcement Using Uncoated Cutting Tool M.S. Said, M.S. Yusoff, C.H. Che Hassan, M.A. Selamat, J.A. Shukur and J.A. Ghani	973
Thermal Properties of Recycled Polyethylene/Chitosan Composites: The Effect of Eco-Degradant PD 04 A.N. Azieyanti and H. Salmah	978
Quenching Heat Treatment Effects on the Mechanical and Microstructure Properties of AISI 304 Type Welded by GMAW Process Using Different Shielding Gases R. Deraman and M.N. Berhan	983
The Effect of Sintering Temperature and Composition for Density and Porosity of SS316L Foam N.I. Mad Rosip, S. Ahmad, N.L. Arpawi, K.R. Jamaluddin and F. Mat Noor	988
Synthesis of Y_2O_3 Nanoparticles by Modified Transient Morphology Method A. Amirabadizadeh and Z. Momeni Larimi	993
Mechanical Milling of Tronoh Silica Sand Nanoparticles Using Low Speed Ball Milling Process Z. Rizlan and O. Mamat	998
Fabrication of Al-Sn Composites from Direct Recycling Aluminium Alloy 6061 N.A. Badarulzaman, S.R. Karim and M.A. Lajis	1003

Chapter 10: Sustainable Products and Manufacturing Processes

A Study of Injection Moulding Optimum Parameters to Control Shrinkage and Warpage of Polypropylene-Nanoclay Hinges Samples W.N.A. Wan Muhammad, M.H. Othman, S. Hasan and M.F. Ruslee	1011
Design of Ultrasonic Compaction Tool for Powder Metallurgy Y. Daud, N.A. Raman, S.A. Aziz and K.R. Jamaludin	1016
Analysis of Single Actuator for Rehabilitation Device of Leg Weakness K.F. Samat, M. Hussein and M.R. Safizadeh	1021
Use of Failure Mode and Effects Analysis (FMEA) Method in Remanufacturing Analysis for Engine Block T.A. Abdullah, A. Hashim, A.B. Baharudin and D. Abd Wahab	1026
Effect of Percentage Ratio of Hydroxylated Biomonomer with Synthetic Epoxy of Polymer Foam for Sound Absorption Study N.Q.A. Adnan and A.Z.M. Rus	1034
Acoustical Behavior of Treated Wood Dust-Filler for Polymer Foam Composite S. Sa'adon and A.Z.M. Rus	1039

Influence of Hot Compression Moulding of Particulate Biopolymer and their Sandwich Layups for Sound Absorption Characteristic N.A. Latif, A.Z.M. Rus and M.K.Z.A. Ghani	1044
Evaluation of the Surface Integrity when Machining LM6 Aluminum Metal Matrix Composites Using Coated and Uncoated Carbide Cutting Tools A.B. Mohd Hadzley, A. Siti Sarah, R.A. Raja Izamshah, A.A. Mohd, M.S. Kasim, M.A. Sulaiman and M.R. Nurul Fatin	1049
Green Supplier Selection: Analysis of Qualitative Environmental Criteria Using Fuzzy Axiomatic Approach L.G. Beng and O. Badrul	1054
Dissimilar Materials Laser Welding Characteristics of Stainless Steel and Titanium Alloy Z. Mohid, M.A. Liman, M.R.A. Rahman, N.H. Rafai and E.A. Rahim	1060
Decision Making of Screw Manufacturing for the Best Environmental and Economic Combination by Using AHP M.A. Azlan, A.A. Buja, S.C. Kiong, N.H. Muhd Nor and J. Azlis-Sani	1065
Studies on Rapid Prototyping Pattern Using PLA Material and FDM Technique M. Ibrahim and M.N. Hafsa	1070
Performance of Tools Design when Helical Milling on Carbon Fiber Reinforced Plastics (CFRP) Aluminum (Al) Stack E.A. Rahim, Z. Mohid, M.R. Hamzah, A.F. Yusuf and N.A. Rahman	1075
Life Cycle Assessment of Palm Oil Biodiesel Production in Malaysia M.H. Mohammadi Ashnani, A. Johari, H. Hashim and E. Hasani	1080
Effect of Thickness and Permeability of Ceramic Shell Mould on <i>In Situ</i> Melted AZ91D Investment Casting H. Jafari, M.H. Idris and A. Ourdjini	1087
Permeability Number for Various Grain Size of Tin Mine Tailing Sand for Greensand Casting Mould A. Abdullah, R. Abdullah, S.K.E. Shariff and N. Haliza	1093
Investigation of Tool Wear, Tool Life and Surface Roughness when Machining AISI D2 Hardened Steel Using PVD TiAlN Coated Carbide Tools N.H. Rafai, M.A. Lajis and N.A.J. Hosni	1098
A Decision Support System (DSS) for Sustainable Production of Biofuel M.H. Mohammadi Ashnani, A. Johari, H. Hashim and E. Hasani	1103
Development Time in Liquid Penetration Testing for Metal Butt Joint Y. Suhaila, A. Rafidah, N.H. Ariffin, A. Arshad, S.A. Ismail, F.A.A. Bakar and M. Ibrahim	1109
Performance Investigation of Modified Turning Tool Holder for MQL Application E.A. Rahim, Z.H. Samsudin, M.A.A. Rahim and Z. Mohid	1114
Study on Temperature, Force and Specific Energy of AISI 1020 under MQL Grinding Process E.A. Rahim, R. Ibrahim, Z. Mohid, M.F. Ahmad and M. Shahrudin	1119

Chapter 11: Industrial Engineering and Operations Management

The Linear Regression vs. Additive Forecast Techniques in Predicting Palm Oil Estate Monthly Delivery Quantity N.A. Mohd-Lair, J.K. Hong and M.S. Misaran	1127
Developing Vocational Education Practical Program with Job Shop, Batch and Research Project G. Ananto	1133
Clustered Absolute Bottleneck Adjacent Matching Heuristic for Re-Entrant Flow Shop S. Ahmad Bareduan and I.M. Gani	1138
The Effectiveness of the Single Minute Exchange of Die (SMED) Technique for the Productivity Improvement M.N. Bin Che Ani and M.S.S. Bin Shafei	1144
Design of an Artificial Neural Network Pattern Recognition Scheme Using Full Factorial Experiment I. Masood, N.Z.Z. Abidin, N.R. Roshidi, N.A. Rejab and M.F. Johari	1149

Management Systems Integration for Organizational Sustainability: Quality, Environmental, Occupational Health and Safety, and Energy F. Mohamad, N.H. Abdullah, M. Mohammad and N.K. Kamaruddin	1155
Development of Questionnaire for Assistive Device Design in LPG Cylinder Handling A.A. Mohamed Sultan, Z. Nuradilah, H. Isa, A.M. Nor, I. Febrian and Taufik	1160
Pinch Techniques and their Effects on Pinch Effort: A Pilot Study P.K. Ng, M.C. Bee, Q.H. Boon, K.X. Chai, S.L. Leh and K.S. Jee	1165
Applying Clockwise and Counterclockwise Torque Directions in Pinch Grips: A Descriptive Study P.K. Ng, K.X. Chai, S.L. Leh, M.C. Bee, Q.H. Boon and A. Saptari	1170
The Effects of Different Tactile Sensations on Pinch Effort P.K. Ng, S.L. Leh, M.C. Bee, Q.H. Boon, K.X. Chai and K.S. Jee	1175
Case Studies on the Implementation of Lean Manufacturing in the Automotive Malaysian Companies M.A. Sahwan, M.N.A. Rahman and B.M. Deros	1180
Optimization Design of 2-EWMA Control Chart Based on Random Process Shift M. Shamsuzzaman	1185
Development of Malaysian Primary School Children Anthropometrics Data for Designing School Furniture Parameters M.S. Yahya, T. Palaniandy, N.Y. Zainun and M. Mohammad	1191
Respirable Dust Exposure: Symptoms and Effect on Lung Function of Industrial Workers N.A. Paiman, A.M. Leman, A. Hariri and M. Ismail	1196
The Roles of Shape and Size in the Pinch Effort of Screw Knobs P.K. Ng, Q.H. Boon, K.X. Chai, S.L. Leh, M.C. Bee and A. Saptari	1202

Chapter 12: General Mechanical and Manufacturing Engineering

Effect of Welding Current Mode on Weld Quality Characteristics of Pulsed Current Micro Plasma Arc Welded AISI 304L Sheets K. Siva Prasad, C. Srinivasa Rao and D. Nageswara Rao	1209
The Effect of EDM Die-Sinking Parameters on Material Characteristic for Aluminium Composite Using Tungsten Copper Electrode M.A. Ali, L. Suraya, H.I.K. Nor, N.I.S. Hussein, M.R. Muhamad, B. Manshoor, M.A. Lajis, R. Izamshah, M. Hadzley and Taufik	1214
The Effect of Vortex well Thickness on Microstructure and Mechanical Properties of Aluminium LM6 H. Hehsan and R. Ahmad	1219
Design of Experiment (DOE) Approach to Optimize Accuracy of Surface Roughness A. Rafidah, A. Nurulhuda, A. Azrina, Y. Suhaila, I.S. Anwar and A.W.M. Ikbar	1224
Influence of Pressure Angle on Load Sharing Based Stresses in Asymmetric Normal Contact Ratio Spur Gear Drives P. Marimuthu and G. Muthuveerappan	1229
Load Sharing Based Fillet Stress Analysis of Involute Helical Gears R. Prabhu Sekar and G. Muthuveerappan	1234
Hydrogen Blended with Gasoline for Internal Combustion Engine Effect on Specific Fuel Consumption Based on Load Tests (L0,L1,L2) H. Razali, K. Sopian and S. Mat	1239
Correlation between RFID Network Planning (RNP) Parameters and Particle Swarm Optimization (PSO) Solutions A. Nawawi, K. Hasnan and S. Ahmad Bareduan	1245
Preparation of Aluminum Feedstock for Green Part Specimen Using Metal Injection Molding H. Saidin and M. Azuddin	1250
Comparative Study of Particulate Matter (PM) Emissions in Diesel Engine Using Diesel-Methanol Blends A.F. Yusof, R. Mamat, M.H. Mat Yasin, A.A. Abdullah and A. Aziz	1255
Investigation Performance of Heat Exchanger on Thermoacoustic Heat Engine for Harvesting a Waste Heat I. Abd Rahim, M.S. bin Wahab, M.Z. Yahaya and M.Z.M. Zain	1262

Performance of an Electro-Mechanical Parking Brake (EMPB) System A.H. Rozaini, M.R. Ishak, N. Quettier, A.R. Abu Bakar and M.Z. Mohd Zain	1267
Effect of Process Conditions on Hydrophobic Characteristics of Injection Molded Silicone Rubber Surface Replicated from Electric Discharge Machined Surface J.J. Kang, S.K. Hong, S.Y. Lee, S.C. Lee and S.H. Lee	1272
Effect of Velocity on the Impact Resistance of Woven Jute Fiber Reinforced Composites A.E. Ismail, M.H.B. Zainulabidin, M.N. Roslan, A.L. Mohd Tobi and N.H. Muhd Nor	1277
Gel Combustion Synthesis and Characterizations of Nanocrystalline ZnO in Various Dispersants and Mol Ratio N.A.A. Razak, N.N.H. Shah, H. Misran, A. Manap and B.K. Yap	1282
Influence of Preheat Flux on the Microstructure of 304 Stainless Steel A.U. Alkali, T.L. Gintar, H. Fawad and A.M. Abdulrani	1287
Welding Fume Exposure among Welders in Small Size Welding Workshops in Malaysia A. Hariri, A.M. Leman and M.Z.M. Yusof	1292
Influence of Temperature on the Substitution of Quartz by Rice Husk Ash (RHA) in Porcelain Composition H.U. Jamo, M.Z. Noh and Z.A. Ahmad	1297
Root Causes Analysis of Disbonds and Unidentifiable Ultrasonic Indications on Composite Materials M.I. Hussain, Z. Mohd Zain and T.L. Kee	1304
Effect of Friction Stir Welding pin Shape on Mechanical Properties of AA6061 Alloy Weldment M.H. Idris and M.S. Husin	1309
Modelling and Control of Fish Feeder System B.A. Md Zain, M.H.M. Jamal and S. Md Salleh	1314
Investigation on the Stress Behaviour of Coating-Substrate Interface under Contact Loading M.Z.M. Rani, A.L.M. Tobi, A.E. Ismail, W.A. Siswanto and A.A. Saad	1319
Modelling Analysis on Mechanical Damage of Kenaf Reinforced Composite Plates under Oblique Impact Loadings M.N. Roslan, A.E. Ismail, M.Y. Hashim, M.H.B. Zainulabidin and S.N.A. Khalid	1324
Effect of Micro-EDM Parameters on Material Removal Rate of Nonconductive ZrO₂ Ceramic A. Sabur, A. Moudood, Y.A. Mohammad and M.A. Maleque	1329
Injury Analysis Validation of a Deformable Vehicle Front End Model K. Venkatasen, K. Abdullah, S. Sivaguru, M.M. Idres, Q.H. Shah and W.S. Voon	1334
Two Degree of Freedom Vortex Induced Vibration Tests of a Riser Model Using Spring Bars M.M. Bin Tofa, A. Maimun, Y.M. Ahmed, S. Jamei, A.S. Kader and H. Abyn	1339
Maximum Torque of Combinations Threat for Spur Gear Based on AGMA Standard S.C. Kiong, J.H. Wu and N.H. Muhd Nor	1347
Verification of Fully Developed Flow Entering Diffuser and Particle Image Velocimetry Procedures N. Nordin, Z.A. Abdul Karim, S. Othman and V.R. Raghavan	1352
Current Trend in the Oil and Gas Industry on Subsea Processing Equipment K.O. Shobowale and F.M. Hashim	1357
Study on Internal Helical Gear Worm Forging by Finite Element Analysis T.S. Yang, J.Y. Deng and J. Chang	1361
Investigation of Loading-Unloading Curve and Stress Distribution of Thin Hard Coating by Finite Element Analysis during Nanoindentation Process T.S. Yang, S.Y. Chang and J.H. Deng	1365
Effect of GMAW-CMT Heat Input on Weld Bead Profile Geometry for Freeform Fabrication of Aluminium Parts A. Wagiman, M.S. bin Wahab, Z. Mohid and A. Mamat	1370
Tactile Slippage Analysis in Optical Three-Axis Tactile Sensor for Robotic Hand H. Yussof, Z. Nur Ismarrubie, A.K. Makhtar, M. Ohka and S.N. Basir	1375
Performance Enhancement of Coal Classifier on the Effect of the Geometry N.M. Isa, J.A.R. Bansin and A. Sadikin	1380

Stress Concentration Analysis of Plate with Circular Hole: Elasticity Theory and Finite Element Comparison	
S.R. Masrol and W.A. Siswanto	1385
Duct Monitoring at Building Services Laboratory Using Mechanical Robot (MerDuct)	
M.D.A. Abdullah, A.M. Leman, A.H. Zainudin and M.M.S. Syazwan	1390
Inclusion of Strain-Rate Effects in Low Velocity Impact Simulation of Laminated Composites	
A. Abdul-Latif, M.H. Che Man and S. Mansor	1395
3D Printer Patterns Evaluation for Direct Investment Casting	
O.M.F. Marwah., S. Sharif, M.A. Zainol, M. Ibrahim and E.J. Mohamad	1400