

Table of Contents

Preface, Forewords, Committees, Sponsors and Reviewers

Chapter 1: CAD/CAM/CAE and Advanced Modelling Technologies

Design Analysis of Motion Simulation for Development of Rehabilitation Device K.F. Samat, S.K. Sayed Nordin and Z. Abdullah	3
Warpage Analysis of Different Number Cooling Channels for Dumbbell Plastic Part in Injection Moulding M. Amran, S. Salmah, R. Izamshah, M. Shahir, M. Amri, E. Mohamad, M. Sanusi, Sivaraos, Z. Marjom, U. Al-Amani, M.K. Musa and Z. Abdullah	8
Design of Five-Phase Transformer through Finite Element Simulation K. Abdul Karim, L. Geok Yin, N.A. Mohd Yusoff, M.N. Othman and A. Jidin	12
Modelling and Simulation of Hollow Profile Aluminum Extruded Product H.M. Magid, S. Sulaiman, M.K.A. Mohd Ariffin and B.T.H.T. bin Baharudin	17
Simulation Advancement in Automotive Development: A Brief Review H. Katoh	22
Numerical Investigation of 3-D Turbulent Flow in Orifice Plate within a Pipe M.A. Alabas Siba, W.M.F.W. Mahmood, M.Z. Nuawi and R. Rasani	27
A Study on CAD/CAM Application in CNC Milling Using Industrial Clay N.W. Muhamad Bustaman and M.S. Abu Mansor	32
Development of Database for Checking Fixtures for Automotive Parts Z. Abdullah, S. Imran, M. Amran, H. Hasib, N.S. Muhammad and R. Jaafar	37
Effect of Different Coolant Medium on Warpage Deflection Using Moldflow Insight Analysis M.A. Ali, S. Salmah, Z. Abdullah, P.J. Liew, M.R. Muhamad, R. Izamshah, M. Hadzley, A. Abdullah and Z. Marjom	42
Design Simulation on Fatigue Life of Fiber Reinforced Polymer Composites Z.A. Rosfadzlin Hanna, Taufik, Sivaraos, S. Mohd Ghazali, J. Rosidah and M.A. Mohd Amran	47
The Effect of Fiber Size on the Mechanical Properties of Bertam/Unsaturated Polyester Composites M.H. Norhidayah, A. Hambali and M.Y. Yuhazri	52

Chapter 2: Concurrent Engineering and Applications

Concurrent Engineering in Natural Fibre Composite Product Development S.M. Sapuan	59
Conceptual Design of Kenaf Polymer Composites Automotive Spoiler Using TRIZ and Morphology Chart Methods M.R. Mansor, S.M. Sapuan, A. Hambali, E.S. Zainudin and A.A. Nuraini	63
The Influence of the Microwave Plasma Nitrided Ti6Al4V Substrate Properties to the Duplex Coating Performance Y. Yusuf, Z. Rosli, J. Mohd Juoi, O. Nooririnah and U.A.A. Azlan	68
Integration of Failure Mode Effect and Criticality Analysis (FMECA) and Analytical Hierarchy Process (AHP) to Improve the Packaging Process for Automotive Stamping Part M.R. Azroy, A. Hambali, M.A. Rahman, H. Isa, Sivaraos, A.A. Masni, M. Zolkarnain and Y. Ahmad	73
Mechanical Properties Comparison of Stainless Steel 304L and Carbon Steel BS1387 Prior to Orbital Welding M.N. Ayof, Z.M. Noh and N.I.S. Hussein	79
Cross-Industry Concurrent Engineering S. Fukuda	83
Voltage Source Inverter Fault Detection System Using Time Frequency Distribution N.S. Ahmad, M. Mustafa, A.R. Abdullah, N.A. Abidullah and N. Bahari	88

Investigation of Cutting Parameter and Machine Tool Vibration Effects Using Regression Analysis to Enhance Part Dimensional Accuracy	93
M.A. Rahman, N.A. Md Sadan, M. Minhat, H. Isa and A.B. Baharudin	
Geometric Accuracy Evaluation of Fabricated Parts by Additive Manufacturing toward Parallel Fabrication	98
T. Tateno, Y. Yaguchi and O. Hasegawa	
Optimizing Assembly Line Production through Line Balancing: A Case Study	104
A. Saptari, J.X. Leau and M. Nor Akramin	

Chapter 3: Design for Automation and Intelligent Systems

A New Object Recognition Approach Using Combination of Texture, Color and Shape Features	111
A. Kadir, K.A.A. Aziz and Irianto	
Comparison on Techniques for Multiple Video Streaming via Webcam for Manufacturing Engineering Purpose	116
N.S.A. Ramdan, A.Y. Bani Hashim, S.R. Kamat and S.A. Asmai	
Product Identification Using Image Processing and Radial Basis Function Neural Networks	120
K.A.A. Aziz, A. Kadir, R.A. Hamzah and A.A. Basari	
Improvement of Corrosion Detection Using Vision System for Pipeline Inspection	125
S.A. Idris, F.A. Jafar, Z. Jamaludin and N. Blar	
Cutting Parameters Optimization of Mild Steel via AIS Heuristics Algorithm	132
A.J. Abbas, M. Minhat and M.N. Abd Rahman	
Positioning Control of XY Table Using 2-DOF PID Controller	137
O. Yee Teng, S.H. Chong and H. Wai Keat	
Positioning Control of Ball Screw System Driven by DC Motor	142
S.H. Chong, T. Tze Ter and V. Sakthivelu	
Design and Analysis of Disturbance Force Observer for Machine Tools Application	148
J. Jamaludin, Z. Jamaludin, T.H. Chiew and L. Abdullah	
Development of Informal Communication Environment Using Interactive Tiled Display Wall	153
T. Ogi and Y. Sakuma	
A Review of Humanoid Robots Technical Characteristics in the Application for Robotic Teacher	158
N. Blar, F. Azni Jafar, S.A. Idris and M. Mat Ali	

Chapter 4: Design for Manufacturing Systems

Improvement of Overall Equipment Effectiveness (OEE) through Implementation of Autonomous Maintenance in Crankcase Line	165
M.A. Musa, N.I. Kasim, A.R. Razali, Mahadzir and W.A.N. Wan Saidin	
Detection of Nut Welding Using Poka-Yoke Roller Coaster Jig	170
W.A.N. Wan Saidin, A.Z. Mohd Idris, S. Ravi, A.M. Ahmad Zaidi and N.I. Kasim	
Core and Cavity Generation Using Slicing and Boolean-Based Algorithm	175
M. Md Yusof and M.S. Abu Mansor	
Improvement of Overall Equipment Effectiveness (OEE) through Implementation of Total Productive Maintenance (TPM) in Manufacturing Industries	180
N.I. Kasim, M.A. Musa, A.R. Razali, N. Mohamad Noor and W.A.N. Wan Saidin	
A Study on Tool Allocation Method Considering Load Balancing and Optimization of Transportation Based on Mathematical Programming	186
K. Tanaka, K. Iwamura, Y. Tanimizu and N. Sugimura	
Development and Analysis of Small Scale Water Accumulator by Using Piston Type	191
M.N.A. Saadun, A.A. Yusof and M.I. Zakaria	
Verifying Innovative Solutions of TRIZ Engineering Contradiction Matrix Using Substance-Field Analysis in Manufacturing	196
M.C. Ang, K.W. Ng and D.T. Cher	

Chapter 5: Design for Mechatronics Systems

Frequency Dependent Vibration Attenuation of a Suspended Handle Using Piezostack Actuator

A.Z. Ahmad Mazlan and Z. Mohd Ripin 211

The Effect of Swing Arms Posture Motion on Walking Straightness of Humanoid Robot

M.R. Razali, M.F. Miskon and N.L.A. Shaari 216

Modelling and Analysis of All Terrain Vehicle (ATV) Using System Identification for Yaw Stability

F.A. Azis, M.S.M. Aras, M.Z.A. Rashid, K.S. Khamis, O.A.A. Ghani and M. Nur Othman 221

Design and Analysis of Linear Quadratic Regulator for a Non-Linear Positioning System

T. Teng Fong, Z. Jamaludin, A.Y. Bani Hashim and M.A.A. Rahman 227

Force Characterization of a Rotary Motion Electrostatic Actuator Based on Finite Element Method (FEM) Analysis

M. Md Ghazaly, T.A. Choon, C.A. Aliza and S. Kaiji 233

Development of Passive Quarter Car Suspension Prototype

C.A. Aliza, F.Y. Chin, M. Md Ghazaly, S.H. Chong and V. Sakthivelu 238

Development of System Identification for Piezoelectric Patch Actuator

M.N. Maslan, Z. Jamaludin, M.A.A. Rahman, L. Abdullah, M.L. Abd Latib, J. Karjanto and M. Mailah 245

Review on Cutting Force Compensation Techniques for Machine Tools Application

M. Maharof, Z. Jamaludin, M. Minhat and T. Ito 250

Chapter 6: Design in Manufacturing Processing Engineering, Tools and Equipment

An Experimental Study of Wear Mechanism on High Speed Machining of FC300 Gray Cast Iron Using TiAlN Coated Carbide Cutting Tool

M.R. Nurul Fatin, A.B. Mohd Hadzley, R.A. Raja Izamshah and M.A. Amrand 257

Tool Life and Wear Mechanism when Machining LM6 Aluminium (MMC) with Coated and Uncoated High Speed Steel

A. Siti Sarah, A.B. Mohd Hadzley, R. Izamshah and A. Abdullah 262

Investigating and Modeling the Machinability of Al 6061 Using Response Surface Methodology

B.A. Khidhir, A.F. Shahab, S.E. Abdullah and B.A. Saeed 267

Development of Three-Axis Mini Milling Machine for Small Scale Production

A.B. Mohd Hadzley, M.H. Samsudin, M.N. Zamri, R.I. Raja Abdullah, M.S. Kasim and A. Abdullah 273

Design and Development of Weaving Aid Tool for Rattan Handicraft

Z. Abdullah, N. Fadzlina, M. Amran, S. Anuar, M. Shahir and K. Fadzli 277

Optimization of Cutter Geometry Features to Minimise Cutting Force on Machining Polyetheretherketone (PEEK) Engineering Plastic

R. Izamshah, N. Husna, M. Hadzley, M. Amran, M.S. Kasim and Sivaraos 282

Multi Objective Optimization of Cutting Parameters in Machining Cellulose Based Hybrid Composites

R. Izamshah, Z. Zuraidah, M.S. Kasim, M. Hadzley and M. Amran 287

Optimization of Milling Parameter for Untreated and Heat Treated Polyetheretherketones (PEEK) Biomaterials

R. Izamshah, A.Y. Lung, E. Mohamad, M.A. Azam, M. Amri, P.J. Liew and M. Sanusi 293

Experimental Methods for NiCrBSi-WC Cladding on Gray Cast Iron Trim Cutter Die

N.I.S. Hussein, S.R. Kamarul and M.N. Ayof 298

The Effect of EDM Die-Sinking Parameters on Machining Characteristics in Aluminum Alloy Machining L. Suraya, M.A. Ali, N.I.S. Hussein, M.R. Muhamad, M. Bukhari, M.A. Lajis, I. Raja, H. Mohd and Taufik	303
Assessing the Significance of Rate and Time Pulse Spraying in Top Spray Granulation of Urea Fertilizer Using Taguchi Method O. Rostam, M.F. Dimin, Sivaraos, H.H. Luqman, M.R. Said, L.K. Keong, M.Y. Norazlina, M. Norhidayah and A. Shaaban	308
Cutting Temperature and Tool Wear Assessment of Turning Process with Minimal Quantity Lubrication C.Y. Teo and A. Yassin	313
Analysis of Tool Performance during Ball-End Milling of Aluminium Alloy 6061-T6 M.S. Kasim, M.H. Atan, C.H. Che Haron, J.A. Ghani, M.A. Sulaiman, E. Mohamad, M. Minhat, M. Hadzley and J.B. Saedon	318
Experimental Setup for Ultrasonic-Assisted Desktop Fused Deposition Modeling System S. Maidin, M.K. Muhamad and E. Pei	324
Analysis of Applying Ultrasonic Frequency on a Desktop FDM Nozzle S. Maidin, K.F. Abdul Aziz, M.K. Muhamad and E. Pei	329
Risk Screening as Input for Risk Assessment of Rotating Equipment R.K. Wassan and A.M. Mohd Amin	333

Chapter 7: Materials in Design

A Comparative Study between Silicon Germanium and Germanium Solar Cells by Numerical Simulation A.A. Zulkefle, M. Zainon, Z. Zakaria, M.A. Mat Hanafiah, N.H.A. Razak, S.A. Shahahmadi, M. Akhtaruzzaman, K. Sopian and N. Amin	341
Flexural Strength Analysis of Dense and Porous Sintered Clay Using Weibull Probability Distribution M. Abubakar, A.B. Aliyu and N. Ahmad	347
Effect of Sintering Temperature on Aluminium Chip Recycling (Al7075) by Powder Metallurgy Process Y.F. Fuziana, M.W.A. Rashid, M.A. Lajis, M.A. Azam and A.H. Mustaffa	352
Mechanical Properties of Rubber Mat Compound via Two Factors Modelling Using Response Surface Methodology Q. Ahsan, N. Mohamad and S. Tiak Chuan	358
Stitch Bonding Strength of Cu Wire on AuAg/Pd/Ni Preplated Cu Leadframes: Influence of AuAg Thickness S.C. Tey, K.T. Lau, M.H. Mohamad Noor, Y.L. Tham and M.E. Abd Manaf	364
The Influence of Nitric Acid Treatment on the Crystallographic Structure of Multiwalled Carbon Nanotubes M.Y. Norazlina, S. Azizah, M.F. Dimin, Y. Faridah and O. Rostam	369
Mechanical Properties of Oil Palm Empty Fruit Bunch Fibers-Cast Alloy Composite Using Three Point Bending Test M. Hafizudin, T.R. Sahroni, M.R. Muhamad, N. Farah and M.R. Kamal	374
Effect of Different Types of Pore-Forming Agent on the Macro Pore Size of Ceramic N. Nasir, R. Jumaidin, M.Z. Selamat, S. Salleh and K.T. Lau	380
Non-Covalent Polymeric Wrapping of IGEPAL C0890 for Graphene Nanoplatelets (GNPs-C0890) Filled NR/EPDM Rubber Blend Nanocomposites J. Abd Razak, S.H. Ahmad, C.T. Ratnam, M.A. Mahamood, K.T. Lau, H.E. Ab Maulod, R.F. Munawar and N. Mohamad	385
Facile Surface Modification of Graphene Nanoplatelets (GNPs) Using Covalent ATPS-Dehydration (GNPs-ATPS) and Non-Covalent Polyetherimide Adsorption (GNPs-PEI) Method J. Abd Razak, S.H. Ahmad, C.T. Ratnam, J. Yaakub, M.A. Azam, M.Z. Zainal Abidin, M.E. Abd Manaf and N. Mohamad	391
Effect of Neodymium and Samarium on the Properties of Bismuth Titanate Ceramics U.A.A. Azlan, A.F. Mohd Noor, Y. Yusuf, N. Omar and N. Mohamad	397

Antibacterial Activity of Amine-Functionalized Zeolite NaY against <i>Staphylococcus aureus</i> ATCC6538 and <i>Escherichia coli</i> ATCC11229	402
S.A. Mohd Hanim, N.A.N.N. Malek, Z. Ibrahim, M. Mad Salim, N.I. Ramli, N.S. Sarah and M.A. Azam	
Electrochemical Impedance Behavior of Various Composition Quaternary Ni Alloy in 3.5 Wt% NaCl	407
M. Zaimi, M.A. Azam, A.H. Sofian and K. Noda	
Electrophoretic Deposition and Heat Treatment of Steel-Supported PVDF-Graphite Composite Film	412
K.T. Lau, M.H.R. Ab Razak, S.L. Kok, M. Zaimi, M.W. Abd Rashid, N. Mohamad and M.A. Azam	
Effects of Layer Thickness on the Microstructures of TiN/AlTiN Multilayer Coatings	417
K.J. Kadhim, N. Abd Rahman, M.R. Salleh and K.I. Mohd Zukee	
Control of Cobalt Catalyst Thin Film Thickness by Varying Spin Speed in Spin Coating towards Carbon Nanotube Growth	421
N.N. Zulkapli, M.E. Abd Manaf, H.E. Ab Maulod, N.S. Abdul Manaf, R.N.A. Raja Seman, M.S.A. Bistamam, E. Talib and M.A. Azam	
Fabrication of Activated Carbon Filled Epoxidized Natural Rubber Composite Using Solvent Casting Method	426
M.A. Azam, A. Hassan, N. Mohamad, E. Talib, N.S. Abdul Manaf, N. Najihah, R.N.A. Raja Seman and M.S.A. Bistamam	
Effect of Nitrogen-to-Total Gas Flow Ratio on the Nanocomposite TiAlBN Coating	431
Z. Rosli, W.L. Kwan, M.W.A. Rashid, J. Mohd Juoi and N. Nayan	
The Translucency of Yttria-Stabilized Zirconia in Dental Crowns: A Review	436
C.H. Chin, A. Muchtar, M. Razali and C.H. Azhari	
Cure Characteristics of Natural Rubber/EPDM Blends for the Effect of MAH Grafted EPM and Compounding Parameters via Response Surface Methodology	441
N. Mohamad, M.A. Mahamood, J. Abd Razak, R.F. Munawar, M.Z. Zainal Abidin, M.A. Azam, M.S. Kasim, M.S. Othman and M.I. Shueb	
Dispersion Stability of Graphene Nanoplatelets (GNPs) and Noncovalent-Functionalization of GNPs with Chitosan in Ethanol	447
J. Yaakub, N. Mohamad, J. Abd Razak, K.T. Lau, M.E. Abd Manaf and M.I. Shueb	
Cyclic Voltammetry Analysis of Carbon Based Electrochemical Capacitor in Aqueous Electrolytes	452
R.N.A. Raja Seman, R.F. Munawar, J. Abd Razak, N.N. Zulkapli, M.S.A. Bistamam, E. Talib, T.I. Tunku Kudin, N.S. Abdul Manaf and M.A. Azam	
Characterizations of NiAl-Al₂O₃ Produced Using Gel Combustion Synthesis Method	457
N.F. Afandi, A. Manap, H. Misran, S.Z. Othman and N.I.M. Pauzi	
Platinum and Aluminium Microresonator Bridges for Artificial Basilar Membrane	462
T.B. Anak Ngelayang, B.Y. Majlis, M.A. Azam, F. Arith and R. Latif	
Electrochemical Performance of Multi Walled Carbon Nanotube and Graphene Composite Films Using Electrophoretic Deposition Technique	468
E. Talib, K.T. Lau, M. Zaimi, M.S.A. Bistamam, N.S. Abdul Manaf, R.N.A. Raja Seman, N.N. Zulkapli and M.A. Azam	
Synthesis and Characteristics of Mesoporous SBA-15 Influence by HMTA as an Internal pH Modifier	473
M.H. Mohd Husin, M.R. Nordin, I.S. Mohamad and J.L. Li	
Fracture Toughness of AZ61 Magnesium Alloy with Various Thickness	479
M.A. Mohd Daud, N. Zaiyah Nasir, M.Z. Selamat and S. Dhar Malingam	
Influence of Heat Treatment on Impact, Hardness and Fatigue Strength of 6061 Aluminium Alloy	484
N. Zaiyah Nasir, M.A. Mohd Daud, O. Bapokutty, A. Talib bin Din and M.Z. Selamat	
Wear Behaviour of Cryogenic Treated Recycled Carbon Fibers Filled Epoxy Composite	489
M.L. Law, Q. Ahsan, H.E. Ab Maulod, N. Mohamad and Sivaraos	
Binder Application in Durian Peels Briquette as a Solid Biofuel	494
N.M.M. Mitan, A.H. Azmi, M.N. Nur Fathiah and S.M. Se	
Optimization of Pultrusion Process for Kenaf Fibre Reinforced Vinyl Ester Composites	499
A.M. Fairuz, S.M. Sapuan, E.S. Zainudin and C.N.A. Jaafar	

HRTEM Analysis of Magnetron Sputtered Ni₄Al Thin Films	
T.J.S. Anand, M.A. Azam, Sivaraos, Z. Buang, R.K.M. Rajan, N. Hazliza, M. Zaidan and K.Y. Chua	504
Way Forward to Halt Pressure Loss in Automotive Tyres	
M.J. Raguvanan, Sivaraos, M. Amran, T.J.S. Anand, Qumrul, R. Izamshah and A.S. Dahlan	510
Green Magnetic Composite Sheet from Durian Shell and Nano-Magnetite Particles	
M.K. Shahril, R.F. Munawar, M.H. Mohamed, A.B. Arif, N. Mohamad, M.E. Abd Manaf, J. Abd Razak and H.E.A. Maulod	515
Development of Green Composite: Pineapple Leaf Fibers (PALF) Reinforced Polylactide (PLA)	
R.F. Munawar, N.H. Jamil, M.K. Shahril, S.M. Skh Abdul Rahim, M.Z. Zainal Abidin, M.A. Azam and K.T. Lau	520
Tensile Behavior of Polypropylene Reinforced with Comminutes Extracted from Out-of-Condition Aerospace Grade Carbon Fiber Prepreg Waste	
N. Mohamad, A. Abd Latiff, M.A. Drahman, S.R. Shamsuri, J. Abdil Razak, I.S. Othman, J. Karjanto, M.F. Abdollah and H.E. Ab Maulod	526
Correlation between Process Parameters with Flexural Properties of Hybrid Glass/Jute Fibre Reinforced Epoxy Composite Fabricated via Vacuum Infusion Technique	
N. Mohamad, M.F. Hassan, S.Y. Chang, Q. Ahsan, Y. Yaakob and H.E. Ab Maulod	531
Potential of Epoxidized Natural Rubber (ENR) as Hydrophobicity Contributor in Chitosan-Urea Fertilizer	
N. Mohamad, N.N. Abdul Hamid, N.A. Abdul Aziz, J. Abd Razak, U.A.A. Azlan, M.F. Dimin and A. Shaaban	536

Chapter 8: Manufacturing Management and Operations

The Measures of Performance for World Class Manufacturing Practices: A Critical Review	
L. Sukarma and H. Azmi	545
A Conceptual Framework in Determining Manufacturing Complexity	
W.H. Wan Mahmood, M.N.H. Mohd Rosdi and M.R. Muhamad	550
Translating OEE Measure into Manufacturing Sustainability	
W.H. Wan Mahmood, I. Abdullah and M.H.F. Md Fauadi	555
The Relation between Manufacturing Sustainability and Lean Production in Malaysian Industries - An Initial Study	
W.H. Wan Mahmood, M.Z. Yusup, M.R. Salleh and A.S. Mohd Yusof	560
A Study of Lean Behavior in Business Development and IT Department	
A.P. Puvanasvaran, N. Norazlin and C. Suk Fan	566
Fit Manufacturing: Analogy of Human Fitness Components	
Z. Ebrahim, A.N.A. Wahab and T. Shamsuddin	571

Chapter 9: Green Design and Sustainability

Characterization on Piezoelectric Cantilever for its Linear Response at Low Frequency for Measuring Acceleration Level of Vibration	
Y.J. Bong and S.L. Kok	579
Simulation Study on Kenaf-Fibre Polyester Composite and LM6 Material	
N.F.A. Mohd, T.R. Sahroni and M.H. Abd Kadir	584
Upgradable Design for Reduction of Production Cost and CO₂ Emission - Case Study of a Laptop Computer	
S. Yamada, T. Yamada, S. Bracke and M. Inoue	589
Development of E-Saving Glass by Malaysia Overview Using Quality Function Deployment Method for Market Transformation	
S.R. Hamid, B.C. Chew, M.A. Abdullah and S. Halim	594
Self-Excited Small Scale Hydropower Generator in Malaysia: A Brief Review	
K.A. bin Mat Daud, N.F. Sapian, A.R. Ismail and W.A. Wan Ismail	599
Harnessing Buoyancy Force to Operate Mini Cost-Saving Water Treatment Plant for River Inlets	
V.K. Kher, A. Talib bin Din and C.F. Tan	604

Lean Principles Approach in Solving Poor Risk Management: A Short Review	609
A.P. Puvanasvaran, R.P.R. Subramaniam and R. Mohd Syaiful	
Simulation-Assisted Ship Design Method for Maximizing Profit	615
K. Hiekata and B. Moser	
Understanding Time Loss in Manufacturing Operations	619
Z. Ebrahim, A.H. Abdul Rasib and M.R. Muhamad	
Human System Modeling Technique for Semiconductor Assembly and Test	624
R. Abdullah, M.N. Abd Rahman and S.N. Khalil	

Chapter 10: Product Design Innovation

Development of Jig for Sintering Hollow Tube Mat	631
A.B. Mohd Hadzley, R. Izamshah, M. Amran and W. Azahar	
The Implementation of Product Architecture in Developing Conceptual Design for Passive Grease Trap	636
K. Juffrizal, M.Y. Nidzamuddin, C.F. Tan, M.F.B. Abdollah, Z.M. Zulfattah, N. Mohamad and N.M. Maslan	
Cutting Technology Innovation in Production of Porous Cellular Mat	641
A.B. Mohd Hadzley, R. Izamshah, M. Amran, W. Farhan, M. Azran, W. Azahar and D.C. Wijeyesekera	
The Concept of Single Use Piston Break Safety Syringe	646
A.M. Mazlan, M.R. Sapiee and M.S. Yahaya	
The Implementation of Genetic Algorithm in the Manufacturing Process of a Product for Reduced Environmental Impact: A Case Study of a Pulley Crankshaft	651
H. Syafiq, Z. Taha and R. Muhamad	

Chapter 11: Ergonomics in Design

Psychophysical Experience and Heart Rate Analysis in Manual Lifting Task of Malaysian Population	659
H. Isa, O. Rawaida, M.S. Syed Mohamed, A. Rohana, Z. Nuradilah, M. Hafiz Zani and F.R. Ahmad	
Working Posture Assessment in a Small and Medium Industry (SMI): Automotive Repair Facility	664
M.S. Syed Mohamed and M.N.H. Basiri	
Design of an Ergonomic Acquisition and Monitoring Framework in Assembly Task	668
Z. Zailan, S.R. Kamat, M.A.A. Rahman, N. Hashim, M.E. Roselaile and M.N. Abd Razak	
The Effects of Roller Conveyor on Muscle Activity in Workpiece Loading on CNC Machining Centre: A Preliminary Study	673
M. Hafiz Zani, H. Isa, S.M. Muhammad Syafiq, O. Rawaida, Z. Nuradilah and R.A. Fatihah	
Fatigue on Upper Quadrant Human Body: The Psychophysical Experience among Drivers	678
R.A. Fatihah, R.K. Seri, A.Y. Bani Hashim, Z. Nuradilah, O. Rawaida and M. Hafiz Zani	
Influences of Body Position Selections on Knob Selections in Malaysian Manufacturing Industries	683
Y.H. Tan, P.K. Ng, A. Saptari and K.S. Jee	
Roles of Pinch Grips in Different Knob Selections among Malaysian Manufacturing Workers	688
Y.H. Tan, P.K. Ng, A. Saptari and K.S. Jee	
Issues Surrounding Car Center Stack Designs in Malaysia: An Exploratory Study	693
M.S.S. Mohamed, B.M.T. Shamsul, R. Rahman and N.A. Abdul Jalil	
Application of Quality Function Deployment to Design a Liquefied Petroleum Gas Trolley	698
A.A. Mohamed Sultan, H. Isa, I. Febrian, Taufik, Z. Nuradilah and A.M. Nor	