

Table of Contents

Preface, Committee and Acknowledgements

Chapter 1: Biodiesel, Diesel and Gases Fuel

An Analysis of the Ambient Condition Effect on Biodiesel Spray Using Constant Volume Chamber	
N. Jaat, A. Khalid, H. Ramsy, B. Manshoor and S.M. Basharie	3
Analysis of Mixture Formation and Flame Development in Biodiesel Burner Combustion Using Direct Optical Visualization Technique	
A. Khalid, M.D. Anuar, M.F. Sies, B. Manshoor, I. Zaman, A. Adam and M. Rizalman	8
Comparative Study of Properties and Engine Performance Using Blend of Palm and Coconut Biodiesel	
M. Habibullah, H.H. Masjuki, M.A. Kalam, A.M. Ashraful, K.A.H. Al Mahmud and H.M. Mobarak	13
Effect of Ethanol-Coconut Oil Methyl Ester on the Performance, Emission and Combustion Characteristics of a High-Pressure Common-Rail DI Engine	
H.G. How, H.H. Masjuki, M.A. Kalam and Y.H. Teoh	19
Effect of Premixed Diesel Fuel on Partial HCCI Combustion Characteristics	
Y.H. Teoh, H.H. Masjuki, M.A. Kalam, M.A. Amalina and H.G. How	26
Effects of Ambient Temperature Condition on Biodiesel Properties Derived from Palm Oil	
L. Lambosi, H. Zakaria, M. Jaat, B. Manshoor and A. Khalid	34
Effects of Biodiesel on Performance and Emissions Characteristics in Diesel Engine	
A. Khalid, M. Jaat, N. Mustaffa, M.D. Anuar, B. Manshoor, M.F.M. Ali and Z. Ngali	39
Prospect of Parallel Biodiesel and Bioethanol Production from <i>JatrophaCurcas</i> Seed	
M.S.M. Zahari, M.Z. Ibrahim, S.S. Lam and R. Mat	44
Public Perception and Acceptance of Diesel-Powered Passenger Cars in Malaysia: An Initial Study	
M.F.A. Hamid, W.M.F.W. Mahmood, M.R.A. Mansor and S. Abdullah	49
Stability Studies of Water-in-Diesel Emulsion	
A.K. Hasannuddin, M.I. Ahmad, M. Zahari, S.S. Mohd, A.B. Aiman, S.A. Aizam and J.Y. Wira	54
Spray Characteristics of Diesel-CNG Dual Fuel Jet Using Schlieren Imaging Technique	
M.A. Ismael, M.R. Heikal and M.B. Baharoom	58
The Effect of High Carbon Dioxide Content on the Performance and Emission Characteristics of a Direct Injection (DI) Compressed Natural Gas Engine	
W.B. Ayandotun, A.R.A. Aziz and M.R. Heikal	64

Chapter 2: Computational and Experimental Mechanics

An Experimental and Numerical Analysis of Empty and Foam-Filled Aluminium Conical Tubes under Oblique Impact Loading	
M. Fauziah, I. Khairul Azwan and S. Yaacob	73
Application of the Wavelet Transforms for Compressing Lower Suspension Arm Strain Data	
T.E. Putra, S. Abdullah, D. Schramm, M.Z. Nuawi and T. Bruckmann	78
Fatigue Life Prediction of Leaf Spring through Multi Mean S-N Approach	
Y.S. Kong, M.Z. Omar, L.B. Chua and S. Abdullah	83
Importance of Selecting a Suitable Analysis Frequency Range in Impact Force Identification for Automobile Test Rig	
K.S. Yee, O.Z. Chao, K.K. Kuan, Z. Ismail, C.W. Tong, S. Noroozi and A.G. Abdul Rahman	88
Multi-Objective Optimization of Aluminum Foam Double Tube Subjected to Oblique Impact Loading for Automobile Bumper Beam	
F. Djamaluddin, S. Abdullah, A.K. Arrifin and Z.M. Nopiah	93
Stress Intensity Factors of Eccentric Cracks in Bi-Material Plates	
A.E. Ismail	98

Stress and Modal Analysis Assessment of Race Cars Chassis Structure	103
S. Fazidah, N.A. Nor Azman and A.L. Zulkarnain	
Control of Crack Propagation in Composite Fiberglass-Polyester Laminates Using Nitinol Wire	108
R. Alebrahim, M. Iqram, M. Farizal, S.S.K. Singh, S.M. Haris, A.K. Elwaleed and N. Nikabdullah	
The Study of Disc Brake Noise on Three Different Types of Friction Materials	113
A.R. Mat Lazim, A.R.A. Bakar and M. Kchaou	

Chapter 3: Dynamics, Control and Mechatronics

Acceleration Response in Determining Vehicles Objective Driveability Assessment	121
I.Y.A. Machmudi Isa, M.A. Zainul Abidin and S. Mansor	
Composite Nonlinear Feedback for Vehicle Active Front Steering	127
M.H. Che Hasan, Y.M. Sam, K.M. Peng, M.K. Aripin and M.F. Ismail	
Estimation of Counterweight for Shaking Force Balancing of a Crank-Rocker Mechanism	135
S.E. Mohammed, M.B. Baharom and A.R.A. Aziz	
Hybrid Skyhook-Stability Augmentation System for Ride Quality Improvement of Railway Vehicle	141
M.H. Harun, W.M.Z.W. Abdullah, H. Jamaluddin, R.A. Rahman and K. Hudha	
LQG Control Design for Vehicle Active Anti-Roll Bar System	146
N. Zulkarnain, H. Zamzuri and S.A. Mazlan	
Mixed H₂/H_∞ with Pole-Placement Control Design Outline for Active Suspension Systems	152
A. Shavalipour and S.M. Haris	
Simulation on Force Tracking Control of a Magnetorheological Damper under Impact Loading	158
A.Z. bin Pokaad, M.R. bin Said, F. bin Ahmad and M.N. Kamaruddin	
Suspension Parametric Analysis of Conventional Bus through Finite Element Modal Simulation	163
Y.S. Kong, M.Z. Omar, L.B. Chua and S. Abdullah	
Performance Prediction of Inertial Auto-Reinforce Magnetic Flywheel Energy Storage Device Using Finite Element Magnetic Modeling	169
A.R. Akbar and M. Awang	
Pre Crash Wheel-Locking Braking System	175
C.W. Joon	
Pulleys' Axial Movement Mechanism for Electro-Mechanical Continuously Variable Transmission	185
K.B. Tawi, I.I. Mazali, B. Supriyo, N.A. Husain, M.S. Che Kob and Y.Z. Abidin	
Parameter Analysis of Electromagnetic Braking Using Fully Nested and Two Way ANOVA	193
M.Z. Baharom, M.Z. Nuawi and G. Priyandoko	
Optimized Potential Radius Reference Generator Algorithm for Autonomous Vehicle Controller Development	198
M.A. Zakaria, H. Zamzuri, R. Mamat and S.A. Mazlan	
A GA-Weighted Adaptive Neuro-Fuzzy Model to Predict the Behaviour of Magnetorheological Damper	203
M. Zeinali, S.A. Mazlan, A.Y. Abd Fatah and H. Zamzuri	
Active Suspension System to Improve Ride Comfort Performance of Electric Vehicle (EV) Conversion	208
S.A. Abu Bakar and A. Abdul Aziz	
Design of the Controller Cooling System of an Electric Vehicle	213
M.M. Rahman, T.J. Hua and H.Y. Rahman	
Development of Audible Signal Control System for Electric Vehicle as Pedestrian Detection	218
I. Salleh, M.Z. Mohd Zain and R.I.R. Hamzah	
Experimental Study of Position Controller for an Electro-Mechanical Throttle Actuator for Automotive Applications	223
B. Supriyo, K.B. Tawi, M.S.C. Kob, I.I. Mazali and Y.Z. Abidin	
Experimental Test Rig for Electro-Mechanical Friction Clutch Actuator	228
K.B. Tawi, Y.Z. Abidin, B. Supriyo, I.Z.M. Darus Abu, M.S. Che Kob and I.I. Mazali	

Hardware-in-Loop of Fault Detection System for Air-Fuel Ratio Control M.H.B. Mohd Nordin, M.K.B. Hassan, A.B.C. Soh and M.A.B. Mohd Radzi	233
Indirect Clamping Force Measurement Method Using Current Sensor for Electro-Mechanical Dual Acting Pulley Continuously Variable Transmission System B. Supriyo, K.B. Tawi, M.S. Che Kob, I. Mazali and Y.Z. Abidin	238
Influence of Fuzzy-PID Controller on Semi-Active Suspension System Performance Using Magnetorheological Damper Fuzzy Model M. Zeinali, S.A. Mazlan and M.A. Abdul Rahman	243
Shape Memory Alloys in Automotive Applications J.M. Jani, M. Leary and A. Subic	248
Non-Linear Complementary SO(3) Filters for Attitude Estimation and Navigation of Ground Vehicles F. Sandhu, H. Selamat and Y.M. Sam	254

Chapter 4: Materials and Processing Technologies

Microstructure Evolution and Mechanical Properties of Rheocast A319 Aluminum Alloy Using Cooling Slope M.S. Salleh, M.Z. Omar, J. Syarif, M.N. Mohammed and K.S. Alhawari	261
Microstructural Change of a Ti-10at%Mo-10at%Cr Alloy on Sintering Process E. Kurniawan, J. Syarif, Z. Sajuri and M.R. Rasani	266
Refinement of Mg₂Si Particulate Reinforced Al-20%Mg₂Si <i>In Situ</i> Composite with Addition of Antimony N.A. Nordin, S. Farahany, A. Ourdjini, T.A. Abu Bakar and E. Hamzah	271
The Interface Morphology of Thixo-Joined Cold Work Tool Steel M.N. Mohammed, M.Z. Omar, J. Syarif, Z. Sajuri, M.S. Salleh and K.S. Alhawari	276
Modelling and Optimizing of Joint's Fracture Toughness between A7075-T651 and AZ31B Dissimilar Alloys Welded by GMA Spot Welding Method M.R. Islam and Mahadzir	281

Chapter 5: Engine Lubrication and Thermoengineering

An Investigation of the Effect of 2T Oil Blend on Spark Ignition Engine Performance M.N. Zahelem, A.S. Rohana, N.H.B. Jemily, M.A. Aris, S. Zain and S.N. Soid	289
Conceptual Thermosyphonic Loop Cooled Thermoelectric Power Cogeneration System for Automotive Applications J. Sim, R. Zulkifli and S. Abdullah	294
Experimental Study of Thermoelectric Generators Ubaidillah, Suyitno, I. Ali, E.P. Budiana and W.E. Juwana	299
Heat Transfer Characteristic of Thermal Barrier Coated Piston Crown for a Compressed Natural Gas Direct Injection Engine A.J. Helmisyah, S. Abdullah and M.J. Ghazali	304
Measuring and ANFIS Modelling for Thermal Conductivity of Cu/Zn Bimetallic Nanofluids H.H. Balla, S. Abdullah, W.M.F. Wan Mahmood, Z. R. and K. Sopian	311
Study on Energy Converter from Waste Heat of Automobile Engine I. Abd Rahim, M.Z. Mohd Zain and N.Z. Asmuin	317
Twin Pulsating Jets Impingement Heat Transfer for Fuel Preheating in Automotives A.A. Gitan, R. Zulkifli, K. Sopian and S. Abdullah	322

Chapter 6: Internal Combustion Engine and Computational Fluid Mechanics

A Converted Two-Stroke Cycle Engine for Compression Ignition Combustion A.M. Andwari, A.A. Aziz, M.F.M. Said and Z.A. Latiff	331
Analysis of Variable Intake Runner Lengths and Intake Valve Open Timings on Engine Performances M.F.M. Said, Z.A. Latiff, A. Saat, M. Said and S.F.Z. Abidin	336

Effect of Two-Stage Injection Timing on a Gas-Jet Ignition CNG Engine M.F.M. Ali, A. Khalid and Y. Kidoguchi	342
Effect of Vaned Diffuser on a Modified Turbocharger Centrifugal Compressor Performance L.H. Jawad, S. Abdullah, Z. R. and W.M.F.W. Mahmood	347
Experimental on the Effects of Various Air Filter Elements on Spark Ignition Engine Performance S. Zain, M.N. Zahelem and M.H. Basri	354
Improvement of Engine Performance Using an Adaptive Valve Lift and Timing (AVLT) Mechanism at High Engine Speeds A.F. Abdul Rasid, T.I. Mohamad, M.J. Ghazali and W.M.F.W. Mahmood	359
Smoke Simulation in an Underground Train Station Using Computational Fluid Dynamic Z. Harun, M.S. bin Sahari and T.I. Mohamad	366
Statistical Analysis for Multiple Non-Linear Knock Factors in Internal Combustion Engine A.R.H. Witwit, A. Yasin, H. Gitano and M.I. Mahmood	373
Interpolation Techniques in Computational Particle Tracking inside a Direct-Injection Diesel Engine Cylinder L.B. Seng, M.A. Zuber, W.M.F.W. Mahmood, Z.Z. Abidin and Z. Harun	381
Numerical Study of Circle Fractal Grid Perforated Plate as a Turbulent Generator in Combustion Chamber M. Fahmi, B. Manshoor, A. Khalid and M. Al-Hafiz	387

Chapter 7: Noise, Monitoring, Vibration and Harshness

Assessment of Hand-Arm Vibration Exposure among Motorcyclist in Malaysia D. Mohamad, B. Md Deros, D.D.I. Daruis, N.K. Khamis and N.H.M. Tahir	395
Air-Gap Effect on Single Axis Vibration of Electromagnetic Braking Using Eddy Current on Bearing Cage M.Z. Baharom, M.Z. Nuawi, M.S. Ab-Rahman, G. Priyandoko, C.K.E. Nizwan and M.S. Salleh	400
A Preliminary Study on the Sound Absorption of Date Palm Fibers E.A. Khidir, N.A. Nik Mohamed, M.J. Mohd Nor, M.F.M. Tahir and R. Zulkifli	406
Comparison of Hand-Arm Vibration on Truck Steering Wheels Based on Speed Changes Using I-Kaz Method S.A.A. Aziz, M.Z. Nuawi, M.J. Mohd Nor and D.D.I. Daruis	411
Correlation between Noise Exposure and I-kazTM Coefficient for Malaysian Army 3-Tonne Truck Drivers S.A.A. Aziz, M.Z. Nuawi, M.J. Mohd Nor, D.D.I. Daruis, A.R. Bahari and M.S. Ab-Rahman	415
Development of Semi-Active Panel Design for Sound Absorption N.S.S. Selamat, M.F.M. Tahir, R. Zulkifli, M.J. Mohd Nor, M.A. Mohd Sabri, A.K. Elwaleed and M.Y. Siti-Munirah	421
Development of Fuel Injector Monitoring Using Strain Gauge Signal C.L. Hoo, M.Z. Nuawi, S.M. Haris, S. Abdullah and A.R. Ismail	426
Genetic Algorithm-Based Fatigue Data Editing Technique M.H. Osman, Z. Mohd Nopiah, S. Abdullah and I. Asshaari	431
Effect of Density on the Sound Absorption of Date Palm Fibers E.A. Khidir, N.A. Nik Mohamed, M.J. Mohd Nor, M.F.M. Tahir, R. Zulkifli and M.Z. Nuawi	437
Material Characterization by Using Non-Contact Ultrasonic Method M.Z. Nuawi, K.K. Huat, M.F.M. Tahir, M.A. Mohd Sabri, N.K. Khamis and M.R. Rasani	442
Material Property Characterisation Method Using Vibro-Acoustic Signals M.Z. Nuawi, A.R. Bahari, S. Abdullah, A.K.A.M. Ihsan and F. Lamin	447
Monitoring the Petrol Engine Oil Viscosity: Investigation of the Capability of the Metal Magnetic Memory Technology O. Inayatullah, W.S. Chin, N. Jamaludin, S. Abdullah and A. Ariffin	453
Recycled Paper Fibres as Sound Absorbing Material J.S.T. Sim, R. Zulkifli, M.F.M. Tahir and A.K. Elwaleed	459
Sound Absorption Property of Agricultural Lignocellulosic Residue Fiber Reinforced Polymer Matrix Composites E. Jayamani, S. Hamdan, S.K. Heng and M.R. Rahman	464

Transmissibility of Z-Axis Vibration from Car-Body to Pedal-Pad on Tarmac and Paved Road Surfaces	469
A.R. Yusoff, B.M. Deros and D.D.I. Daruis	
The Study of Thermal Comfort and Noise Level in Battery Plate Factory	474
M.A. Mohd Sabri, M.F.M. Tahir, K. Sopian and M.H.Z. Rosdi	
Understanding the Effect of Discomfort Level towards Motorcycle Riders among Teenagers: A Preliminary Study	480
N.K. Khamis, B. Md Deros and M.Z. Nuawi	
Technique for Hanger Location of Vehicle Exhaust System Using Finite Element Method	485
M.S. Noorazizi, B.A. Aminudin and H. Faraziah	

Chapter 8: Design, Hybrid and Electric Vehicles

Independent Torque Control of an Independent-Wheel-Drive Electric Vehicle	493
M.H.M. Ariff, H. Zamzuri, N.R.N. Idris, S.A. Mazlan and M.A.M. Nordin	
Impact of Motor Size & Efficiency on Acceleration, Fuel Consumption & Emissions of Split-Axle Through-the-Road Parallel Hybrid Electric Vehicle	498
S.A. Zulkifli, S. Mohd, N.B. Saad and A.R.A. Aziz	
Li-Ion Battery Pack Charging Process and Monitoring in Electric Vehicle	504
Y. Yusof, M.F.M. Adnan, R. Guenther, M.H.M. Zaman, A.A. Ibrahim and A. Ayob	
Series Plug in Hybrid Vehicle for Urban Driving Cycle	510
A. Mujianto, M. Nizam and Inayati	
Design and Development of Low Cost All Terrain Vehicle (ATV)	517
M.A. Abdullah, N. Tamaldin, F.R. Ramli, M.N. Sudin and M.A.M. Mu'in	
Numerical Study on Hydrodynamic Resistance of New Hull Design for Multipurpose Amphibious Vehicle	522
A. Maimun, M. Nakisa, A. Tarmizi, Y.M. Ahmed and F. Behrouzi	
Development of PROTON Electric Vehicle Control Unit (eVCU) Using State Machine Deterministic Rule-Based Approach	532
N.A. Mohd Azubir, M.K. Hassan, H. Zamzuri and S.A. Mazlan	
Preliminary Analysis in the Improvement Turning Abilities in Design of the Monorail Bogie PT. MBW Indonesia	539
A.S. Danardono, G. Prayogo, S. Sugiharto, T. Nugraha and K. Nuryadi	

Chapter 9: Crash and Safety, Transportation and Ergonomics

ASEAN NCAP Crash Tests: Modifier Assessment Justified	547
S.M. Syazwan, H. Azhar, A.H. Ariffin, M.I. Mohd Hafzi, R. Mohd Khairudin, M.J. Zulhaidi, N.F. Paiman, A. Yahaya and A.K. Khairil Anwar	
Crashworthiness Determination of Side Doors and B Pillar of a Vehicle Subjected to Pole Side Impact	552
A.H. Lilehkoohi, A.A. Faieza, B.B. Sahari, A.A. Nuraini and M. Halali	
Child Motorcycle Pillion Rider Anthropometric Measurement	557
N.F. Paiman, A. Shabadin, A.H. Ariffin, S.M. Syazwan and H. Azhar	
Development of Mobile Deformable Barrier for Side Impact Crashworthiness Evaluation in ASEAN New Car Assessment Programme (ASEAN NCAP)	562
A.H. Ariffin, M.S. Solah, H. Azhar, M.H. Mohd Isa, M.K. Rahman, Z. Mohd Jawi, N.F. Paiman, Y. Ahmad and K.A. Abu Kassim	
Driving Fatigue among Long Distance Heavy Vehicle Drivers in Klang Valley, Malaysia	567
N.K. Khamis, B.M. Deros, M.Z. Nuawi and R.B. Omar	
Estimating Energy Absorbing Performance of Motorcycle Safety Helmet	574
H. Azhar, A.H. Ariffin, S.M. Syazwan and S.V. Wong	
Investigation on Adult Occupant Protection in Car Pole Side Impact Using Various Material and Thickness of Side Doors and B Pillar	579
A.H. Lilehkoohi, A.A. Faieza, B.B. Sahari, A.A. Nuraini and M. Halali	
Investigation of Thickness Influences on Energy Absorption for Side Doors and B Pillar in Euro NCAP Pole Side Impact Test	585
A.H. Lilehkoohi, A.A. Faieza, B.B. Sahari, A.A. Nuraini and M. Halali	

Lateral Side Impact Crash Simulation of Restrained 3 Year Old Child	590
S. Shasthri, Q.H. Shah, V. Kausalyah, M.M. Idres, K.A. Abdullah and W.S. Voon	
Preliminary Cost-Benefit Analysis (CBA) for Safety Assist Technologies in ASEAN NCAP – Rationalizing the Impact to Road Safety for Malaysia’s Case	596
Z. Mohd Jawi, A.H. Ariffin, Y. Ahmad, K.A. Abu Kassim, N. Mohamed and W.S. Voon	
The Prevalence of Child Restraint System Use among Children in Vehicles Equipped with Front Passenger Airbag in Kajang, Malaysia	604
M.Q.M. Ariffin, N.F.M. Soid, N. Borhan and A. Sukardi	
Numerical Modeling of Air-Based Bus Seat	610
C.F. Tan, K.F. Liew, S.N. Khalil, M.R. Said, W. Chen, G.W.M. Rauterberg, J. Karjanto, Z.T. Yau, B.L. Tan and T.L. Lim	
The Effect of Geometry in End-of-Life Vehicle Recovery of Safety Beams	614
A.A. Lashlem, D.A. Wahab, S. Abdullah and C.H. Che Haron	
A Review on Crowd Sourcing Geo-Social Related Big Data Approaches as Solution to Transportation Problem	622
A.Z. Mohamed	
Crash Kinematics and Injury Criteria Validation for a Deformable Hybrid Vehicle Model	627
K. Venkatason, K.A. Abdullah, S. Sivaguru, M.M. Idres, Q.H. Shah and S.V. Wong	
Driver’s Perception on Electric Vehicles and its Commercial Marketability in Malaysia	632
B.M. Deros, N.K. Khamis and A.F. Mohd Fauzi	
Impediments of Collaborative Relationships in Automotive SMEs in Malaysia	638
A. Awheda, M.N.A. Rahman, R. Ramli and H. Arshad	
Study on Hazard Perception of Malaysian Drivers	644
S.T. Syed Shazali, A. Selvam and Z. Bujang	
Mirrorless Car: A Feasibility Study	649
J.S. Mohamed Ali and F. Fatin Bazilah	

Chapter 10: Manufacturing

New Approaches in Tool Path Optimization of CNC Machining: A Review	657
K.D. Narooei and R. Ramli	
Reprocessing Index for Automotive Co-Axial Swash Plate A5	662
R.S. Othman, A.B. Sulong and S. Ibrahim	
Simulation of Thermo-Mechanical Models for Hot Formed Parts by Numerical Experiments	668
A. Senin, Z. Mohd Nopiah, M.J. Jamaludin and A. Zakaria	
Optimizing In-Vehicle Multiplexed Network Using WDM over POF	675
N.K. Farshad and S.A.R. Mohammad	

Chapter 11: Magnetorheological Applications

Bypass Rotary Magnetorheological Damper for Automotive Applications	685
F. Imaduddin, S.A. Mazlan, H. Zamzuri and M.A. Abdul Rahman	
Modelling Behaviour for Magneto Rheological Motorcycle Suspension System	690
M.A. bin Ismail, P.B. Muhamad and A. bin Abu	
Potential Applications of Magnetorheological Elastomers	695
Ubaidillah, S.A. Mazlan, J. Sutrisno and H. Zamzuri	
Selection of Materials in Designing Magnetorheological Brake	700
L.H. Hamdan, S.A. Mazlan, S. Sarip, H. Zamzuri and M.A.A. Rahman	