

Table of Contents

Preface, Committees and Sponsors

Chapter 1: Advanced Materials Engineering and Processing Technologies

LiFePO₄ - Activated Carbon Composite Electrode as Symmetrical Electrochemical Capacitor in Mild Aqueous Electrolyte	
M.Y. Ho, P.S. Khiew, D. Isa, T.K. Tan, W.S. Chiu and C.H. Chia	3
Spectral Sensing of Asbestos According to Concentration in Various Asbestos Containing Materials	
H.S. Ahn, B.K. Jung, J.C. Joo and J.R. Park	7
Thermal and Morphological Properties of Chitosan Filled Epoxy	
B. Satheesh, K.Y. Tshai and N. Warrior	12
Mechanical Properties of Microwave Sintered 60YSZ-Al₂O₃/10HAP Bioceramics Composites	
M.R.N. Liyana, N.M.S. Adzali, W. Rahman, M.Z.M. Zamzuri and H. Azmi	18
The Effects of Laminate Orientation in Resin Infused Kenaf Fibre Reinforced Epoxy Composite	
K.Y. Tshai, K.C. Wong, W.J. Tan and A.B. Chai	24
In-Process Prediction of Surface Roughness in Grinding Process by Monitoring of Cutting Force Ratio	
V. Thammasing and S. Tangjitsitcharoen	29
The Study on the Ultrasonic Nanomachining of Au/Ti Thin Film by Atomic Force Microscopy	
J.C. Huang, H. Chang, Y.C. You and H.T. Ling	35
Characterization of Graphene Oxide Thin Film According to Heat Treatment Condition for the Selective VOCs Sensing	
H.S. Ahn, B.K. Jung, J.C. Joo and J.R. Park	40
Optimal Pouring System Design for Investment Casting of Cladding Thin-Plate Heater Using Metallic Mold Flow Analyses	
P.H. Huang, J.Y. Luo, S.C. Hung, C.J. Lin and H.H. Cheng	46
Optical Characterization of Undoped and Au-Doped MoS₂ Single Crystals	
M. Sigiyo, Y.S. Huang and C.H. Ho	50
Investigation of Machining Parameters for Burr Minimization in CNC Turning of Brass Using RSM and GA	
R. Ravikumar and M.M.A. Hafeez	54

Chapter 2: General Mechanical Engineering and Applied Mechanics

Comparison of Various Spatial Discretization Schemes in Numerical Simulation for Ship Airwakes	
S.H. He, D.Y. Liu and D.L. Tan	63
Impact Study of Bend Tube on Bullet Initial Disturbance under the Action of Gravity	
G.Q. Liu, C. Xu and X.Y. Zhang	69
Mechanism-Based Numerical Approach to Ductile Fracture in an 2024-T3 Aluminium Alloy	
W. Jiang, Y.Z. Li, Y.X. Shu and M. Kikuchi	74
Detection of Damaged Tooth by Support Vector Machines	
Q.R. Fan, K. Ikejo and K. Nagamura	79
An Improved FE-BE Method for Solving the Fluid-Structure Interaction Problems of Plates	
Z.W. Huang and Q.D. Zhou	84
Lift Investigation of Airfoil with Flaps	
V.A. Frolov and W.M. Dong	89

Factor of the Finite Rigidity of the Working Member in the Dynamics of the Vibratory Machine	
V. Zviadauri, T. Nadiradze, M. Chelidze and G. Tumanishvili	93
Modeling of the Mechanical Properties of Carbon-Black Reinforced Rubber Blends by Machine Learning Techniques	
R. Fernandez-Martinez, R. Hernandez, J. Ibarretxe, P. Jimbert, M. Iturrondobeitia and T. Guraya-Díez	97
Theoretical Model for Calculating the Rotation in Cementless Acetabular Cup Prosthesis Implanted by Press Fit into a Hip of Canines	
R.L. Lorza, W.T. McCartney, B.J. Mac Donald and R.F. Martinez	101
Serration Optimum Design of Gear Plunge Shaving Cutter	
S.L. Chang, K.H. Doan and D.H. Nguyen	105
An ERAFNN Prediction of Concrete Compressive Strength Based on Physical Properties of Electric Arc Furnace Oxidizing Slag	
L. Chen and T.Y. Pai	111
Numerical Simulation Study on Airflow Structural Characteristics and Vortex Evolution in Human Mouth-Throat Model	
D. Sun, F.S. Li, X.X. Xu, X.G. Zhao and S.L. Tan	115
Simulation Analysis of Designing a New Technique KER Warhead	
H.J. Ning, H. Wang, C. Zhang and W.J. Ruan	119
Buckling Analysis of C-Section Cold-Formed Steel Purlins under Uplift Loadings	
X.F. Wu, Y.H. Zhao, J. Zhu, C. Sun and C. Xie	124
Modified Contour Integrals for Calculation of Stress Intensity Factors for Cracks in Anisotropic FGMs	
J.H. Chang and J.Y. Jiang	129

Chapter 3: Applied Thermodynamics and Thermal Effects

Optimum Excess Air for the Utilization of Palm Biodiesel Blends in Fire Tube Boiler	
S.A. Rachman and L.N. Komariah	137
Two-Dimensional Thermal Stresses and Displacements in an Arbitrarily Inhomogeneous Elastic Layer	
Y. Tokovyy, Y. Lozynskyy and C.C. Ma	141
Approximate Analytical Method to Stefan Problem for Spheres with Wide Temperature Range of Phase Transition	
R. Chiba	145
Thermal Stress of Building Materials Containing Plasticizer Characterised by Alternating Electric Field	
I. Kusák, M. Lunak, Z. Chobola and K. Šamárková	149
Temperature Distribution of Hot Air Flow in Heating Zone for Drying Application	
N. Srisiriwat and C. Wuthithanyawat	153

Chapter 4: Instrumentation, Measurement Technologies, Monitoring and Detection, Analysis and Methodology

Effect of Purging Rate on the Calibration of Dew Point Sensor and the Estimation of Measurement Uncertainty	
Y.K. Bae and D.H. Hyun	161
The Design of Used Temperature Measurement Circuit	
Q. Lei, Z. Yan, W. Feng and Y. Zong	168
Coordinate Measurements of Geometrically Complex Ceramic Parts	
M. Magdziak and R. Wdowik	172
Analysis of Mechanical Error's Effect on the Measurement Accuracy of the Six-Axis Force Sensor	
R.N. Liang	177
Sun Intensity and Angle on Efficiency of Solar Cell System	
B.W. Huang, J.G. Tseng and D.R. Hsiao	182

Damage Observation of Glass Fiber/Epoxy Composites Using Thermography and Supported by Acoustic Emission	
J. Bale, E. Valot, M. Monin, P. Laloue, O. Polit, C. Bathias and T.P. Soemardi	187
Measurements of Surface Roughness in Ultrasonic Assisted Grinding of Ceramic Materials	
R. Wdowik, M. Magdziak and J. Porzycki	191
Study on the Young's Modulus of Red Blood Cells Using Atomic Force Microscope	
C.C. Lien, M.C. Wu and C. Ay	197
Characteristic Analysis on Transverse Comb Structure Using PSpice	
C. Kavitha and M. Ganesh Madhan	202
Reliability Analysis of Plug Door System Based on Dynamic Fault Tree	
Y.H. Wang, L.F. Bi and L.J. Li	207
A Compact Low Cost Wearable Sensor System for Quantitative Gait Measurement	
M.G. Tan, C.B. Leong, J.H. Ho, H.T. Goh and H.K. Ng	212
Single Beacon Indoor Localization System Based on Counter-Synchronized Compass and RSSI	
K.S. Eu, K.M. Yap and T.H. Tee	217
Study on the Judgment of Cell Detachment Using Image Processing	
J.Y. Chung, Y.I. Huang and C. Ay	223

Chapter 5: Mechatronics, Robotics and Automation of Manufacturing

A New Brake-by-Wire System Based on Direct-Drive Electro-Hydraulic Brake Unit	
X.X. Gong, S.Q. Chang, L.C. Jiang and X.P. Li	231
Internal Model Control Design for Autothermal Reforming System	
C. Wuthithanyawat and N. Srisiriwat	236
Gait Characteristics for a Lower Limb Exoskeleton Implementing the Precedence Walking Assistance Mechanism	
D.W. Cha, K.I. Kim, K.S. Kim, B.J. Lee and S.H. Kim	241
An Airflow Analysis Study of Quadrotor Based Flying Sniffer Robot	
K.S. Eu, K.M. Yap and T.H. Tee	246
Deflection Analysis of Ionic Polymer Metal Composites (IPMC) Actuators for Bionic Joints	
M. Farid, Z. Gang, T.L. Khuong, Z.Z. Sun and M. Rizwan	251

Chapter 6: Civil Engineering and Building Materials

A Precast Road Panel Structure for Heavy Vehicles	
H. Qi, Y.G. Li and K. Liu	257
Boundary-Constraint Meshing Based on Paving Method	
J. Duan, X.M. Chen, H. Qi and Y.G. Li	262
Impact-Echo Methods to Assessment Corrosion of Reinforced Concrete Structures	
K. Šamárková, Z. Chobola, D. Štefková and I. Kusák	268
High-Temperature Degradation of Mortar Containing Rubber Aggregates and EVA Binder Evaluated by Impact-Echo Method	
D. Štefková, M. Tupý, K. Sotiriadis, K. Šamárková and Z. Chobola	272
Neural Network Prognostic Model for Predicting the Fire Resistance of Eccentrically Loaded RC Columns	
M. Lazarevska, M. Cvetkovska, M. Knežević, A. Trombeva Gavriloska, M. Milanovic, V. Murgul and N. Vatin	276
Durability Performance of Concrete Containing CFBC Fly Ash and Coal-Fired Fly Ash	
M.C. Chi and R. Huang	283
Rayleigh Damping in Abaqus/Explicit Dynamic Analysis	
X.M. Chen, J. Duan, H. Qi and Y.G. Li	288

Chapter 7: Product Design and Industrial Engineering

EOR (Oil Recovery Enhancement) Technology Using Shock Wave in the Fluid M. Petrichenko, N. Vatin, D. Nemova, N. Kharkov and A.A. Staritcyna	297
Defective Reduction in an In-House Recycle Process of Hard Disk Drive Media K. Damrongseree and W. Tharmmaphornphilas	304
An Effective Inventory Allocation Policy in Two-Echelon Distribution Network C.Y. Tsai, P.P. Tekanene and K.F. Li	310
The Procurement Policy and Optimal Stopping Time of Machining Tools C.R. Li, B.R. Sarker and H.Z. Yi	314
System Dynamics of a Marine Renewable Energy Scheme (MRE) for Malaysia A.H.P. Tan, K.F. Chen and E.H. Yap	318
Principal Component Analysis for Physical Properties of Electric Arc Furnace Oxidizing Slag L. Chen and T.Y. Pai	323
Application of Six Sigma Methodology in Improving of the Industrial Production Processes G. de Carvalho, E. da Silva Christo and K. Alonso Costa	327
A Design of Launching Pattern for Final Inspection of Assembled Cars in Mixed Model Assembly Line P. Vinitorn and S. Prombanpong	332
Electric Cultivator Design and its Impact of the Operator K.W. Hsieh, C.S. Iu and H.Y. Hounng	337
System Dynamics of Electric Cars (EC) Usage and Support Infrastructure in Malaysia S.W. Lim, K.F. Chen and E.H. Yap	342
The Alternatives of Ballast Water System H. Elkady, D.F. Han and L.G. Gao	347
Study of Air-Flow and Temperature Distribution in a Small-Scale Dryer for Grains Drying A. Chai, S. Kho and H.H. Ung	353
Hybrid Photovoltaic-Diesel Energy System Optimization (Case Study of Electric Power Supply for Buildings under the Weather Conditions of Montenegro) G. Radovic, V. Murgul, N. Vatin and E. Aronova	357
Development of Computerized Preventive Maintenance Management System with Failure Mode and Effect Analysis for CNC Machine E.A. Rungsa and S. Tangjitsitharoen	365
The Implementation of an Artificially Intelligent Personal Assistant for a Personal Computer C.H. Hsieh and D.J. Buehrer	372
A Study of National Defense Traffic SoS Modeling Based on ROPI Hierarchical Method D. Sun, Z.H. Guo, M.T. Li, W.G. Ma and X.J. Pu	377