

Table of Contents

Preface and Conference Organizers

I. Material Science and Processing

A Structure and Morphology of Nanocomposites Composed of Carbon Nanotubes with a Varying Fraction of Platinum Nanoparticles	
A.D. Dobrzańska-Danikiewicz, M. Pawlyta and D. Łukowiec	3
Analysis of Influence of Aluminum Content on Inclusion Characteristic and Fatigue Life of Bearing Steel Using Statistics of Extreme Values	
C.C. Hsu and H.H. Chung	11
Deformation Behavior of Adhesive Layer in Stretch-Bending/Unbending for Adhesively Bonded Sheet Metals	
M. Takiguchi, T. Tokuda, T. Yoshida, T. Uemori and F. Yoshida	19
Deformation Behaviour of TRIP Steel Monitored by <i>In Situ</i> Neutron Diffraction	
J. Zrník, O. Muránsky and P. Sittner	25
Deformation Evolution of a Zr-Based Bulk Metallic Glass under Three-Point Bending Tests	
S.H. Chen, K.C. Chan and L. Xia	31
Effect of Interference-Fit on Fatigue Life for Composite Lap Joints	
H.Q. Xue, Q. Tao and E. Bayraktar	39
Effect of Temperature on Cyclic Behavior of AZ31 Mg Alloy Sheet	
T. Katahira, S. Hosokawa, T. Naka, M. Kohzu, H. Adachi and F. Yoshida	47
Effects of Scoring Depth, Tracking Angle, Rubbing on Bending-Moment Relaxation of Creased Paperboard	
S. Nagasawa, Y. Shiga and Y. Fukuzawa	53
Harmonic Structure Design of Co-Cr-Mo Alloy with Outstanding Mechanical Properties	
C. Sawangrat, O. Yamaguchi, S.K. Vajpai and K. Ameyama	60
New Design of Aluminium Based Composites through Combined Method of Powder Metallurgy and Thixoforming	
L.M.P. Ferreira, M.H. Robert, E. Bayraktar and D. Zaimova	68
Research of Large-Area Electrical Discharge Machining for Insulating Si₃N₄ Ceramics with the Assisting Electrode Method	
D. Hanaoka, Y. Fukuzawa and K. Yamashita	76
Role of Halloysite Nanoparticles and Milling Time on the Synthesis of AA 6061 Aluminium Matrix Composites	
L.A. Dobrzański, B. Tomiczek, G. Matula and K. Gołombek	84
Tensile Properties and Microstructure of Joined Vacuum Die Cast Aluminum Alloy A356 (T6) and Wrought Alloy 6061	
M. Wang, Y.D. Zou, H. Hu, G. Meng, P. Cheng and Y.L. Chu	90
Processing of Epoxy-Nickel Matrix Composites Reinforced with Aluminum and Waste Elastomers	
D. Zaimova, E. Bayraktar, M.J. Tan and I. Miskioglu	98
Wear Resistance of Elastomeric Based Composites by Continuous Multi-Cycle Indentation Used in Manufacturing Engineering	
D. Zaimova, E. Bayraktar, I. Miskioglu and N. Dishovsky	106
New Design of Composite Materials Based on Scrap Rubber Matrix Reinforced with Epoxy and SiC	
D. Zaimova, E. Bayraktar, I. Miskioglu, D. Katundi and N. Dishovsky	114
YSZ-Reinforced Mg-Based Amorphous Composites: Processing, Characterisation & Corrosion	
Y.S. Wang, M.J. Tan, B.W. Chua and E. Bayraktar	122
Search for Rapid Quality Control of Ni-Cr-Mo Low Alloy Steels Using Multifaceted Approaches for Fracture Toughness Estimation	
K.K. Ray, V.P.R.J. Chegondi, U. Roy and R.N. Jha	130

Shaping Porous, Low Density Al Composites by AWJ Cutting Process D. Kramar, E.M. Nascimento, A.F. Jorge, J. Kopač and M.H. Robert	138
Tensile Property of Electrochemically Polished Titanium Alloy T. Ikushima, T. Shimizu and M. Yang	146
The Effect of Particle Deformation on Densification of 316L Stainless Steel under Micro-FAST X.Z. Yang, Y. Yang, G. Yang, Y. Qin and D.Q. Yin	152

II. Advanced Machining

Application of Electrochemical Discharge Machining to Micro-Machining of Quartz K.L. Wu, H.M. Lee and K.H. Chin	161
Application of Idling Stop Technology for Servo Motors in Machine Tool Operations to Reduce Electric Power Consumption T. Nagawaki, T. Hirogaki, E. Aoyama and K. Ogawa	169
Applications of Optical Path Length Compensation Technology for High Power CO₂ Laser Cutting Process Z.C. Chen and L.J. Pan	177
Bonding PDMS Microfluidic Devices to PMMA and Glass Substrate Using Pulsed UV Laser Technology C.C. Yang, W.T. Hsiao, C.K. Chung and K.C. Huang	186
Finite Element Modeling of the Effect of Tool Rake Angle on Cutting Force and Tool Temperature during High Speed Machining of AISI 1045 Steel S. Sulaiman, M.K.A. Mohd Ariffin and A. Roshan	194
Investigation of Chatter Vibration in End-Milling Process by Considering Coupled System Model K. Hattori, H. Kodama, T. Hirogaki and E. Aoyama	201
Micro Cutting of Biliary Stent with Nanosecond Fiber Laser System P.T. Teng, F.Y. Chang, Y.T. Chang, P.C. Liang and K.W. Huang	209
Temperature Distribution of Micro Milling Process due to Uncut Chip Thickness B.T.H.T. Baharudin, K.P. Ng, S. Sulaiman, R. Samin and M.S. Ismail	214
The Use of Supports to Fast Fabrication of Plastic Parts T.D. Lin and A.C. Lin	222
Effect of Optical Properties Characteristic Polymethylmethacrylate Using UV Laser Direct-Structuring C.K. Chung, W.T. Hsiao, S.F. Tseng, K.C. Huang and M.F. Chen	230

III. Geometry Analysis and Forming

Effect of Punch Surface Topography on Friction in Micro Combined Forward and Backward Extrusion of Brass C.C. Chang and C.P. Siao	239
An Analytical Model for Deformation Path Design in Multistage Incremental Sheet Forming Process Z.B. Liu, Y.L. Li, W.J.T.B. Daniel and P. Meehan	245
Effect of Edge Shape of Tool in Finish Blanking T. Yamada, Z.G. Wang and T. Fukao	253
Forming Limits of Several High-Strength Steel Sheets under Proportional/Non-Proportional Deformation Paths R. Hino, S. Yasuhara, Y. Fujii, A. Hirahara and F. Yoshida	260
Stiffness Improvement of Stamping Die by Means of Topology Optimization H. Hamasaki, M. Nakazono, R. Hino, F. Yoshida, H. Manabe, H. Kondo and V.V. Toropov	266
Study on Step Depth for Part Accuracy Improvement in Incremental Sheet Forming Process H.B. Lu, Y.L. Li, Z.B. Liu, S. Liu and P.A. Meehan	274

IV. Forming Processes

Bulging Investigation of Cylinder Compression Forming Using Upper Bound Analysis	283
S.C. Weng, G.Y. Tzou and B.L. Kuo	
A Study of Hole Flanging-Upsetting Process	291
G.X. Yan, X.Y. Wang, L. Deng and J.S. Jin	
Comparison of Cast and Extruded Stock for the Forging of AA6082 Alloy Suspension Parts	299
Y. Birol, O. Ilgaz, S. Akdi and E. Unuvar	
Effect of Counter Punch Pressure on Springback of High Strength Steel Sheet	305
K. Lawanwong, H. Hamasaki, R. Hino and F. Yoshida	
Experimental Study and Efficient Prediction on Forming Forces in Incremental Sheet Forming	
Y.L. Li, Z.B. Liu, H.B. Lu, W.J.T.B. Daniel and P.A. Meehan	313
Incremental Sheet Forming (ISF) of AISI 316 Stainless Steel Sheet Using CNC Milling Machine	
M. Moayedfar, Z. Leman and B.T.H.T. bin Baharudin	322
Influence of Pre-Generated Infinite Adhesive Defects on the Forming Behaviour of Adhesive Bonded Steel Sheets	
V. Satheeshkumar and R.G. Narayanan	328
Influence of Wire Reinforcement on the Forming Behaviour of Adhesive Bonded Steel Sheets	
D. Doley, V. Satheeshkumar and R.G. Narayanan	336
Influences of Process Conditions on Stretching Characteristics of Crystalline Polymer Film	
L.Y. Chen, C.C. Su and R.H. Chen	342
Precision Glass Molding of High Filling Factor Micro Lens Arrays	
C.C. Chen, C.Y. Huang, W.J. Peng and W.Y. Hsu	349
Research on Formability of Aluminum Alloy Automotive Panels by Using Viscous Pressure Forming	
Y. Li, Z.J. Wang, D.Y. Lin and Y.P. Li	355
Springback of Aluminum Alloy Sheet Metal and its Modeling	
T. Uemori, S. Sumikawa, S. Tamura, T. Naka and F. Yoshida	361
Theoretical and Experimental Studies on the Influence of Process Parameters on Strains and Forces of Single Point Incremental Forming	
V. Oleksik, A. Pascu, E. Avrigean and I. Bondrea	367
Verification of Numerical Roll Forming Loads with the Aid of Measurement Equipment	
P. Groche, C. Mueller and L. Baeumer	373
On Flow Layer Uniformity in the Co-Extrusion of Polymer Multilayer Film	
G.C. Tzeng and R.H. Chen	381

V. Forming with Temperature Influence

Development of Looper Shape Meter and Verification Test Results in Hot Rolling	391
H. Furumoto, R. Kinose, S. Maniwa, O. Takao, K. Hayashi, S. Kanemori and S. Sueda	
Direct Thermal Method of Aluminium 7075	400
A.H. Ahmad, S. Naher and D. Brabazon	
Effect of Heating on Springback in Heat Assisted Microbending	409
T. Aoyama, T. Shimizu, Q. Zheng and M. Yang	
Flow Stress and Pyroplastic Behaviour of Ultra-Low Carbon Steel in Warm Temperature Range	
N. Kong, H.T. Zhu, K. Tieu and Q. Zhu	415
Influence of Cooling Conditions on Forming Performance of Hot Stamped and Press-Quenched Steel Sheet Part	
S. Maki, Y. Kusunoki and E. Nakanishi	422
Thermomechanical Forming of NiTi Shape Memory Alloy Wire	
K.J. Fann and H.C. Hsu	430

Design and Test of a Rapid Thermal Annealing Furnace for Improving Surface Properties of Silicon Brick in Multi-Wire Sawing Process	
C.C.A. Chen, S.C. Cheng, M.H. Chan, W.C. Hsu and S.L. Cheng	437

VI. Surface and Precision Engineering

A New Approach to Calibration of Printed Circuit Board Coordinates: 2D-Depth Sensor Applied to Robotic Screwdrivers Assembly Systems	
S.P. Dong, H.W. Wang, T.Y. Wu and C.M. Yeh	445
Deformation Behavior and Wear Resistance of Hard TiCN and TiCN/Ti Coatings on Ti6Al4V Alloy	
Y. Sun, C. Lu, H.L. Yu, A.K. Tieu, Q. Zhu, Y. Zhao and H.T. Zhu	451
Design of Experiments to Study Slurry Erosive Wear Behavior of Inconel-718 Coatings on Copper	
C.S. Ramesh, R.S. Kumar, S. Ramakrishna and V.K.G. Kashyap	459
Ga-Doped ZnO Films Deposited by Atmospheric Pressure Plasma	
J.M. Hsu, P.C. Ho, C.C. Chang and T.H. Chou	465
A New Concept of the Sliding Compression Test to Independently Investigate the Contact Normal Stress and the Surface Enlargement	
P. Groche, C. Müller and M. Keller	473
Development of a Self-Propelled Multi-Jet Polishing Tool for Ultra Precision Polishing	
A.A. Tsegaw and F.J. Shiou	481
Surface Roughness Measurements of a Narrow Borehole — Development of Stylus with Cylindrical Mirror and Lensed Fiber	
E. Okuyama, W. Yoshinari, Y. Suzuki, R. Yoshida, I. Yoshida and M. Iwakata	491
The Numerical Research of Drag Reduction over Bionic Fluctuation-Adaptive Non-Smooth Surface	
Y.L. Hu, M.L. Zhu, J. Xiao, X.Z. Wang and Z. Xu	499
Assessment of Using Secondary Concentrators for Nonferrous Material Removal Applications	
A.H. Alami	506

VII. Computer Aided Engineering

A Study on the Structure Analysis of Skate for Transportation Using Composite Materials	
S.H. Ko, H.G. Kim, H.J. Shin, H.W. Kim, Y.J. Cha, I.P. Cha, G.C. Kim and L.K. Kwac	517
A Study on the Warm Forging-Flaring Process of Brass Tube	
C.H. Liu, A.C. Wang, C.H. Lee and Y.M. Huang	524
Dynamic Simulation and Analysis of Large-Scale Gear Reducers	
H.C. Hou and Y.R. Wu	530
Flow and Film-Forming Characteristics Analysis of Non-Newtonian Fluid Slot Coating	
W.C. Shu, T.F. Wu, R.H. Chen, K.Y. Cheng and C.W. Hsieh	539
Investigation of Drilling Conditions of Printed Circuit Board Based on Data Mining Method from Tool Catalog Data-Base	
H. Haneda, H. Kodama, T. Hirogaki, E. Aoyama and K. Ogawa	547
Investigation of Gear Meshing Noise of Planetary Gear Mechanism for Hybrid Vehicles	
T. Miyata, L.B. Kang, T. Hirogaki and E. Aoyama	555
Prediction of Maximum Forging Load and Billet Volume Using FEM of a Near Net-Shaped Helical-Bevel Gear Forging	
T.S. Yang, J.H. Liang and J. Chang	563
Study on Utilizing Rapid Prototyping Technology to Build Oral and Maxillofacial Models	
Y.L. Cheng and W.S. Lu	570
The Development of a Cross-Flow Fan for Electronic Devices Cooling with a Focus on Laptop Computers	
A.T. Li and R.Q. Hsu	577
The Study on the Boltzmann Distribution of Ideal Gas under Gravitational Field by Computer Simulation	
J.C. Huang and F.J. Cheng	584

The Effect of Seat Tube Angle (STA) on Muscle Tension Leg Riders I.M.L. Batan, D. Harnany and E. Rinaldi	592
Generalized Two-Point Method for Straightness Profile Measurement - Error Propagation and Experimental Results E. Okuyama, S. Asano, Y. Suzuki and H. Ishikawa	600

VIII. Automation and Manufacturing Systems

Control of Service Robot by Integration of Multiple Intermittent Sensors L.K. Chen and M.Y. Hsiao	609
Development of an Advanced Semi-Active Damper Using Smart Fluid M.M. Ferdaus, M.M. Rashid and M.M.I. Bhuiyan	615
Hybrid Genetic Algorithm for Solving Assembly Line Balancing Problem in Footwear Industry J.C. Chen, C.W. Wu, T.D.D. Thao, L.H. Su, W.H. Hsieh and T. Chen	623
Performance Analysis of an Open-Cathode PEM Fuel Cell Stack H.L. Chiang, T.L. Feng, A. Su and Z.M. Huang	630
A Survey of Sustainable Design-Centered Integration for Medical Additive Manufacturing S.H.M. Wang, Y.R. Qu, C.C.A. Chen and S.P. Chang	635

IX. Micro/Nano Technology

Development and Optimization of a Low Normal Force Contact M.M.I. Bhuiyan, T. Bin Alamgir and M.M. Rashid	647
Mechanism of TiO₂ Nanotubes Formation on the Surface of Pure Ti and Ti-6Al-4V Alloy T.D. Dikova, M.G. Hahm, D.P. Hashim, N.T. Narayanan, R. Vajtai and P.M. Ajayan	655
Nano-Scale Control Design and its' Practical Implementation of Piezoelectric Materials Y.Y. Chen	663
The Nanostructure Fabrication on Conductive Diamond-like Carbon Thin Film by Nano-Oxidation Technique J.C. Huang, H. Chang and H.T. Ling	671
The Study of Aluminum Pattern on Phosphors Anode in Field Emission Device C.C. Chang, L.W. Zheng, W.H. Tsai and J. Lo	679
The Study on the Ultrasound Assisted Atomic Force Microscopy Base Nanomachining J.C. Huang, Y.J. Weng, H.S. Liu, F.C. Tsai and F.J. Cheng	684