

# Table of Contents

## Preface

## I. Materials

### Solar Control Glass

H. Altan and J. Mohelníková 1

### The Mechanism of Defects Formation in Silicon Substrates

A. Bogorosh, S. Voronov, N. Višniakov, D. Ščekaturovienė and A. Bubulis 7

### The Simulation Spreading Process of Steel Tubes Hollow

T.C. Dyl 13

### Effect of the Unit Pressure on the Selection Parameters of Intermetallic Coatings NiAl and Ni<sub>3</sub>Al after Plastic Working

T.C. Dyl, R. Starosta and R. Skoblik 19

### Assessments of Shrinkage Degree in Bioceramic Sinters HA+ZrO<sub>2</sub>

A. Dudek and C. Kolan 25

### Structure and Properties of Bioceramics Layers Used for Implant Coatings

A. Dudek and R. Włodarczyk 31

### Stress Corrosion Cracking of 5083 and 7020 Aluminium Alloys Jointed by Friction Stir Welding

K. Dudzik and M. Czechowski 37

### Tensor Interpolation of Tribological Wear in Ionitriding of 316L Steel

T. Frączek, M. Olejnik, M. Knapinski and G. Biernat 43

### Microstructure State and Heat Treatment Influence on Barkhausen Noise Parameters and Residual Stress Measurements

T. Garstka 50

### Influence of Ageing Process on Structure and Mechanical Properties of the T24 Steel

G. Golański 56

### Cyclic Fracture Analysis of Semi-Natural Cast Iron Plate with Metallurgical Defects Layer

M. Gutauskas, J. Bacevičius and M.K. Leonavičius 61

### Investigation of Copper Fragmentation Property

J. Janiszewski and R. Panowicz 66

### Effects of Vibration Energy Input on Stress Concentration in Weld and Heat-Affected Zone of S355J2 Steel

A. Jurčius, A.V. Valiulis and O. Černášejus 73

### Asymmetric Process of Plate Rolling Analysis

A. Kawałek, H. Dyja and M. Knapiński 79

### Analysis of the Plasticity of High-Carbon Alloy Steel in the Conditions of Hot Plastic Working

M. Knapiński, M. Kwapisz and A. Kawałek 85

### Effect of Erosive Particle Velocity on the Intensity of Polymeric Coating Wear

D. Kotnarowska 91

### Selective Transfer Phenomenon in Friction Couples Lubricated with Base Oils

A. Kotnarowski 97

### Effect of PWHT on the Mechanical Properties of P5 Steel Welded Joints

V. Kumšlytis, A.V. Valiulis and O. Černášejus 104

### High Temperature Corrosion of Evaporator Tubes with Thermal Sprayed Coatings

J. Łabanowski and J. Ćwiek 110

### Properties of Duplex Stainless Steel Surface Layers after Burnishing Process

J. Łabanowski and A. Ossowska 118

### Investigations of Production Processes of W-Re-Ni and W-Re-Ni-Fe Heavy Metals

T. Majewski 124

### Modification of W and Re Powders by Plasma Technique

T. Majewski 130

<b>Development of Finite Element Model of Reorientation of Cementite Lamellae in Pearlite Colonies in Wire Drawing Process for Wires Made from High Carbon Steel</b>	136
Z. Muskalski and A. Milenin	
<b>Mechanical and Physicochemical Properties of Some Originally Made Composite Materials for Dental Fillings</b>	142
J. Mystkowska, G. Rokicki, J. Sidun and J.R. Dąbrowski	
<b>Surface Activity and Fluid Sorption of Titanium Alloys Soaked in SBF Solution</b>	147
J. Mystkowska, P. Deptuła, S. Bakier and J. Sidun	
<b>Steel Strips Flattening in Ball Rolling Mill</b>	153
J. Przondziona and J. Szyszal	
<b>Polymer-Surface Modification with <math>\alpha</math>-C:N:H Layers Plasma Chemically Deposited in RF CVD and MW CVD Systems</b>	159
K. Przetakiewicz, K. Tkacz-Śmiech, P. Boszkowicz and S. Jonas	
<b>The Characteristic of Surface Layers on Austenitic Stainless Steel after Glow-Discharge Nitriding Process</b>	165
A. Sitko, M. Szkodo and M. Gazda	
<b>The Effect of Fabrication Method of Cobalt Base Clad Layer on Air Oxidation</b>	169
H. Smolenska	
<b>Cobalt Base Clad Layer Resistance on the Corrosion under Low Sulfur Pressure</b>	173
H. Smolenska	
<b>The Influence of Plastic Strain on the Corrosive Properties of Plasma Sprayed Intermetallic NiAl and Ni<sub>3</sub>Al Coatings</b>	177
R. Starosta	
<b>The High Cyclic Failure Analysis of Welded Joints of CT Specimens</b>	183
R. Stonkus and M.K. Leonavičius	
<b>Influence of Cavitation Intensity on the Relative Cavitation Resistance of Laser Processed C45 Carbon Steel</b>	189
M. Szkodo	
<b>Cavitation Erosion Resistance of Austenitic Microstructure Created by Laser Beam</b>	195
M. Szkodo	
<b>Assessment of FSW Welds Made of Aluminum Alloy AW7075-T651</b>	201
M. Szkodo, J. Adamowski and A. Sitko	
<b>Magnetic Properties of Co<sub>2</sub>O<sub>n</sub> (n = 1-9, 12) Nanoparticles</b>	207
J. Tamulienė, R. Vaisnoras, G. Badenes and M.L. Balevicius	
<b>Advanced Materials Research and Technologies Development: Lithuanian Experience</b>	210
A.V. Valiulis and J. Škamat	
<b>The Influence of Strain Rate and Strain Intensity on Retained Austenite Content in Structure of Steel with TRIP Effect</b>	216
S. Wiewiórowska	
<b>Analysis of Rolling Process for Alloy on the Base of Silver BAg7</b>	221
S. Wiewiórowska, Z. Muskalski and M. Suliga	
<b>Determination of Temperature Range Enabling the Plastic Deformation Process of CP302 Solder</b>	226
S. Wiewiórowska, Z. Muskalski and M. Suliga	
<b>Properties and Application of Sintered Stainless Steel as Interconnectors in Fuel Cell</b>	231
R. Włodarczyk and A. Dudek	
<b>II. Engineering Technologies</b>	
<b>Finishing of Ceramics in a Single-Disk Lapping Machine Configuration</b>	237
A. Barylski and M. Deja	
<b>Optimal Design for the Environment of the Means Transportation: A Case Study of Reuse and Recycling Materials</b>	244
N. Chamier-Gliszczyński	
<b>Generation of Optimal Process Plan Alternatives for Manufacturing Mechanical Components</b>	250
M. Deja and M. Siemiatkowski	
<b>The Operator Protective Structures Testing for Mining Machines</b>	256
D. Derlukiewicz, J. Karliński and A. Iluk	

<b>Modeling and Simulation of Tool Cycle in Manufacturing Cell</b>	262
M. Dobrzynski	
<b>Surface Roughness Model for Components Created by Stereolithography Method</b>	268
S. Dzionk	
<b>Design Process Innovation of Mechanical Objects with the Use of Design for Six Sigma Methodology</b>	274
S. Koziołek, D. Derlukiewicz and M. Ptak	
<b>Critical to Quality Factors of Engineering Design Process of Armoured Vehicles</b>	280
S. Koziołek, E. Rusiński and K. Jamroziak	
<b>Diagnostic Models of the States of Developing Fault for Working Parts of the Excavator</b>	285
M. Kowalczyk, J. Czmochowski and D. Derlukiewicz	
<b>The SMA Wires Application in the Braille Monitor</b>	290
J. Kwaśniewski and I. Dominik	
<b>The Effect of the Normalizing Rolling of S355J2G3 Steel Round Bars on the Selected Mechanical Properties of Finished Product</b>	294
K.B. Laber and H. Dyja	
<b>Estimation of the Influence of Burnishing Parameters on X5CrNi18-10 Steel</b>	300
W. Labuda and R. Starosta	
<b>Cavitation Wearing of the SUPERSTON Alloy after Laser Treatment at Cryogenic Conditions</b>	306
B. Majkowska and W. Serbiński	
<b>New Roll Pass Design to the Bar Rolling Process Using Longitudinal Slitting Passes</b>	310
S. Mróz	
<b>Sensing of Carbon Dioxide and Hydrocarbons Using Photonic Bandgap Fiber</b>	316
J. Pawłat, X.F. Li, T. Sugiyama, T. Matsuo, Y. Zimin and T. Ueda	
<b>Analysis of the Fatigue Fractures in the Eccentric Press Shaft</b>	321
E. Rusiński, P. Harnatkiewicz, G. Przybyłe and P. Moczko	
<b>Structural Modifications of Excavator's Bucket Wheel by the Use of Numerical Methods</b>	330
E. Rusiński, P. Moczko and P. Kaczyński	
<b>Multicomponent Layers for Aluminium Alloys Surface Consolidation</b>	336
W. Serbiński	
<b>Application of Syntactic Pattern Recognition Approach in Design and Optimisation of Group Machining Systems</b>	342
M. Siemiatkowski	
<b>Analysis of Asymmetrical Rolling Process of Multilayer Plates</b>	348
R. Skoblik, D. Rydz and G. Stradomski	
<b>Identification of Internal Stresses in Bolted Flanged Joints</b>	353
T. Smolnicki, J. Karliński and D. Derlukiewicz	
<b>Determination of Centre of Gravity of Machines with the Rail Undercarriage</b>	359
T. Smolnicki and M. Stańco	
<b>Slitting Criterion for Various Slitting Roll Geometry in MSR Rolling Process</b>	365
A. Stefanik, P. Szota, S. Mróz and H. Dyja	
<b>The Influence of the Value of Single Draft on Mechanical-Technological Properties of High Carbon Steel Wires</b>	371
M. Suliga	
<b>Theoretical and Experimental Analysis of Drawing of Square Wire and Square Twisted Wire</b>	377
M. Suliga, S. Mróz and P. Szota	
<b>Numerical Modelling of the Microstructure during Rolling of Flat Bars</b>	382
P. Szota, A. Stefanik and H. Dyja	
<b>Analysis of Microslips and Friction in the Riveted Joints</b>	388
E. Szymczyk, J. Jachimowicz, A. Derewonko and G. Ślawinski	
<b>Influence of Material Model on Tensile Loaded Joint</b>	394
E. Szymczyk and G. Ślawinski	
<b>FEM Modeling of Failure of a Foam Single Cell</b>	400
W. Szymczyk and D. Miedzińska	
<b>Electrochemical Behaviour of Stainless Steel Wire for Urology</b>	404
W. Walke and J. Przondziona	

## **Education**

<b>The Course of Microcontrollers Oriented to Practical Skills</b>	
A. Baskys	410
<b>Continuing Perfection of Industrial Engineering and Management Knowledge after Master Studies</b>	
B. Jančiauskas and E. Toločka	414
<b>Mechatronics Engineering Programs at German Universities of Applied Sciences</b>	
H. Loose	419
<b>Intelligent Agent Find its Way in the Drawing</b>	
A. Sokas	425