

Table of Contents

Preface

Chapter 1: Welding and Welded Structures

Failure Analysis in Resistance Welded Automotive Components I.A. Perianu, A. Murariu, I. Duma, R. Popescu, R. Faur, B. Cornelia, I.D. Uțu, M. Brand, O.F. Cornea and C.A. Cornea	3
Process Parameters Testing for Various Aluminium Alloys Using Laser Beam Welding D. Guran and V.. Constantin	17
Integration of Thermographic Data and SolidWorks Simulation for Welding Process Optimization in Shipbuilding A.A. Midan, S.V. Savu, A. David, A.I. Biholar and Y. Douimia	23
Researches Regarding Heterogeneous Welding between Carbon and Stainless Steel Used in Fabrication of Cylinders' Rod for Magnesium Alloy Extruders L. Zgripcea, V. Socalici, C.B. Baneasa, I. Duma and R. Faur	31
Connection between the Matching Phenomenon and Fatigue Crack Growth Behaviour of High Strength Structural Steel Welded Joints J. Kovács and J. Lukács	41
Microstructural Investigations on Built-Up Cold-Formed Steel Beams Welded by MIG Brazing I. Hulka, B. Radu, V. Ungureanu and N.A. Sîrbu	49

Chapter 2: Friction Stir Processing

Experimental Research on Submerged Underwater Friction Stir Processing of EN AW 1200 Aluminum Alloy L.N. Botila, I.A. Perianu, I. Duma, E. Dobrin, R.N. Popescu and R. Faur	59
Submerged Friction Stir Processing of En Aw 5754 Aluminum Alloy L.N. Botila, I.A. Perianu, I. Duma, V.. Constantin, R. Faur and R.N. Popescu	69
Aspects of Fracture Surface Analysis of Aluminum Alloy EN AW 6082 Submerged Friction Stir Processed L.I. Sîrbu, L.N. Boilă, R.R. Herci, R. Faur and F.A. Bude	79
Fracture Surface Analysis of EN AW 5754 Aluminium Alloy during Submerged Friction Stir Processing G.V. Mnerie, L.N. Boilă, R. Faur, B. Savić and A. Akac	89
Development of a Finite Element Model for Thermal Analysis of FSW Butt Welding of AA2124/SiC/25p-T4 Aluminium Metal Matrix Composite M. Pop-Calimanu and I.A. Perianu	101
SEM and EDX Analysis of the Fracture Surface of the Submerged Friction Stir Processed EN AW 7075 Aluminum Alloy R.R. Herci, L.N. Boilă, L.I. Sîrbu and R. Faur	113
Analysis of the Fracture Surface in Multiple Pass SFSP Processing of Aluminium Alloy EN AW 1200 E. Dobrin, L.N. Boilă, R. Faur, G.V. Mnerie, L.I. Sîrbu and A. Anaghostopoulou	123
Comparative Analysis of the Fracture Surfaces for FSP and SFSP Processed EN AC 5083 Cast Aluminium Alloy A.O. Raia, L.N. Boilă, A.C. Bucur and A. Cazacu	131

Chapter 3: Ultrasonic Welding

Ultrasound Welding of Automotive Seat Belts A.C. Bucur, A. Cazacu, R. Faur and M. Florea	147
--	-----

Ultrasound Welding of Dissimilar Metal Materials for the Automotive Industry A. Cazacu and A.C. Bucur	163
Optimizing Ultrasonic Welding Technology for 3D Printed Metal Composite Materials: A Research Study L.I. Sirbu, G.V. Mnerie, E. Dobrin and A. Suci	177
Analysis of Ultrasonic Welding of Samples Made by 3D Printing E.D.A. Bontea, D.A. Predu and D.M. Lupsa	185

Chapter 4: Additive Manufacturing

Optimization of 3D Printing Parameters for H13 and Inconel Metal Powders: A Comprehensive Study on Achieving Superior Print Quality D.A. Predu, N.A. Sîrbu, N. Trihenea and R. Faur	197
Aly718 and H13 Alloy Mixed Powder Vs. Layers, 3D Printed by DED Method. Comparison G.V. Mnerie, D.A. Predu, N.A. Sîrbu, P. Tanović, L. Sikolya and A. Suci	215
Impact Properties of SLM Printed Specimens from AlSi10Mg According to Building Orientation G. Murariu, G. Ivanici and S.V. Galatanu	225
Effect of Infill Density and Outer Shell on Flexural Behavior of FFF Printed PLA Samples I. Miron, A.A. Medru and E. Linul	233
Effect of Printing Parameters on Mode I Fracture Toughness of FFF Printed PLA Samples R.P. Bercuci, M.V. Baban and E. Linul	241
Comparative Study of Direct Energy Deposition (DED) and Traditional Casting Techniques for 316L Stainless Steel N. Trihenea, G.V. Mnerie, D.A. Predu and N.A. Sîrbu	249
3D Printing Materials Testing for Gears R.C. Klobucaric, D.A. Predu and E. Bontea	261

Chapter 5: Coatings and Surface Treatment

Optimising the HVOF Deposition Technology of Al₂O₃-40%TiO₂ Coatings for Energy Industry Applications A.C. Murariu, I.A. Perianu, M. Cocard and E. Frici	273
Solutions for Increasing the Durability of Metallic Materials to Hydroabrasive Wear Used in the Construction of Hydraulic Turbines C.A. Tugui, M.C. Perju, I. Mititelu and I.A. Perianu	285
Spectroscopic Analysis of HVOF-Sprayed Al₂O₃-40%TiO₂ Coatings for Solar Thermal Applications C.A. Ciurel, A.C. Murariu and A.L. Borz	291
Examination of the Need for Pre-Heating in Case of Hardfacing on S1100QL Steel G. Terdik and A. Meilinger	301
Optimization of Hardness and Adhesion of Al₂O₃-40%TiO₂ Coating Obtained by HVOF Spraying through Process Parameter Control V.. Constantin, A.C. Murariu, I.A. Perianu, M. Cocard, I. Duma and C.A. Antal	311

Chapter 6: Heat Treatment

Effect of Heat Treatment on Microstructure, Phase Composition and Mechanical Properties of Low-Cost Titanium Alloy Ti-2.8Al-5.1Mo-4.9Fe Obtained by TIG Welding S.V. Akhonin, V.Y. Belous and R.V. Selin	327
The Effect of Flame Straightening Thermal Cycles on S1100M Properties M. Gáspár, S. Alden Abd Al Al, M. Török and L. Gyura	335
Experimental Research Concerning Structural and Hardness Stability of 100Cr6 Steel Parts D.M. Duma, S. Duma, I. Duma and D. Buzdugan	345

Chapter 7: Strength of Materials, Corrosion and Tribology

Investigation of Pipe Failures in Sprinkler Systems: A Case Study I. Duma, E. Dobrin, G. Marginean, R. Faur, A. Afezolli, I.A. Perianu and R.N. Popescu	355
Characterization of a Low-Friction EPDM for Dynamic Sealings Applications: Tensile, Wear Behavior and Hot Water Resistance D. Foltu, G.I. ooi, D.T. Pascal, I.D. Uțu and V.A. erban	365
3D-Printed Protective Button Covers for Technical Devices C. State and D.A. Predu	375
Investigation of the High Cycle Fatigue Behaviour of Aluminium Alloy Clinched Joints A. Shukurea, P.Z. Kovács and J. Lukács	385
The Research of the Cavitation Erosion Resistance of the Aluminium Alloy 2017 a Structure Obtained by WIG Remelted I. Bordeasu, A.N. Luca, R. Parmanche, C. Ghera, C.L. Salcianu, L.M. Micu, D. Ostoia, I. Duma and V.I. Safta	397
The Cavitation Behavior of the 6082 Alloy Aluminium Structure Obtained by WIG Remelted I. Bordeasu, R. Parmanche, C. Ghera, C.L. Salcianu, A.N. Sîrbu, N.A. Luca, I. Duma, S.T. Duma and C.E. Podoleanu	409
Review on Welding Criteria Related to Hydrogen Transport in Carbon Steel Pipelines Á. Pap, Á. Meilinger and M. Gáspár	421

Chapter 8: Specific Material Processing and Tool Development

Study of the Influence of Process Parameters on Processing Time in Laser Engraving F. Corb, T. Buidos, C. Stănăel, I. Stănăel and G.V. Mnerie	443
New CNC Turning Solution Versus CNC Conventional Turning A. But and L. Gal	453
Analysis of the Vibration Behavior of the Cutting Tool in the Case of Turning Machining G. Belgiu, M.E. Selariu and B. Radu	465
Design and Structural Analysis of a Support System for a 3d Printer S. Dohan, A.I. Biholar and S.V. Galatanu	475

Chapter 9: Polymers

Testing of Tensile Strength and Elongation at Break of Polymer Packaging Materials P. Tanović, B. Savić, G.V. Mnerie and D. Mnerie	487
Research of Physical and Mechanical Properties of Stretch Films Based on Recycled Materials N. Kulyk, M. Alipatova, O. Chepeliuk and G.V. Mnerie	497
A Short Description of most Common Biocompatible Materials that are Suitable for 3D Printing in Medical Field M. Florea and G.V. Mnerie	503

Chapter 10: Techniques of Materials Properties Analysis

Evaluating Chemical Analysis Techniques: A Comparative Study of SEM-EDX and Optical Emission Spectroscopy R. Faur, I. Duma, M. Florea and A.C. Bucur	527
Ai-Driven X-Ray Image Analysis for Enhanced NDT Performance S. Szávai, J. Dudra, Z. Zsíros, P. Margitai, M. Pataki, C. Balogh and V. Matók	539

Chapter 11: Building Materials and Technologies in Construction

Further Investigation Regarding the Use of Ultrasonic Pulse Velocity (UPV) on Earthen Elements	
B. Bolborea, S. Dan, C. Baeră, A. Gruin and I.A. Perianu	551
Experimental Study on Spent Garnets for Fine Grain Aggregate a Partial Substitution in Cement Based Mortars: Validation of Preliminary Research	
A.C. Vasile, C. Baeră, A. Gruin, I.A. Perianu, I.K. Petrisor and A. Ion	563
Vibration Instrumentation in Analyzing the Dynamic Structural Behaviour	
D. Dobre, C.S. Dragomir, I.G. Craifaleanu, C.F. Dobrescu, E.S. Georgescu and A. Gruin	579