

# **10th International Conference on Advanced Concepts in Mechanical Engineering (ACME 2022)**

IOP Conference Series: Materials Science and Engineering  
Volume 1262

Online  
9 - 10 June 2022

ISBN: 978-1-7138-6158-4  
ISSN: 1757-8981

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

This work is licensed under a Creative Commons Attribution 3.0 International Licence.  
Licence details: <http://creativecommons.org/licenses/by/3.0/>.

No changes have been made to the content of these proceedings. There may be changes to pagination and minor adjustments for aesthetics.

Printed with permission by Curran Associates, Inc. (2022)

For permission requests, please contact the Institute of Physics  
at the address below.

Institute of Physics  
Dirac House, Temple Back  
Bristol BS1 6BE UK

Phone: 44 1 17 929 7481  
Fax: 44 1 17 920 0979

[techtracking@iop.org](mailto:techtracking@iop.org)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2633  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

Preface	
Peer Review Statement	
A Prospective View on Biodegradable Lubricants for Hybrid and Electric Vehicles .....	1
<i>C I Bradu, G Ianuș</i>	
Comparative Analysis Concerning the State of Stress for Involute Gears Using ISO, AGMA Standards and Finite Element Method.....	10
<i>M Bucur, S Cananau, R F Mirica, S Gabroveanu</i>	
Optimizing the Trajectory of Aggregates in Drying Units from the Asphalt Plants.....	17
<i>A I Burlacu, M Tănase, C Ilincă, M G Petrescu</i>	
Friction Coefficient Between Glass Surfaces and Soft Materials .....	29
<i>B Chiriac, C M Oprisan, V Carlescu, D N Olaru</i>	
Film Thickness in Miniature Ball Bearing Grease Lubricated .....	39
<i>D Cojocaru, G Ianuș, V Cârlescu</i>	
Calculating the Film Thickness for the Rapeseed Oil in Order to Evaluate Functioning Regime.....	49
<i>D Guglea, C Georgescu, L Deleanu</i>	
Considerations Concerning the Power Loss in a Gear System.....	58
<i>A Ilieș, M Bucur, S Cananau, R F Mirica, S Gabroveanu</i>	
Influence of Test Parameters on the Operation of Automotive High-Pressure Pumps.....	65
<i>R C Iordache, C Bujoreanu</i>	
Fractal Dimension in Tribology – an Overview .....	75
<i>A Lăpușteanu, M Agop, V Paleu</i>	
A Review on Tribological Behaviour of Mechanical Components Obtained by Additive Manufacturing .....	85
<i>G Macovei, V Paleu</i>	
The Evaluation of the Influence of Tilting on Static Performances of a Novel Elastohydrostatic Thrust Bearing.....	96
<i>A Marinescu, Ș Coadă, E Moses</i>	
Static and Dynamic Friction Coefficient in Low Loads and Sliding Speed Conditions .....	105
<i>C M Oprisan, B Chiriac, A Tufescu, D N Olaru</i>	
Modeling Non-Newtonian Fluid Flow Through Pipes with Slip Boundary Conditions.....	115
<i>A V Radulescu, I Radulescu</i>	
Considerations Concerning Friction in Four Ball Scuffing Test .....	123
<i>I C Romănu, I Muscă, C Hangan</i>	
Use of Principles from Axiomatic Design in the Case of Equipment for Studying Abrasion Resistance.....	129
<i>L Slătineanu, A Hrițuc, A M Mihalache, O Dodun, G Nagîț, M Coteață, I Surugiu</i>	

A Simple Method to Introduce the Centrifugal Effects in an Angular Contact Ball Bearing.....	137
<i>A Zamă, A Tufescu</i>	
Literature Review of Reinforced Cementitious Composites with Carbon Nanotubes in the Field of Historical Building Restoration.....	145
<i>E Basalic, I S Entuc, C Nejneru, G Bădărău, P Paraschiv, I Știrbu, N Cimpoescu</i>	
Influence of Technological Parameters on the Behaviour in Operation of the Asphalt Milling Equipment.....	153
<i>T Dumitru, C Ilincă, M Tănase</i>	
Replacement of Natural Sand with Sand Obtained from the Recycling of Crushed Household Glass .....	171
<i>C C. Epure, C Munteanu, B Istrate, S C Lupescu, M Harja</i>	
Metallographic Study and Corrosive Behavior of Titanium Alloys for Their Use in Medical Applications.....	182
<i>H Guerra Yánez, N R Florido Suárez, I Voliculescu, J C Mirza Rosca</i>	
Influence of Homogenization and Aging Parameters Applied to Mechanical and Structural Characteristics of Alloy 5083.....	191
<i>D Istrate, C Lazar (Natra), O P Odagiu, A M Demian, A D Buzatu, B Ghiban</i>	
Evaluation of Mechanical Characteristics of 3003 Aluminum Alloy Plated Sheets.....	203
<i>C Lazar (Natra), D Istrate, O P Odagiu, A M Demian, A D Buzatu, B Ghiban</i>	
Structural Analysis and Mechanical Properties of Some Coatings Obtained by Cold Spray Method. a Review .....	218
<i>F C Lupu, C Munteanu, B Istrate, S C Lupescu, R Ciubotaru, S Adrian</i>	
Mechanical and Structural Characterisation of a 3D Warp-Knitted Spacer Fabric Subjected to Compression.....	227
<i>G C Lupu, A Fătu, Y Henry, P Turtoi, T Cicone</i>	
Biomechanical Properties of Animals Bones and the Influence of Oncologic Drug on Pig Femur .....	237
<i>J C Mirza Rosca, N R. Florido Suárez, L Baltas, M Tierean</i>	
Equipment for Thermo-Mechanical Contact Fatigue in Rolling Conditions Determination.....	245
<i>S Mistreanu, F Tudose-Sandu-Ville, V Manole, I Știrbu</i>	
Instrumentation and Preliminary Evaluation of a Drop Tower Tester for Low and Medium Impact Energy.....	253
<i>I R Nechita, P Turtoi, T Cicone, C Puică</i>	
An Example for Determining the Physical Parameters Used in DEM Modelling for the Interaction Process Between Aggregates and Working Equipment.....	266
<i>A Niță, E Laudacescu, I N Ramadan, M G Petrescu</i>	
Influence of the Defect Characteristic in Aluminum Alloy 7075 in Non-Destructive Electromagnetic Testing.....	281
<i>A Savin, R Steigmann, V Uchanin, M D Stanciu</i>	
Eddy Current Assessment of Flaw Severity of Cylindrical Products .....	293
<i>A Savin, R Steigmann, N Iftimie, G S Dobrescu, M L Craus</i>	
Determined to the Microstructural and Mechanical Properties of Deposits Made of High Alloy Steels Used in the Construction of Environmentally Friendly Hydraulic Turbines .....	301
<i>C A Tugui, P Vizureanu, M C Perju, N Cimpoesu</i>	

Research Regarding the Influence of Different Printing Strategies on the Mechanical Characteristics of Some FDM Manufactured Structures .....	307
<i>D Besnea, C I Rizescu, A Spanu, E Moraru, D Rizescu, V Constantin, I Panait</i>	
Practical Evaluation of the Vibrations of a Rail Mounted Boom Crane.....	317
<i>R Bosoancă, I Bosoancă</i>	
Cooling Solutions by Matching Plastic and Metal in Automotive Industry .....	331
<i>S G Pal, D P Bistriceanu, V Vornicu</i>	
Design Recommendation for Thermal Conductive Plastic Parts in Automotive Industry .....	337
<i>S G Pal, D P Bistriceanu, V Vornicu</i>	
Design and Simulation of an Unmanned Aerial Vehicle Based on a Motor Glider Concept .....	349
<i>S Pop, A Steopan, M C Luculescu, A L Boer, L Cristea, C S Zamfira</i>	
LabVIEW Instruments for Creating Brain-Computer Interface Applications by Simulating Graphical Animations and Sending Text Messages to Virtual and Physical LEDs Based Display Systems Connected to Arduino Board.....	359
<i>O A Ruşanu</i>	
Analysis of Thin Wall Cells Made of Zhermack Silicone Rubber Used for Lower Limb Prosthesis .....	372
<i>Alina Rodica Spanu, Daniel Besnea, Edgar Moraru</i>	
Some Analyzes on Box Girders Bridges - Literature Review .....	382
<i>A M Velniciuc, C Bujoreanu</i>	
Proposed Gear Rack Cutter for Spur Gear Manufacturing by Generating Method. Part II: Comparison Between the Standard and Modified Profiles .....	390
<i>S Alaci, F-C Ciornei, I A Doroftei</i>	
About Dynamics of a Workpiece in a Transportation Mechanism from a Robotized System .....	396
<i>F Buium, D Leohchi</i>	
Proposed Gear Rack Cutter for Spur Gear Manufacturing by Generating Method. Part I: Theoretical and Strength Analysis Arguments .....	404
<i>F-C Ciornei, S Alaci, I-C Romanu, I Doroftei</i>	
Dimensional Synthesis and Comparative Simulation of Two Planar Deployable Mechanisms.....	412
<i>I Doroftei, I A Doroftei</i>	
The Structural Groups Approach and Transmission Angles Limits .....	421
<i>C D Duca, F Buium</i>	
Influence of Material Characteristics on Impact Response for Fabrics Made of Glass and Aramid Fibers.....	431
<i>L Chiper Titire, V Totolici Rusu, S Sandu</i>	
Numerical Investigation of the Stress State in the Runner Hub of a Kaplan Turbine .....	443
<i>V Cojocar, C-O Miclosina, C V Campian, D Frunzaverde, D Nedelcu</i>	
Evaluation of the Dynamic Behaviour of a Typical Wind Energy Recuperation Offshore System for the Black Sea Costal Area (I) .....	452
<i>L Crudu, R Bidoae, O Neculet, AV Petrov</i>	

A Comparative Evaluation of Hydrodynamic Loads for a Series of River Chemical Tankers Converted into River – Sea Series .....	473
<i>L Crudu, O Neculeț, E Găvan, D C Obreja, E Aramă</i>	
Calibrating a Double Aluminium Bar with Electrotensometric Strain Gauge Attached .....	484
<i>A I Dontu</i>	
Vickers Hardness Variation on the Part and Welding Cord Subjected to Plastic Deformation .....	493
<i>V Goanta, C I Moraras</i>	
Static Calibration of a Modified Weigh-In-Motion Sensor .....	508
<i>M Mihaila, I Blanari, P D Barsanescu</i>	
Finite Element Analysis of a Modified Weigh-In-Motion Sensor .....	517
<i>M Mihaila, I Blanari, V Goanta, P D Barsanescu</i>	
Strains and Stresses at Welding with Tubular Wires and Swinging the Electric Arc .....	525
<i>C I Mocanu, D I Tudose, A Hadar, E Gavan</i>	
Structural Evaluation of a Pusher-Tug Vessel to Comply with the Requirements for Navigation in Ice Covered Waters .....	541
<i>L A Moise, A M Pohlca, C I Mocanu, L Domnisoru</i>	
Structural Changes of GFRP Composite Material After Immersion in Liquid Nitrogen and Normal Water .....	554
<i>C Morăraș, D E Husaru</i>	
Using the Equivalent Plate Concept to Calculate Functionally Graded Plates by Numerical Method .....	560
<i>V. Nastasescu, S. Marzavan</i>	
A Ballistic Impact Model for Evaluating a Preliminary Higher Level from Simulation and Tests on a Glass Fibber Composite .....	571
<i>G G Ojoc, L Chiper Titire, C Pirvu, C Popescu</i>	
Laboratory Scale Technology for a Ballistic Protection Panel and Preliminary Results .....	583
<i>G G Ojoc, L Deleanu</i>	
Acoustic and Elastic Properties of Wood Used for Musical Instruments .....	595
<i>M D Stanciu, R Gall, Z Orbok, T Stan</i>	
An Overview of Actual Braking Systems .....	601
<i>E M Boitan, T M Ulian</i>	
The Study of the Influence of Speed Regimes on Smoke Emissions for a Diesel Injection Car .....	610
<i>S M Burciu, G Coman</i>	
A Theoretical Study on Hydrogen - Diesel Fuel Dual Fuelled Diesel Engine Operation .....	618
<i>A Cernat, C Pana, N Negurescu, C Nutu</i>	
Automatically Collecting Data Traffic in Intersections by Using Video Analytics Software for Vehicle Counting .....	626
<i>A I Dontu, L Gaiginschi, A Sachelarie</i>	
Experimental Methods to Investigate the Performance of the Braking System Using GPS and IMU Equipment .....	636
<i>R Drosescu, D Cojocaru, S Zamfir</i>	

Cold Flow Simulation for an Internal Combustion Engine with Swirl Flaps .....	649
<i>M Fratita, E Rusu, S M Burciu</i>	
Cold Flow Simulation for a S.I. Engine with Shrouded Intake Valve .....	656
<i>M Fratita, E Rusu</i>	
Analytical Model for the Frontal Impact with a Non-Deformable Barrier .....	662
<i>A M Manea, D Iozsa, A Molea, C Stan</i>	
The LPG-Diesel Fuel Dual Fuelling Effect on Diesel Engine Performance .....	668
<i>L Nemoianu</i>	
Design and Finite Element Analysis of a Circular Steel Profile Frame Using Autodesk Inventor .....	686
<i>F Popescu, R M Chivu, K Uzuneanu, I Ion</i>	
Design and Finite Element Analysis of a Lower Arm Using CATIA V5 .....	694
<i>F Popescu, R M Chivu, K Uzuneanu, I Ion</i>	
Simulation of a Frontal Vehicle Collision in Order to Study the Comparison Between a Forward Facing and Rear Facing Child Occupant .....	699
<i>A I Radu, B A Tolea</i>	
Experimental Study on Combustion of an Automotive Diesel Engine Fuelled with CNG .....	706
<i>S Rotaru</i>	
The Study of the Spark Ignition Engine Performance at Fueling with N-Butanol-Gasoline Mixture .....	713
<i>Cr Sandu, C Pana, N Negurescu, Al Cernat, D Fuiiorescu, R Georgescu, C Nutu</i>	
Zonal Cooling Principle Model Engine. Experimental Results .....	725
<i>T M Ulian, E Rakosi, G Manolache, C Ciobotar</i>	
Influence of Air Flow in the Lateral Areas of a Tractor Unit on Its Aerodynamic Performance .....	737
<i>E M Vieru, D Iozsa, L Ilea, G Frățilă</i>	
Comparison Between Two Measurement Methods for Airflow in Circular Ventilation Ducts .....	743
<i>D A Adîncu, A Popescu, M Atanasiu</i>	
Preliminary Experimental Assessment of a Vertical Shell and Tube Heat Exchanger Based on Phase Change Materials .....	753
<i>J Al Douri, H Pop, V Apostol, KS Hmood, S J Al Qaisy, A Nabbat, N K Fadhil, C Ionita, T Prisecaru</i>	
Power Control of a Wind Turbine Using an Electrohydraulically Controlled Active Pitch Control Mechanism .....	759
<i>A P Chiriță, Ș Șefu, I M Baciu, R Rădoi, A M Popescu</i>	
Elimination of Disturbances Due to Changes in Air Flow in a Wind Turbine with Hydrostatic Transmission .....	769
<i>C Dumitrescu, A P Chiriță, Ș Șefu, I M Baciu, R Rădoi</i>	
Heat Transfer Analysis of Roll-Bond Evaporator in a Small-Scale Household Refrigerator Operating with R600a.....	776
<i>K S Hmood, S J Al Qaisy, H Pop, V Apostol, J Al Douri, V Badescu</i>	
Study of a New Support System JNG 20 Equipping Recycled Batteries Containers Powered by Solar Energy for Isolated Farms Or Agri-Food Micro-Factories .....	796
<i>T I Jinga, C V Zăpodeanu</i>	

Safety Analysis of Thermal Equipment and Piping Systems in the CANDU Nuclear Power Plant Subjected to Thermal Shocks .....	805
<i>L T Lozonschi, C E Panaite</i>	
Constant Pressure Combustion of Gaseous Mixture of Natural Gas and Hydrogen and Evaluation of Harmful Emissions.....	820
<i>M F Lucăcel, S Darie, D T Bălănescu, G Dumitrașcu</i>	
Air-To-Water Heat Pumps' Seasonal Performance for Heating in 16 Greek Locations with Climate Data of the Last Decade .....	829
<i>G Mouzeviris, K Lagouvardos, K T Papakostas</i>	
Modelling Heat Transfer in Fins Using Finite Difference Method .....	843
<i>G D Tcaciuc, A G Lupu, A Popescu</i>	
Thermal Conductivity of Ag-RGO/water Hybrid Nanofluids: An Experimental Approach .....	849
<i>G A Vardaru, G Huminic, A Huminic</i>	

**Author Index**