



ISSN 2247-8604
ISSN-L 1454-9166

ANNALS
OF THE UNIVERSITY OF PETROSANI
MECHANICAL ENGINEERING
VOL. 25 (LII)

UNIVERSITAS Publishing
PETROȘANI – ROMANIA
2023

EDITOR OF PUBLICATION
Prof. Ph.D. Eng. Sorin Mihai RADU

ADVISORY BOARD:

Prof.Eng. Moise-Ioan ACHIM Ph.D. – “1 Decembrie 1918” University of Alba–Iulia, *Romania*;
Prof.Eng. Iosif ANDRAȘ Ph.D. – University of Petroșani, *Romania*;
Prof.Eng. Alexandru BOROIU Ph.D. – University of Pitești, *Romania*;
Prof.Eng. Anca BUCUREȘTEANU Ph.D. – “Politehnica” University of București, *Romania*;
Prof.Eng. Ioan CARTIȘ Ph.D. – Politechnical University of Timișoara, *Romania*;
Prof.Eng. Ion CIUCĂ Ph.D. – “Politehnica” University of București, *Romania*;
Prof.Eng. Predrag DAŠIĆ Ph.D. – High Technical Mechanical School R. Krstića, Trstenik, *Serbia*;
Prof.Eng. Netai Chandra DEY Ph.D. Indian Institute of Engineering Science and Technology, *India*
Prof.Eng. Sorin DIMITRIU Ph.D. – “Politehnica” University of București, *Romania*;
Prof.Eng. Valeriu DULGHERU Ph.D. – Tech.University of Moldova, Chișinău, *Republic of Moldova*;
Assoc.Prof.Eng. Dan Ovidiu GLĂVAN Ph.D. – “Aurel Vlaicu” University of Arad, *Romania*;
Prof.Eng. António GONÇALVES–COELHO Ph.D. – Universidade Nova de Lisboa, *Portugal*;
Prof.Eng. Otto GRIGOROV Ph.D. – National Technical University of Kharkov, *Ukraine*;
Prof.Eng. Anatoli GHRABCHENKO Ph.D. – National Technical University of Kharkov, *Ukraine*;
Prof.Eng. Nicolae ILIAȘ Ph.D. – University of Petroșani, *Romania*;
Prof.Eng. Krzysztof KRAUZE Ph.D. – AGH University of Science and Technology, *Poland*;
Assoc.Prof.Eng. Gábor LADÁNYI Ph.D. – University of Miskolc, *Hungary*;
Prof.Eng. Traian MAZILU Ph.D. – “Politehnica” University of București, *Romania*;
Prof.Eng. Mihai MINESCU Ph.D. – “Petroleum–Gas” University of Ploiești, *Romania*;
Prof.Eng. Mircea NICOARĂ Ph.D. – Politechnical University of Timișoara, *Romania*;
Prof.Eng. Gyula PATKO Ph.D. – University of Miskolc, *Hungary*;
Prof.Eng. Cristina PUPĂZĂ – “Politehnica” University of București, *Romania*;
Assoc.Prof.Eng. Eugen PĂMÎNȚAȘ Ph.D. – Politechnical University of Timișoara, *Romania*;
Prof.Eng. Șerban RAICU Ph.D. – “Politehnica” University of București, *Romania*;
Prof.Eng. Tomasz ROKITA Ph.D. – AGH University of Science and Technology, *Poland*;
Prof.Eng. Alexei TOCA Ph.D. – Technical University of Moldova, Chișinău, *Republic of Moldova*;
Prof.Eng. Raul R. TURMANIDZE Ph.D. – Technical University of Tbilisi, *Georgia*;
Prof.Eng. Nicolae UNGUREANU Ph.D. – Technical University of Cluj–Napoca, *Romania*;
Prof.Eng. Ioan VIDA–SIMITI Ph.D. – Technical University of Cluj–Napoca, *Romania*;
Assoc.Prof.Eng. Zoltán VIRÁG Ph.D. – University of Miskolc, *Hungary*;

EDITORIAL BOARD:

Editor-in-chief: **Prof.Eng.Habil. Florin Dumitru POPESCU Ph.D.** - University of Petroșani, *Romania*
Deputy Editor: **Prof.Eng.Habil. Andrei ANDRAȘ Ph.D.** - University of Petroșani, *Romania*
Associate Editors: **Prof.Eng.Habil. Dan Codruț PETRILEAN Ph.D.** - University of Petroșani, *Romania*
Assoc.Prof.Eng. Bogdan-Zeno COZMA Ph.D. - University of Petroșani, *Romania*
Assoc.Prof.Eng. Gabriel PRAPORGESCU Ph.D. - University of Petroșani, *Romania*

Editorial office address:

University of Petroșani, 20 University Street, 332006, Petroșani, Romania,
Phone: (40) 254/54.29.94, 54.25.80, 54.25.81, 54.25.82, **Fax.** (40)254/54.34.91, 54.62.38,
<https://www.upet.ro/annals/mechanical/> E-mail: annals-mech@upet.ro | andrei.andras@gmail.com

Contents

Alexandru, T.G., Anania, F.D., Pupaza, C., Gogu, C. <i>Numerical Investigation on the Thermomechanical Performances of Nanosatellite Assemblies</i>	1
Andraș, A., Popescu, F.D., Măceșaru (Lăpăduși), I.C., Brînaș, I. <i>The Study of the Kinematics of the Lifting-Lowering Mechanism of the SMA-2 Powered Roof Support Using Computer Software</i>	17
Apostu, S.E., Șoica, A. <i>Geotechnical Research of the Rocks from the Tailings Dumps in the West of the Jiu Valley Regarding the Stability of Their Slopes</i>	33
Brînaș, C.L., Popescu, F.D., Manițiu, D. <i>Research Results on Modeling and Simulation of the Cutting Drums of a Longwall Mining Shearer</i>	39
Cozma, B.-Z. <i>Study the Adaptation and Fixation Chain Ends on Advance Mechanism of 2K-52MU Combine to the Stations of the TR-5 Scraper Conveyor</i>	51
Draica, M.-I., Popescu, F.D., Brînaș, I., Popescu, V. <i>Determination of the Tensile Stress in Mine Hoisting Cables Using Numerical Methods</i>	59
Grecea, D., Nicola, A.H., Grecea, I. Marc, B.I., Urdea G.-B. <i>Modeling and Simulation of Electric Cars Using MATLAB - Simulink</i>	71
Itu, R.B., Cozma, B.-Z., Petrilean, D.C. <i>Aspects Regarding the Method of Inverse Motion and Collinearity in Mechanics</i>	81
Itu, R.B., Florea, V.A., Vitan, D.P. <i>Aspects Regarding the Application in Mechanics of Concurrency Condition of Three Lines in a Plane</i>	93
Itu, R.B., Toderaș, M., Marc, B.I. <i>Aspects Regarding Reduction of Sliding Vectors</i>	103
Marica, L., Itu, R.B., Apostu, S.E. <i>Determination of The Support of a System of Sliding Vectors Function of the Resultant Moment of the Vector System</i>	113
Mihăilescu, S. <i>Level Crossing Accidents Analysis in Romania</i>	123
Mihăilescu, S. <i>Causes Analysis of Serious Road Accidents in Romania</i>	133

Mureșan – Grecu, F., Cepreaga Moldoveanu, R., Moraru, R.I. <i>Safety and Health Risks Assessment for the Operators of a Tire Manufacturing Line</i>	145
Peagu (Furdui), D., Popescu, F.D., Andraș, A. <i>Mechanical Stress Simulation of the Explosion-Proof Encapsulation with Cylindrical Frame</i>	161
Petrilean, D.C., Tataru, A.C., <i>Establishing the Hourly and Optimal Energy Balance for the Kaeser BSD 81.45 kW Helical Screw Compressor</i>	169
Petrilean, D.C., Tataru, A.C. <i>Establishing the Energy Balance for the LOOS Dampfix 1250 Steam Generator</i>	175
Popescu, F.D., Andraș, A., Draica, M.-I., Brînaș, I., Marc, B.I. <i>Computer Modeling of the CA-1 Longwall Shearer Helical Vane Drum with Variable Axial-Radial Pitch</i>	183
Radu, S.M., Vîlceanu, F., Dinescu, S., Tufiș, A.E. <i>Contributions to the Dynamic Study of Rotor Excavators by Resistive Tensometry and Spectral Analysis</i>	193
Șoica, A., Urdea, G.-B., Florea, V. <i>Analysis by the Finite Element Method of the Tensions and Deformations Produced in the Mechanized Support Beams</i>	209
Stănilă, S.D., Zamora, A., Fiță, N.D. <i>Description and Importance of Mechanised Systems Within the Extractive Energy Industry</i>	217
Stănilă, S.D., Zamora, A., Fiță, N.D. <i>Rocks Cutting Parameters of Industrial Mining Systems</i>	231
Szurbik, S., Virág, Z. <i>Modal Analysis of a Bridge Frame for Belt Conveyors</i>	259
Urdea, G.-B., Nicola, A.H., Marc, B.I. <i>Kinematic Analysis of the SMA-2 Type Mechanised Support Used In The Jiu Valley</i>	265
Index of Authors	277
Instructions for Authors	279