



**ISSN 2247-8604**  
**ISSN-L 1454-9166**

**ANNALS**  
**OF THE UNIVERSITY OF PETROSANI**  
***MECHANICAL ENGINEERING***

**VOL. 24 (LI)**

**UNIVERSITAS Publishing**  
**PETROȘANI – ROMANIA**  
**2022**

**EDITOR OF PUBLICATION**  
**Prof. PhD. 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 KOTWICZA 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. Janusz REŚ 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:** **Assoc.Prof.Eng. 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*  
**Assoc.Prof.Eng. Sorin VĂTAVU 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](mailto:annals-mech@upet.ro)  
| [andrei.andras@gmail.com](mailto:andrei.andras@gmail.com)

---

## Contents

Andraș, A., Popescu, F.D., Brînaș, I., <i>Computerised Analysis of the Air Resistance for a Forward Moving Vehicle</i>	1
Andreica, M., <i>Alignment of Vibration Efficiency on Axial Fan Functioning. Case Study.</i>	13
Alexandru, T.G., Pupăză, C., Anania, D., Bișu, C., <i>Thermomechanical Study on Multiple Hinge Configurations Employed in Modular Microsatellite Design</i>	19
Brînaș, I., <i>The Study of the Buckling Phenomenon of Industrial Railways in the Jiul Valley</i>	29
Brînaș, I., <i>Simulation of the Cracking of Marble Samples Resulting From the Coring Process Using Irazu Software</i>	43
Bucureșteanu, A., Alexandru, T.G., Ovanisof, A., <i>Research into the Design and Construction of 3D Printers for Plastic Materials</i>	55
Cioclu, A.R., Danciu, C., Brînaș, C.L., Popescu, F.D., <i>The Study of the Rock Shear Test Kinematics</i>	65
Cozma, B.-Z., <i>Study of an Automatic Installation for Taking Coal Samples in Charging Station with CAD Software</i>	73
Itu, R.B., Florea, V.A., <i>Plane-Parallel Motion Aspects Regarding Isocline Circles</i>	81
Măceșaru (Lăpăduși), I.C., Popescu, F.D., Andraș, A., <i>Stress-strain Study of a Powered Roof Support Section Using Numeric Simulation</i>	89
Mihăilescu, S., <i>Analysis of the Influence of Economic and Exploitation Factors on the Public Transport System in the Petroșani Basin</i>	101
Mihăilescu, S., <i>Public Transport - Analysis of Natural and Socio-Political Factors in the Petroșani Basin</i>	115
Popescu, F.D., Andraș, A., Brînaș, I., <i>Determination Using FEA of the Static Stress of a Mine Hoist Drum After Safety Braking</i>	125

Popescu, F.D., Tomuş, O.-B., <i>Hoisting Installation Control and Monitoring System Based on Main Functional Parameters</i>	141
Şoica (Stanimirescu), A., Egri, A., <i>The Influence of Tailing Dumps on the Environment from a Chemical and Pedological Point of View at the Level of the Berbesti-Alunu Basin</i>	145
Tomuş, O.-B., <i>Research and Results in the Field of Mechanical Rock Cutting in Underground Conditions</i>	151
Tomuş, O.-B., <i>Research Regarding the Improvement of the Working Parts of the Bucket Wheel Excavators</i>	159
Virág, Z., Juhász, A., Szirbik, S., <i>Vibration Characteristics of a Shield Plate Reinforced with Trapezoidal Ribs</i>	169
Index of Authors	137
Instructions for Authors	138

**INDEX OF AUTHORS**

<b>A</b>		<b>J</b>	
Anania, D.,	19	Juhász, A.,	169
Andreica, M.,	13		
Andraș, A.,	1, 89, 125		
Alexandru, T.-G.,	19, 55		
<b>B</b>		<b>M</b>	
Bîșu, C.,	19	Măceșaru (Lăpăduși) I.C.,	89
Brînaș, C..L.,	65	Mihăilescu, S.,	101, 115
Brînaș, I.,	1, 29, 43, 125		
Bucureșteanu, A.,	55		
<b>C</b>		<b>O</b>	
Cioclu, A.R.,	65	Ovanisof, A.,	55
Cozma, B.-Z.,	73		
<b>D</b>		<b>P</b>	
Danciu, C.,	65	Popescu, F.D.,	1, 65, 89, 125, 141
		Pupăză, C.,	19
<b>E</b>		<b>S</b>	
Egri, A.,	145	Szirbik, S.,	169
<b>F</b>		<b>Ș</b>	
Florea, V.A.,	81	Șoica (Stanimirescu), A.,	145
<b>I</b>		<b>T</b>	
Itu, R.-B.,	81	Tomuș, O.-B.,	141, 151, 159
		<b>V</b>	
		Virág, Z.,	169

## **INSTRUCTIONS FOR AUTHORS<sup>1</sup>**

**THE TITLE OF THE PAPER WILL BE WRITTEN WITH CAPITAL LETTERS, CENTERED, AT 7.0 cm FROM THE UPPER EDGE OF A4 FORMAT, ALONG THE ENTIRE WIDTH, TIMES NEW ROMAN, 14 POINTS, BOLD.**

◀ (14 points)

◀ (14 points)

**The first name and the family name will be written with CAPITAL LETTERS, BOLD, CENTERED, 130 mm width, Times New Roman, 12 points, each name being followed by number, and in the footnote the didactic and scientific degree, the position and place of work of the authors (possibly fax, E-mail) are indicated, with italics, 130 mm width, Times New Roman, 11 points.**

◀ (12 points)

◀ (12 points)

**<Tab> Abstract: (Times New Roman, 10 points, bold)** The Abstract will only be in English and will have between 50 and 100 words, arranged all over the entire width, single, left – right alignment, all over the width of the printed space, Times New Roman, 10 points.

◀ (10 points)

◀ (10 points)

**<Tab> Key words: (Times New Roman, 10 points, bold)** 5 – 10 words, in English, along the entire width, Times New Roman, 10 points.

◀ (10 points)

◀ (10 points)

◀ (10 points)

**<Tab> 1. THE TITLE OF THE CHAPTER IS WRITTEN WITH CAPITAL LETTERS, BOLD, TIMES NEW ROMAN, 11 POINTS AND WILL BE NUMBERED WITH ARABIC NUMBERS.**

◀ (11 points)

**<Tab>** The paper text paragraphs will be left – right aligned. The lines of the entire text will be single spaced with Times New Roman fonts, size 11 points.

The paper will be edited in a language of international circulation (English, French, German) on A4 format (210 x 297), page setup: top 5.6 cm, bottom 4.6 cm, left 3.7 cm, right 3.7 cm, in WORD and the number of pages must be even between 4 and 16. The size of the symbol is given next and is written in the instructions used to assist in editing the text. It indicates a blank line and does not show in the text of the paper, being obtained by pressing <ENTER>. The size of a <Tab> is 1.27 cm. No blank line is left between the paragraphs. Between the last line before the title and the title of the chapter and between the title and the first next line a blank line is left for each.

---

<sup>1</sup> *Professor Eng., Ph.D. at the University of Petroșani, email adress*

**1.1 Subchapter. Subchapters can be used in the text, numbered with the number of the chapter and a number showing the number of the subtitle within the chapter. The subchapters and the numbers are Times New Roman, 11 points, bold.**

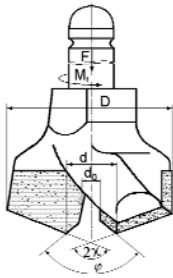
◀ (11 points)

The text is written in new paragraph and not continuing the subtitle, an 11 point blank line being left between the subtitle and the following text.

◀ (11 points)

## **2. PRESENTATION OF THE FIGURES**

◀ (11 points)



**Fig. 1.** Detachable bit  
Times New Roman, 10 points, centered as to the figure. The figures will be surrounded by text.

◀ (11 points)

## **3. PRESENTATION OF THE TABLES**

◀ (11 points)

The tables will be enclosed in the text, a 10 points blank line being left above and under the table, and will be numbered with Arabic numbers. Both the number and the explanations to the table are written with Times New Roman, 10 points, italic, for the number and bold for the explanation to the table, centered in the space of the table and above it. The table entries will be Times New Roman, 10 points, bold, and the data in the table will be Times New Roman, 10 points. The thin lines of the table will be ½ points (0.02 cm), and the thick ones will be ¾ ... 1 points (0.03 ... 0.04 cm).

◀ (11 points)

## **4. PRESENTATION OF THE MATHEMATICAL EQUATIONS**

◀ (11 points)

The mathematical equations will be with times New Roman, 11 points, center of the page and numbered on the right with Arabic numbers between round brackets.

◀ (8 points)◀Blank line 8 point high>

$$X^2 + Y^2 = Z^2 \quad (1)$$

◀ (8 points)◀Blank line 8 point high>

An 8 point high blank line is left between the last line before the relation and the relation and between the latter and the next first line.

The last page will be at least 2/3 full.

The pages of the paper will only be numbered by a pencil outside the printing space.

◀ (11 points)

**REFERENCES** (will be written according to the model, Times New Roman 10 points).

◀ (10 points)

- [1]. **Marian I.**, *Mining mechanization*, Technical Publishing House, Bucharest, 1969 (Romanian language)