



UDC: 621

ISSN 1451-2092

University of Belgrade
Faculty of Mechanical Engineering

FME TRANSACTIONS

New Series, Volume 49, Number 3, 2021

Editor:

Boško Rašuo

University of Belgrade

Associate Editor:

Stevanović Vladimir

University of Belgrade

Editorial Board:

Avellan François

Swiss Federal Institute of Technology, Zurich, Switzerland

Cizmas Paul

Texas A&M University, College Station, USA

Dulikravich S. George

Florida International University, Miami, USA

Đorđević Vladan

University of Belgrade

Ehmann F. Kornel

Northwestern University, Evanston IL, USA

Fragassa Cristiano

Alma Mater Studiorum - University of Bologna, Italy

Gajić Zoran

Rutgers University, USA

Jakirlic Suad

Technische Universität Darmstadt, Germany

Jovanović Jasmina

University of Belgrade

Kartnig Georg

Technische Universität Wien, Austria

Komatina Mirko

University of Belgrade

Meerkamm Harald

Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

Mester Gyula

University of Szeged, Szeged, Hungary

Minak Giangiacomo

Alma Mater Studiorum - University of Bologna, Italy

Moschetta Jean-Marc

ISAE-SUPAERO, University of Toulouse, France

Putnik Goran

University of Minho, Portugal

Radovanović Miroslav

University of Nis

Reddy Sohail R

Naval Postgraduate School, USA

Sedmak Aleksandar

University of Belgrade

Solazzi Luigi

University of Brescia, Italy

Soutis Constantinos

The University of Manchester, Manchester, UK

Stamenović Dimitrije

Boston University, Boston, USA

Vukelic Sinisa

Columbia University, New York, USA

Technical Editor:

Sedmak Simon

University of Belgrade

Published by:

University of Belgrade

Faculty of Mechanical Engineering

The journal is covered in the Emerging Sources Citation Index (ESCI) Clarivate Analytics services.

Volume 49, No 3, 2021, pp. 519 – 768

CONTENTS

	PAGE
Edward E. Osakue, Lucky Anetor, Kendall Harris	519
<i>Contact Stress in Helical Bevel Gears</i>	
Velibor Marinković	534
<i>Some Applications of a Novel Desirability Function in Simultaneous Optimization of Multiple Responses</i>	
Masih Hanifi, Hicham Chibane, Rémy Houssin, Denis Cavallucci, Hicham Chibane	549
<i>IPG as a New Method to Improve the Agility of the Initial Analysis of the Inventive Design</i>	
Paweł Karolczak	563
<i>Application of Discrete Wavelet Transform to Analysis of Cutting Forces in Turning of Composites based on Aluminium Alloys Reinforced with Al₂O₃ Fibres</i>	
Rabih Slim, Rémy Houssin, Amadou Coulibaly, Hicham Chibane	575
<i>Lean System Design Framework Based on Lean Functionalities and Criteria Integration in Production Machines Design Phase</i>	
G. Pinto, F.J.G. Silva, A. Baptista, R.D.S.G. Campilho, F. Viana	587
<i>Investigations on the Oxidation of Zn-coated Steel Cables</i>	
N.M.S. Faria, R.D.S.G. Campilho, F.J.G. Silva, L.P. Ferreira	598
<i>Concept and Design of Automated Moving Device for Healthcare Equipment</i>	
Cs. Papp, R. Kuti	608
<i>Identification of Engine Damages of Vintage Vehicles with Tribological Examination</i>	
Azin Nadi, Mehdi Raghebi	615
<i>Finite Element Model of Circularly Curved Timoshenko Beam for In-plane Vibration Analysis</i>	
M. Chernets, A. Kornienko, O. Radko, A. Radionenko	627
<i>Prediction of the Contact Pressures and Resource of Metal-Polymer Linear Cylindrical Plain Bearings</i>	
Rafał Grzejda, Arkadiusz Parus	634
<i>Health Assessment of a Multi-Bolted Connection due to Removing Selected Bolts</i>	
Umar T. Salman, Shafiqur Rehman, Basit Alawode, Luai M. Alhems	643
<i>Short Term Prediction of Wind Speed Based on Long-Short Term Memory Networks</i>	
Deepak Gupta, Vikas Kumar, Ishan Ayus, M. Vasudevan, N. Natarajan	653
<i>Short-Term Prediction of Wind Power Density Using Convolutional LSTM Network</i>	
Sarah Ali Al-shammari, AbdulHassan A. Karamallah, Sattar Aljabair	664
<i>Optimization of Tilt Angle and Experimental Study of Standalone PV System for Clean Energy Home Supply in Baghdad</i>	

(Contents continued on inside back cover)

The publication of the Vol. 49, No 3 of this Journal was fully financially supported by the Ministry of Education and Science of the Republic of Serbia. This support is gratefully acknowledged.

Printed by:
"PLANETA print", Ruzveltova 10, 11000 Belgrade

Aims and Scope:

The journal FME Transactions publishes original papers (reviewing and contributed papers, and short communications) from all fields of Mechanical Engineering, which is, as a branch of Engineering, considered in the journal in its broadest possible sense. Thus, the articles are welcome from: Applied Mechanics, Fluids Engineering, Thermodynamics, Heat and Mass Transfer, Robotics, Material Science, Tribology, Combustion, Mechanical Design and Machine Dynamics, Production, Industrial, Agricultural, Aerospace, Processing, Railway, Biomedical and Control Engineering, Mechanization, Hydro- and Thermo-power Systems, Internal Combustion Engines and Vehicle Dynamics, Energy Resources Technology, Military Technology, Naval Architecture, and Applied and Industrial Mathematics.

Theoretical, experimental and computational analyses of various problems of Mechanical Engineering are equally welcome and acceptable for publication. In addition, there will be published book reviews, announcements of symposia, and in special issues, proceedings of selected papers from symposia organized by the Faculty of Mechanical Engineering in Belgrade.

Reviewing papers will be published by invitation only. One volume consists of four numbers.

Instructions for Authors:

A FME Transaction manuscript should be written clearly and concisely in correct English, with assumptions clearly identified, with precise logic, with relevance to practice described, and with actual accomplishments of the work plainly stated and honestly appraised.

Normally, the length of a reviewing paper is up to 12 pages, the length of a contributed paper is up to 8 pages, while the length of a short communication should not exceed 4 pages. All papers are subject to a reviewing process. During the process the names of referees will be kept confidential to authors, and also the names of authors will remain anonymous to referees. As a rule the reviewing process should be accomplished in 2-3 months. Final acceptance of a paper for publication in the Journal is based on the decision of the Editorial Board.

Template for Manuscript:

<https://www.mas.bg.ac.rs/istrazivanje/fme/start>

Submission of Papers:

Papers intended for publication in FME Transactions should be submitted to the Editor, in the electronic form, to the following address:

fme-transactions@mas.bg.ac.rs

or:

Prof. Bosko Rasuo, Editor
brasuo@mas.bg.ac.rs
Faculty of Mechanical Engineering
Kraljice Marije 16,
11120 Belgrade 35
Serbia

On line service:

<http://www.mas.bg.ac.rs/transactions>

ISSN 1451-2092

UDC: 621

Volume 49, No 3, 2021, pp. 519 – 768

CONTENTS CONTINUED

	PAGE
Angela O. Shvets	673
<i>Dynamic Indicators Influencing Design Solution for Modernization of the Freight Rolling Stock</i>	
Saja Mohammed Jawad, Alaa Abdulhady Jaber	684
<i>Rolling Bearing Fault Detection Based on Vibration Signal Analysis and Cumulative Sum Control Chart</i>	
Nikola Vorkapic, Sasa Zivanovic, Zoran Dimic, Branko Kokotovic, Nikola Slavkovic	696
<i>Virtual Horizontal Machining Center LOLA HBG 80 for Program Verification and Monitoring</i>	
Basim A. R. Al-Bakri, Radwan M. Aljuhashy	704
<i>The Aerodynamics of the Wavy Blade Under the Effect of Fluctuated Wind Flow</i>	
Stefan V. Milićević, Ivan A. Blagojević, Slavko R. Muždeka	711
<i>Advanced Rule-based Energy Management for Better Fuel Economy of Hybrid Electric Tracked Vehicle</i>	
Veljko M. Petrović, Vladimir V. Buljak, Aram Cornaggia	719
<i>Skorohod-Olevsky Viscous Sintering Model Sensitivity to Temperature Distribution During the Sintering Process</i>	
Dusan S. Rajic	726
<i>Mathematical - Physical Model of Solving Inventive Problems</i>	
Melicherčik Ján, Kuvik Tomáš, Krilek Jozef, Čabalová Iveta	734
<i>Design of the Crusher for Plastic and Rubber Waste Produced in Automotive Industry</i>	
Rahmane Abdelhafid	740
<i>Modal Damping Ratio of Symmetric Laminate Composite Under the Effect of Attached Mass Using Experimental Design</i>	
V. Shepelev, A. Gritsenko, G. Salimonenko	749
<i>Control of Hydrocarbon Emissions when Changing the Technical Condition of the Exhaust System of Modern Cars</i>	
Kapil Gupta	756
<i>Intelligent Optimization of Wire-EDM parameters for Surface Roughness and Material Removal Rate while Machining WC-Co Composite</i>	
Vladimir A. Kodnyanko, Andrey S. Kurzakov	764
<i>Static Characteristics of a Hydrostatic Thrust Bearing with a Membrane Displacement Compensator</i>	



Clarivate
Analytics
Web of Science™