

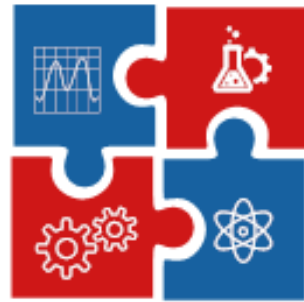
**Innovation Center of  
Faculty of Mechanical  
Engineering**



**Faculty of Mechanical  
Engineering, University  
of Belgrade**



**Center for Business  
Trainings**



**CNN TECH**

**„International Conference of Experimental and  
Numerical Investigations and New Technologies“**

**Sponsored by:**

**MINISTRY OF EDUCATION, SCIENCE AND TECHNICAL DEVELOPMENT  
OF THE REPUBLIC OF SERBIA**

**Programme  
and  
The Book of Abstracts**

**29 June – 02 July 2021**

**Zlatibor, Serbia**

**„International Conference of Experimental and Numerical  
Investigations and New Technologies“**

# **CNN TECH 2021**

**29 June – 02 July 2021**

**Hotel Mona, Miladina Pecinara 26, Zlatibor, Serbia**

<http://cnntechno.com>

# **Programme and The Book of Abstracts**

**Organised by:**

Innovation Center of Faculty of Mechanical Engineering  
Faculty of Mechanical Engineering, University of Belgrade  
Center for Business Trainings

**Sponsored by:**

Ministry of Education, Science and Technical development of the  
Republic of Serbia

<b>Title:</b>	International Conference of Experimental and Numerical Investigations and New Technologies – <b>CNN TECH 2021</b>  <b>PROGRAMME AND THE BOOK OF ABSTRACTS</b>
<b>Publisher:</b>	Innovation Center of Faculty of Mechanical Engineering Kraljice Marije 16, 11120 Belgrade 35 tel: (+381 11) 3302-346, fax 3370364 e-mail: <a href="mailto:cnntechno@gmail.com">cnntechno@gmail.com</a> web site: <a href="http://cnntechno.com">http://cnntechno.com</a> , <a href="http://www.inovacionicentar.rs">http://www.inovacionicentar.rs</a>
<b>Editors:</b>	Dr Goran Mladenovic, Associate Professor Dr Martina Balac, Senior Scientific Researcher Dr Aleksandra Dragicevic, Scientific Researcher
<b>Technical editor</b>	Dr Goran Mladenovic, Associate Professor
<b>Cover page:</b>	Dr Goran Mladenovic, Associate Professor
<b>Printed in:</b>	Innovation Center of Faculty of Mechanical Engineering Kraljice Marije 16 11120 Belgrade 35 tel: (+381 11) 3302-346
<b>Circulation:</b>	100 copies. The end of printing: June 2021.

**ISBN: 978-86-6060-077-8**

---

**Copyright**© 2021 International Conference of Experimental and Numerical Investigations and New Technologies – **CNN TECH 2021**

# “International Conference of Experimental and Numerical Investigations and New Technologies”

## CNN TECH 2021

### SCIENTIFIC COMMITTEE:

---

Milos Milosevic, Serbia (chairman)	Tozan Hakan, Turkey
Nenad Mitrovic, Serbia (co-chairman)	Nikola Momcilovic, Serbia
Aleksandar Sedmak, Serbia	Traussnigg Udo, Austria
Hloch Sergej, Slovakia	Gordana Bakic, Serbia
Drazan Kozak, Croatia	Katarina Colic, Serbia
Nenad Gubelj, Slovenia	Peter Horňak, Slovakia
Monka Peter, Slovakia	Róbert Huňady, Slovakia
Snezana Kirin, Serbia	Martin Hagara, Slovakia
Samardzic Ivan, Croatia	Jovan Tanaskovic, Serbia
Martina Balac, Serbia	Aleksa Milovanovic, Serbia
Mládková Ludmila, Czech Republic	Marija Durkovic, Serbia
Johanyák Zsolt Csaba, Hungary	Tsanka Dikova, Bulgaria
Igor Svetel, Serbia	Ján Danko, Slovakia
Aleksandra Mitrovic, Serbia	Ognjen Pekovic, Serbia
Valentin Birdeanu, Romania	Jelena Svorcan, Serbia
Danilo Nikolic, Montenegro	Suzana Filipovic, Serbia
Goran Mladenovic, Serbia	Darko Kosanovic, Serbia
Bajic Darko, Montenegro	Nebojsa Manic, Serbia
Tasko Manski, Srbija	Zorana Golubovic, Serbia
Luis Reis, Portugal	Vera Pavlovic, Serbia
Zarko Miskovic, Serbia	

### ORGANIZING COMMITTEE:

---

Nenad Mitrovic (chairman)	Dragana Perovic
Milos Milosevic (co-chairman)	Aleksandra Joksimovic
Aleksandar Sedmak	Beti Kostadinovska Dimitrovska
Martina Balac	Tsanka Dikova
Vesna Miletic	Isaak Trajkovic
Igor Svetel	Toni Ivanov
Goran Mladenovic	Snezana Kirin
Aleksandra Mitrovic	Igor Stankovic
Aleksandra Dragicevic	Ivana Vasovic Maksimovic
Zarko Miskovic	Nina Obradovic
Katarina Colic	Andreja Stojic
Milan Travica	Ivana Jevtic



# ACKNOWLEDGEMENT

The organizing committee of the 5<sup>th</sup> International Conference of Experimental and Numerical Investigations and New Technologies – CNN TECH 2021 wishes to sincerely thank all the institutions and individuals who by means of personal engagement and constructive action helped organizing this conference.

We particularly wish to thank our sponsor, **The Ministry of Education, Science and Technological development**, Government of the Republic of Serbia.

We are also grateful to companies, **3D Republic, Shimatzu, Trokutttest, IMW Institute** and **Inter Cert** who have significantly contributed to the organization and realization of the conference.

# PREFACE

Dear Friends and Colleagues, Welcome to CNN Tech 2021 Conference and the fabulous mountain of Zlatibor!

With 90 papers (17 by international authors) and contributions by authors from 12 different countries, International Conference of Experimental and Numerical Investigations and New Technologies CNN Tech 2021 successfully sets the high level for the future conferences. Participation of a large number of domestic and international authors, as well as the diversity of topics, justifies our efforts to organize this conference and contribute to exchange of knowledge, research results and experience of industry experts, research institutions and faculties which all share a common interest in the field in experimental and numerical investigations.

This year CNN Tech 2021 focuses on the following topics:

- Mechanical Engineering,
- Engineering Materials,
- Chemical and Process Engineering,
- Experimental Techniques,
- Numerical Methods,
- New Technologies,
- Clear sky,
- Sustainable Design and New Technologies,
- Advanced Materials and Technology,
- Artificial intelligence and
- Student session.

Apart from a plenty of interesting lectures, the participants will have a chance to lighten up and communicate in friendly and relaxed settings.

Organizing committee of CNN Tech 2021 would like to express gratitude to Ministry of Education, Science and Technological development for financial support of the Conference.

On behalf of the Innovation center of Faculty of Mechanical Engineering, Faculty of Mechanical Engineering and Center for Business Trainings, we wish this to be splendid CNN Tech conference filled with many memorable moments.

PROGRAMME AND ORGANIZING COMMITTEE

# CONTENTS

<b>PROGRAMME</b> .....	<b>i</b>
<b>ABSTRACTS</b> .....	<b>1</b>
<b>Mechanical Engineering</b> .....	<b>2</b>
<i>Emil Veg</i> <b>VIBRATION MONITORING, ANALYSIS AND DAMPING AT THE HYDRO POWER PLANT ....</b>	<b>3</b>
<i>Zarko Miskovic, Radivoje Mitrovic, Milos Milosevic, Goran Petrovic, Goran Mladenovic, Isaak Trajkovic, Dejan Markovic</i> <b>DESIGN AND RAPID PROTOTYPING OF MEDICAL DEVICES – CASE STUDY: MECHANICAL VENTILATOR.....</b>	<b>4</b>
<i>Marko Ristic, Ljiljana Radovanovic, Jasmina Perisic, Ivana Vasovic, Goran Otic</i> <b>AFFECT ON FORECASTING RELIABILITY SAFETY ENGINE IN MEDICAL INSTITUTIONS..</b>	<b>5</b>
<i>Ivan M. Buzurovic, Dragutin Lj. Debeljkovic, Aleksandra M. Jovanovic</i> <b>A NATURAL REGULARIZATION OF LINEARDISCRETE DESCRIPTOR TIME DELAY SYSTEMS.....</b>	<b>6</b>
<i>Ivan M. Buzurovic, Dragutin Lj. Debeljkovic, Aleksandra M. Jovanovic</i> <b>A NATURAL REGULARIZATION OF LINEARCONTINUOUS SINGULAR TIME DELAY SYSTEMS.....</b>	<b>7</b>
<i>Bojan Cudic, Matjaz Klemencic, Milos Milosevic</i> <b>START-UP COMMUNITY AND THE ACCELERATION SERVICES IN THE DANUBE MACRO-REGION: CASES OF AUSTRIA, BOSNIA AND HERZEGOVINA, HUNGARY AND SLOVENIA.....</b>	<b>8</b>
<i>Jelena Sakovic Jovanovic, Aleksandar Vujovic</i> <b>PERFORMANCE MANAGEMENT AND LEAN MANUFACTURING IN ORDER TO ENSURE SUSTAINABLE DEVELOPMENT OF THE ORGANIZATION.....</b>	<b>9</b>
<i>Milos D. Pjevic, Mihajlo D. Popovic, Goran M. Mladenovic, Ljubodrag M. Tanovic, Radovan M. Puzovic</i> <b>APPLICABILITY OF RAPID TOOLING IN INJECTION MOLDING APPLICATION.....</b>	<b>10</b>
<i>Ana Radulovic</i> <b>TRENDS IN THE DEVELOPMENT OF LOGISTICS .....</b>	<b>11</b>
<i>Goran Vasilic, Sasa Zivanovic, Branko Kokotovic, Zoran Dimic, Milan Milutinovic</i> <b>CONFIGURING A CLASS OF MACHINES BASED ON RECONFIGURABLE 2DOF PLANAR PARALLEL MECHANISM.....</b>	<b>12</b>

<b>Engineering Materials</b> .....	<b>13</b>
<i>Miljana Mirkovic, Suzana Filipovic, Pavle Maskovic, Vladimir Pavlovic</i>	
<b>PHASE MORPHOLOGICAL AND ANTIMICROBIAL PROPERTIES OF HAP-TIO<sub>2</sub> NANOMATERIALS OBTAINED BY DIFFERENT SYNTHESIS ROUTE</b> .....	<b>14</b>
<i>Ivana Jevtic, Aleksa Milovanovic, Isaak Trajkovic, Milan Travica, Aleksandar Sedmak, Aleksandar Grbovic, Filippo Berto</i>	
<b>INFLUENCE OF PRINTING PARAMETERS ON DIMENSIONAL STABILITY OF SENB SPECIMENS MADE FROM PLA AND PLA-X MATERIALS</b> .....	<b>15</b>
<i>Aleksandra Jelic, Milan Travica, Vukasin Ugrinovic, Aleksandra Bozic, Marina Stamenovic, Dominik Brkic, Slavisa Putic</i>	
<b>INVESTIGATION OF TENSILE PROPERTIES OF CARBON/EPOXY SANDWICH PANELS WITH DIFFERENT FIBER ORIENTATION USING DIGITAL IMAGE CORRELATION</b> .....	<b>16</b>
<i>Milos Milosevic, Ivana Jevtic, Isaak Trajkovic, Zarko Miskovic, Tihomir Cuzovic, Aleksa Milovanovic, Milan Travica</i>	
<b>SURFACE PROPERTIES ANALYSIS OF METALLIC ADDITIVE MANUFACTURING MATERIALS</b> .....	<b>17</b>
<i>Isaak Trajkovic, Aleksa Milovanovic, Ivana Jevtic, Milan Travica, Liviu Marsavina, Bojan Medjo, Lubos Nahlik</i>	
<b>MONITORING OF FRACTURE MECHANICS PARAMETERS ON SINGLE ENDGE NOTCHED TENSION SPECIMENS MADE OF PLA MATERIAL</b> .....	<b>18</b>
<i>Vladimir Pejakovic</i>	
<b>TRIBOLOGICAL BEHAVIOR OF SULFATE BASED IONIC LIQUIDS AS LUBRICANT ADDITIVES – REVIEW</b> .....	<b>19</b>
<i>Emina Dzindo</i>	
<b>CRACKS IN WELDED JOINTS</b> .....	<b>20</b>
<i>Joksimovic Aleksandra, Dusko Radakovic</i>	
<b>APPLICATION OF GENERATIVE DESIGN ON THE BRACKET MODEL</b> .....	<b>21</b>
<b>Chemical and Process Engineering</b> .....	<b>22</b>
<i>Jelena Vujancevic, Jovana Cirkovic, Endre Horváth, László Forró, Vladimir Pavlovic, Dorde Janackovic</i>	
<b>INFLUENCE OF ANODIZATION VOLTAGE ON PHOTOCATALYTIC ACTIVITY OF TIO<sub>2</sub> NANOTUBES</b> .....	<b>23</b>
<i>Nada V. Ratkovic Kovacevic, Djordje N. Dihovicni, Slavica B. Cabrilo, Visnja M. Sikimic, Aleksandra D. Mitrovic</i>	
<b>THE SMART PACKAGING AND APPLICATIONS IN INDUSTRIAL FOOD PROCESSING</b> ...	<b>24</b>



<i>Dragoljub R. Bovan, Zoran B. Ciric, Nada V. Ratkovic Kovacevic, Djordje N. Dihovicni, Dragan D. Kreculj</i>	
<b>AUTOMATION OF THE BAG FILTER CLEANING IN INDUSTRIAL AIR PURIFICATION SYSTEM .....</b>	<b>25</b>
<i>Aleksandra Mitrovic, Andrej Goranovic, Zorana Golubovic,</i>	
<b>SOLDERING TECHNOLOGY OF INSTALLATION PIPES IN THE MANUFACTURING PROCESS OF VRV SYSTEMS.....</b>	<b>26</b>
<b>Experimental Techniques.....</b>	<b>27</b>
<i>Katarina Maksimovic</i>	
<b>DAMAGE TOLERANCE ANALYSIS OF AIRCRAFT STRUCTURAL ELEMENTS .....</b>	<b>28</b>
<i>Katarina Maksimovic, Mirko Maksimovic, Ivana Vasovic Maksimovic, Dragi Stamenkovic, Stevan Maksimovic</i>	
<b>CFD LOAD AND STRENGTH ANALYSIS OF TACTICAL UNMANNED AERIAL VEHICLE MADE FROM COMPOSITE MATERIALS .....</b>	<b>29</b>
<i>Milena N. Rajic, Dragoljub Zivkovic, Milan S. Banic, Marko Mancic, Nenad Mitrovic, Milos Milosevic</i>	
<b>EXPERIMENTAL AND NUMERICAL ANALYSIS OF HOT WATER BOILER IN START UP REGIME .....</b>	<b>30</b>
<i>Andrijana A. Durdevic, Dorde D. Durdevic</i>	
<b>STRUCTURAL ELEMENTS WITH GEOMETRIC DISCONTINUITIES-NUMERICAL AND EXPERIMENTAL DETERMINATION OF STRESS AND STRAIN STATE.....</b>	<b>31</b>
<i>Marija N. Vuksic Popovic, Jovan D. Tanaskovic, Dejan B. Momcilovic , Vojkan J. Lucanin</i>	
<b>EXPERIMENTAL RESEARCH OF MECHANICAL CHARACTERISTICS OF RAILWAY VEHICLES SAFETY COUPLING COMPONENTS .....</b>	<b>32</b>
<i>Katarina Colic</i>	
<b>THE INFLUENCING FACTORS ON THE INTEGRITY OF ORTHOPAEDIC IMPLANTS.....</b>	<b>33</b>
<i>Aleksandra Lj. Dragicevic, Lidija R. Matija, Zoran V. Krivokapic, Boris B. Kosic, Djuro Lj. Koruga</i>	
<b>POSSIBLE SOLUTION OF IMPLEMENTATION OF THE OMIS METHOD IN EXISTING COLONOSCOPE FOR IN VIVO CANCER SCREENING.....</b>	<b>34</b>
<i>Marko Mancic, Dragoljub Zivkovic, Milena Rajic, Milena Mancic, Milan Dordevic</i>	
<b>MODELING AND TECHNO-ECONOMIC OPTIMIZATION OF A COGENERATION PLANT FOR COMBUSTION OF BIOGAS.....</b>	<b>35</b>
<i>Dragana Barjaktarevic, Bojan Medo, Veljko Dokic, Marko Rakin</i>	
<b>MICROSTRUCTURE AND MECHANICAL PROPERTIES OF ANODIZED SURFACE OF ULTRAFINE-GRAINED Ti-13Nb-13Zr ALLOY FOR BIOMEDICAL APPLICATION.....</b>	<b>35</b>

<b>Numerical Methods.....</b>	<b>37</b>
<i>Igor Dzincic</i>	
<b>A FINITE ELEMENT MODEL OF MORTISE AND TENON JOINT .....</b>	<b>38</b>
<i>Mirjana Perisic, Andreja Stojic, Gordana Jovanovic, Andrej Sostaric, Dimitrije Maletic, Dusan Vudragovic, Svetlana Stanisic</i>	
<b>THE POTENTIAL FOR FORECASTING THE PARTICULATE MATTER LEVELS IN COMPLEX URBAN ENVIRONMENT.....</b>	<b>39</b>
<i>Andreja Stojic, Gordana Jovanovic, Svetlana Stanisic, Andrej Sostaric, Ana Vranic, Marija Mitrovic Dankulov, Mirjana Perisic</i>	
<b>THE IMPACT OF HUMIDITY AND TEMPERATURE ON PARTICULATE MATTER ENVIRONMENTAL FATE .....</b>	<b>40</b>
<i>Svetlana Stanisic, Mirjana Perisic, Andreja Stojic, Andrej Sostaric, Dusan Vudragovic, Dimitrije Maletic, Gordana Jovanovic</i>	
<b>THE IMPACT OF GASEOUS POLLUTANTS ON PARTICULATE MATTER DISTRIBUTION .</b>	<b>41</b>
<i>Nikola Stupar, Ana Vranic, Andreja Stojic, Gordana Vukovic, Dusan Vudragovic, Dimitrije Maletic, Marija Mitrovic Dankulov</i>	
<b>SPATIO-TEMPORAL ANALYSIS OF MOBILITY PATTERNS IN THE CITY OF BELGRADE .</b>	<b>42</b>
<i>Gordana Jovanovic, Svetlana Stanisic, Mirjana Perisic, Andrej Sostaric, Marija Mitrovic Dankulov, Ana Vranic, Andreja Stojic</i>	
<b>ENVIRONMENTAL FACTORS GOVERNING PARTICULATE MATTER DISTRIBUTION IN AN URBAN ENVIRONMENT .....</b>	<b>43</b>
<i>Martina Balac, Aleksandar Grbovic</i>	
<b>FE ANALYSIS OF THE SUPPORT ASSEMBLY OF THE PORT BAY BRIDGE .....</b>	<b>44</b>
<i>Aleksandar Milovanovic, Aleksandar Sedmak, Ljubica Dikovic, Ljiljana Trumbulovic</i>	
<b>FINITE ELEMENT AND FRACTURE MECHANICS ANALYSIS OF A CRACKED PRESSURE VESSEL.....</b>	<b>45</b>
<i>Nikola Lj. Zivkovic, Jelena Z. Vidakovic, Mihailo P. Lazarevic</i>	
<b>HYBRID PSO-NEWTON-RAPHSON ALGORITHM FOR INVERSE KINEMATICS PROBLEM IN ROBOTICS.....</b>	<b>46</b>
<i>Aleksandra S. Kostic, Jovan D. Tanaskovic</i>	
<b>DEVELOPMENT AND STRENGTH ANALYSIS OF THE SUB-ASSEMBLY IMPLEMENTED IN THE BEARING STRUCTURE OF THE "AVENIO" TRAM .....</b>	<b>47</b>
<i>Nikola Mirkov, Seif Eddine Ouyahia, Sara Lahlou, Milada Pezo, Rastko Jovanovic</i>	
<b>VALIDATION OF AN OPEN-SOURCE FINITE-VOLUME METHOD SOLVER FOR VISCOPLASTIC FLOWS .....</b>	<b>48</b>

<b>New Technologies .....</b>	<b>49</b>
<i>Goran Mladenovic</i>	
<b>DEVELOPMENT OF AN OUT OF VACUUM SOLUTION FOR PARTICLE DETECTOR ELECTRONICS USING COMMERCIAL CAD SOFTWARE .....</b>	<b>50</b>
<i>Mihajlo Milovanovic, Petar Pejic, Jelena Pejic</i>	
<b>SENSOR DETECTION OF HONEYCOMB CONTENT .....</b>	<b>51</b>
<i>Andjelija Djordjevic, Marko Mihic</i>	
<b>STRATEGIC IMPORTANCE OF SERBIAN HIGH-TECH BUSINESS INCUBATORS .....</b>	<b>52</b>
<i>Aleksandar J. Vujovic, Jelena D. Sakovic Jovanovic</i>	
<b>APPLICATION OF 3D TECHNOLOGIES IN THE FUNCTION OF PROTECTION OF CULTURAL HERITAGE OF MONTENEGRO .....</b>	<b>53</b>
<i>Goran M. Mladenovic, Ljubodrag M. Tanovic, Radovan M. Puzovic, Milos D. Pjevic, Mihajlo D. Popovic, Ivana Jevtic</i>	
<b>ROUGH MILLING WITH END MILL CUTTER IN APPLICATION FOR FREE FORM SURFACES MACHINING .....</b>	<b>54</b>
<i>Predrag Maksic, Jelena Drobac</i>	
<b>APPLICATION AND CHARACTER OF DESIGN FOR RECYCLING (DFR): CHALLENGES AND OPPORTUNITIES .....</b>	<b>55</b>
<i>Ivana Jevtic, Goran Mladenovic, Milos Milosevic, Isaak Trajkovic, Milan Travica, Aleksa Milovanovic</i>	
<b>ANALYSIS OF THE MATERIALS USABILITY IN ADDITIVE PRODUCTION TECHNOLOGIES.....</b>	<b>56</b>
<i>Ivana Jevtic, Goran Mladenovic, Milos Milosevic, Isaak Trajkovic, Milan Travica, Aleksa Milovanovic, Viktor Stojmanovski</i>	
<b>ADDITIVE TECHNOLOGY DESIGN FOR 3D PRINTING AND APPLICATION TO FAST PRODUCT DEVELOPMENT.....</b>	<b>57</b>
<i>Radivoje M. Mitrovic, Aleksandar S. Sedmak, Nenad D. Zrnic, Mirjana Lj. Kijevcanin, Petar S. Uskokovic, Aleksandar M. Milivojevic, Zarko Z. Miskovic</i>	
<b>INTRODUCTION OF WORK INTEGRATED LEARNING (WIL) IN UNIVERSITY EDUCATION IN SERBIA .....</b>	<b>58</b>
<b>Clear sky.....</b>	<b>59</b>
<i>Ivan M. Lazovic</i>	
<b>INFLUENCE OF THE URBAN HEAT ISLAND ON INCREASED ENERGY USE FOR COOLING OF BUILDINGS .....</b>	<b>60</b>
<i>Marija Baltic, Toni Ivanov, Milos Vorkapic</i>	
<b>COMPARATIVE ANALYSIS OF CONVENTIONAL DIESEL AND ELECTRIC BUS CHARACTERISTICS - TECHNICAL AND ENVIRONMENTAL ASPECTS.....</b>	<b>61</b>

<i>Ivana O. Mladenovic, Marija Z. Baltic, Milos D. Vorkapic</i> <b>CHARACTERIZATION AND ANALYSIS ADHESION OF COPPER COATINGS ELECTRODEPOSITED ON FLEXIBLE SUBSTRATES .....</b>	<b>62</b>
<i>Jelena Svorcan, Aleksandar Kovacevic, Mohammad Sakib Hasan</i> <b>STRUCTURAL ANALYSIS OF SMALL-SCALE COMPOSITE PROPELLER BLADE .....</b>	<b>63</b>
<i>Dragoljub Tanovic, Aleksandar Simonovic, Ognjen Pekovic</i> <b>NUMERICAL SIMULATION OF AIRFOILS FOR AIRBORNE WIND TURBINE .....</b>	<b>64</b>
<i>Aleksandar Kovacevic, Jelena Svorcan, Toni Ivanov</i> <b>PRODUCTION PROCESS OF COMPOSITE PROPELLER FOR MULTIROTOR UAV .....</b>	<b>65</b>
<i>Mohammad Sakib Hasan, Toni Ivanov, Milos Vorkapic</i> <b>IMPROVEMENT OF MECHANICAL CHARACTERISTICS OF PLA BY APPLYING RE MELTING PROCESS.....</b>	<b>66</b>
<i>Milica M. Ivanovic, Dragoljub Lj. Tanovic, Aleksandar M. Kovacevic</i> <b>COMPARATIVE ANALYSIS OF THE THREE SYSTEMS WITH CARBON-DIOXIDE AS A WORKING FLUID FOR INDUSTRIAL REFRIGERATION .....</b>	<b>67</b>
<i>Zorana Trivkovic, Jelena Svorcan, Marija Baltic, Nemanja Zoric, Ognjen Pekovic</i> <b>DESIGN OF SMALL-SCALE COMPOSITE VERTICAL-AXIS WIND TURBINE BLADE .....</b>	<b>68</b>
<i>Toni D. Ivanov, Aleksandar M. Kovacevic, Aleksandar M. Simonovic</i> <b>DESIGN AND ANALYSIS OF OPTIMAL BLDC MOTOR PROPELLER.....</b>	<b>69</b>
<i>Miroslav M Jovanovic, Nebojsa N Lukic and Aleksandar M Simonovic</i> <b>A STUDY ON HIGH VIBRATION BEHAVIORS OF VIPER MK. 22-8 JET ENGINE .....</b>	<b>70</b>
<i>Mladen Furtula, Gradimir Danon, Marija Durkovic, Srdan Svrzic</i> <b>THE WOOD PELLET PRODUCTION IN SERBIA – POSSIBILITY TO IMPROVE ENERGY CONSUMPTION AND GHG EMISSIONS .....</b>	<b>71</b>
<b>Sustainable Design and New Technologies.....</b>	<b>72</b>
<i>Zarko Z. Miskovic</i> <b>DEVELOPMENT AND DESIGN OF THE NEW MECHANICAL VENTILATOR.....</b>	<b>73</b>
<i>Rade V. Pejovic, Ana Z. Cvijanovic</i> <b>RECYCLING AND UPCYCLING IN DESIGN.....</b>	<b>74</b>
<i>Jelena Drobac, Predrag Maksic</i> <b>EXPANDABLE AND ADAPTABLE TEXTILES FOR NEW AGE .....</b>	<b>75</b>
<i>Dragana D. Gardasevic</i> <b>STABILITY ANALYSIS OF VIBRATIONS IN POWER PLANT SYSTEM .....</b>	<b>76</b>

<b>Advanced Materials and Technology .....</b>	<b>77</b>
<i>Aleksandra Sknepnek, Suzana Filipovic, Pavle Maskovic, Miljana Mirkovic, Dunja Miletic, Miomir Niksic, Vladimir B. Pavlovic</i>	
<b>EFFECTS OF SYNTHESIS PARAMETERS ON STRUCTURE AND PROPERTIES OF THE CERAMIC/POLYMER FILMS BASED ON BACTERIAL CELLULOSE .....</b>	<b>78</b>
<i>V. Buljak, V. Petrovic</i>	
<b>CONSTITUTIVE MODELING AND CHARACTERIZATION OF CERAMIC MATERIALS .....</b>	<b>79</b>
<i>J. Zivojinovic, V. A. Blagojevic, V. P. Pavlovic, D. Kosanovic, N. Tadic, V. B. Pavlovic</i>	
<b>THE INFLUENCE OF MECHANICAL ACTIVATION ON MICROSTRUCTURE AND DIELECTRIC PROPERTIES OF SRTIO<sub>3</sub> CERAMICS.....</b>	<b>80</b>
<i>Ana Stankovic, Suzana Filipovic, Ivana Stojkovic Simatovic, Sreco Davor Skapin, Lidija Mancic, Smilja Markovic</i>	
<b>BT/ZNO COMPOSITE MATERIALS WITH IMPROVED FUNCTIONAL PROPERTIES.....</b>	<b>81</b>
<i>N. Obradovic, A. Peles<sup>1</sup>, J. Petrovic, D. Olcan, W. G. Fahrenholtz, A. Djordjevic, V. B. Pavlovic</i>	
<b>MEASUREMENT OF DIELECTRIC PERMITTIVITY USING COAXIAL CHAMBERS AND ELECTROMAGNETIC-MODELING SOFTWARE .....</b>	<b>82</b>
<i>N. Obradovic, S. Filipovic, N. Gilli, L. Silvestroni</i>	
<b>PREPARATION AND CHARACTERIZATION OF ZRB<sub>2</sub>-TIB<sub>2</sub> BASED COMPOSITES FOR HYPERSONIC SYSTEMS.....</b>	<b>83</b>
<i>Zorana Golubovic, Aleksandra Mitrovic, Aleksa Milovanovic</i>	
<b>FDM PRINTING TECHNOLOGY APPLICATIONS IN DENTISTRY .....</b>	<b>84</b>
<b>Artificial Intelligence .....</b>	<b>85</b>
<i>Milica Markovic, Novak Radivojevic, Miona Andrejevic Stosovic, Jelena Markovic Brankovic, Srdjan Zivkovic</i>	
<b>MODELING OF DAM STRUCTURAL RESPONSE USING ARTIFICIAL NEURAL NETWORKS .....</b>	<b>86</b>
<i>Djordje Dihovicni, Nada Ratkovic Kovacevic, Zoran Lalic, Dragan Kreculj</i>	
<b>DECISION MAKING STRATEGIES FOR VEHICLE TRACKING SYSTEM .....</b>	<b>87</b>
<i>Petar D. Jakoljjevic, Nemanja I. Mor, Vesna M. Mihajlovic</i>	
<b>ROBOTIC WELDING .....</b>	<b>88</b>

<b>Student session .....</b>	<b>89</b>
<i>Tijana D. Lukic</i>	
<b>POSSIBILITIES AND APPLICATIONS OF SLA AND FDM PRINTING - ADVANTAGES AND DISADVANTAGES.....</b>	<b>90</b>
<i>Jovana Lazovic</i>	
<b>ATOS CORE 200 AND GEOMAGIC CAPTURE 3D SCANNERS-ADVANTAGES AND DISADVANTAGES .....</b>	<b>91</b>
<i>A. Dubonjac, M. Lazarevic, J. Vidakovic</i>	
<b>IMPACT OF TRAJECTORY CONSTRAINS ON BEAIRCRAFT AND COILC CONVERGENCE RATES.....</b>	<b>92</b>
<i>Djordje V. Trampa, Bozidar S. Simovic, Diana P. Sekulic, Aleksa G. Galic, Nikola D. Stojiljkovic, Toni D. Ivanov</i>	
<b>DESIGN OF ROCKET WITH SLOSHING PAYLOAD CAPABLE OF CRUISE FLIGHT .....</b>	<b>93</b>
<i>Bozidar S. Simovic, Djordje V. Trampa, Diana P. Sekulic, Aleksa G. Galic, Nikola D. Stojiljkovic, Toni D. Ivanov</i>	
<b>IMPACT OF SLOSHING ON AERIAL VEHICLE DYNAMICS.....</b>	<b>94</b>
<i>Milan Z. Rakic, Djordje V. Trampa, Dusan J. Lazic, Marko S. Skakun, Aleksa P. Stefanovic, Nikola D. Stojiljkovic, Toni D. Ivanov</i>	
<b>DESIGN OF MIDDLE ALTITUDE SOLID FUEL ROCKET.....</b>	<b>95</b>
<i>Dusan J. Lazic, Djordje V. Trampa, Milan Z. Rakic, Nikola B. Zlatkovic, Aleksa P. Stefanovic, Nikola D. Stojiljkovic, Toni D. Ivanov</i>	
<b>AERODYNAMIC DESIGN OF A MIDDLE ALTITUDE SOLID FUEL ROCKET.....</b>	<b>96</b>
<i>I. Mikavica, T. Sostaric<sup>1</sup>, A. Antanaskovic, D. Randelovic, J. Petrovic, G. Jovanovic, Z. Lopicic</i>	
<b>LEAD SORPTION FROM WASTEWATERS BY INVASIVE ACER NEGUNDO L. BIOMASS..</b>	<b>97</b>
<i>Jovana Bosnjakovic, Dragan Pavlovic, Ivana Vasovic Maksimovic</i>	
<b>POTENTIAL APPLICATIONS OF NANOMATERIALS IN THE AVIATION INDUSTRY: A REVIEW .....</b>	<b>98</b>
<i>Katarina Pantovic Spajic, Branislav Markovic, Miroslav Sokic, Gvozden Jovanovic, Ksenija Stojanovic</i>	
<b>A REVIEW OF COAL DEMINERALIZATION AND DESULPHURIZATION BY CHEMICAL LEACHING .....</b>	<b>99</b>
<i>Anja V. Antanaskovic, Zorica R. Lopicic, Vladimir M. Adamovic, Tatjana D. Sostaric, Marica B. Rakin, Marko P. Rakin, Danijela D. Smiljanic</i>	
<b>ASSESSMENT OF SORPTION CAPABILITY OF ALGINATE IMMOBILIZED PEACH STONE PARTICLES FOR LEAD REMOVAL FROM WATER.....</b>	<b>100</b>

*M. Novkovic*

**CONSTRUCTIONAL ASPECTS OF BUCKET WHEEL EXCAVATOR BREAKDOWN ..... 101**

*Kostic Bogdan*

**THE BEHAVIOR OF ARMORED STEEL UNDER IMPACT LOAD..... 102**

## A REVIEW OF COAL DEMINERALIZATION AND DESULPHURIZATION BY CHEMICAL LEACHING

Katarina Pantovic Spajic<sup>1\*</sup>, Branislav Markovic<sup>1</sup>, Miroslav Sokic<sup>1</sup>, Gvozden Jovanovic<sup>1</sup>,  
Ksenija Stojanovic<sup>2</sup>

<sup>1</sup> Institute for Technology of Nuclear and Other Mineral Raw Materials, Franchet d' Esperey 86,  
11000 Belgrade, Serbia

<sup>2</sup> University of Belgrade, Faculty of Chemistry, Studentski trg 12-16, 11000 Belgrade, Serbia

\*Corresponding author e-mail: [k.pantovic@itnms.ac.rs](mailto:k.pantovic@itnms.ac.rs)

### Abstract

*Coal is a well-known fossil fuel. It was used as a non-renewable energy source for several centuries. Nowadays it is mainly used for electricity generation in power plants or heat generation for industrial and home utilization. There are many types of coal that differ in composition and calorific value, as well as in the amounts of undesired hazard substances produced by combustion. Depending on the coal composition, environmental impact can be reduced by its treatment before combustion. One of the cheap and effective methods is the chemical leaching of coal that reduces sulfur content and the amount of mineral matter (ash). Lowering the ash amount increases the calorific value of coal, reduces its transportation cost, and reduces the negative environmental impact of toxic elements, which are usually present in ash. Another benefit of coal leaching, that results from lowering the sulfur content is reduced emission of toxic gases (SO<sub>2</sub> and SO<sub>3</sub>) during combustion. In order to determine the optimal leaching conditions for the treatment of different types of coal, numerous studies have been done, investigating various chemical reagents, including inorganic and organic acids, alkalis, oxidative reagents, and their combinations [1, 2]. The key parameters that effect leaching efficiency are type and concentration of reagent, reaction temperature, the mass ratio between coal and leaching reagent, coal particle size, and reaction time. The degree of leaching efficiency is measured by the level of demineralization and desulphurization [3].*

*The current review summarises recent results and further plans for the development of an efficient and environmentally friendly method for the chemical leaching of Serbian sub-bituminous coal.*

### Keywords

Subbituminous coal, chemical leaching, demineralization, desulphurization.

### Acknowledgement

The authors are grateful to the Ministry of Education, Science and Technological Development of the Republic of Serbia (Contract number: 451-03-9/2021-14/200023 and Contract number: 451-03-9/2021-14/200168) for the financial support of this investigation.



**CIP - Каталогизација у публикацији**

Народна библиотека Србије, Београд

621(048)(0.034.2)

62:519.6(048)(0.034.2)

**INTERNATIONAL Conference of Experimental and Numerical Investigations and New Technologies (2021 ; Zlatibor)**

Programme [Elektronski izvor] ; and The Book of Abstracts / International Conference of Experimental and Numerical Investigations and New Technologies - CNN TECH 2021, 29 June - 02 July 2021, Zlatibor, Serbia ; organized by Innovation Center of Faculty of Mechanical Engineering [and] Faculty of Mechanical Engineering, University of Belgrade, Center for Business Trainings ; [editors Goran Mladenovic, Martina Balac, Aleksandra Dragicevic]. - Belgrade : Innovation Center of Faculty of Mechanical Engineering, 2021 (Belgrade : Innovation Center of Faculty of Mechanical Engineering). - 1 elektronski optički disk (CD-ROM) ; 12 cm

Sistemski zahtevi: Nisu navedeni. - Nasl. sa naslovne strane dokumenta. - Tiraž 100

ISBN 978-86-6060-077-8

1. Mašinski fakultet. Inovacioni centar (Beograd)

a) Машинство - Апстракти b) Техника - Нумерички методи - Апстракти

COBISS.SR-ID 41811977