



YOURS 2019

ABSTRACT PROCEEDINGS

YOUNg ResearcherS Conference 2019

26 - 27 March 2019

Ministry of Education, Science and Technological Development

Editorial Board of Journal of Applied Engineering Science

Belgrade Fair

YOURS 2019

YOUNg ResearcherS Conference 2019

26 – 27 March 2019 – Belgrade Fair

This year's conference topics are related to technologies, materials, production processes, organizational aspects, information technologies and engineering software, standards and regulations, tests and measurements, maintenance and reliability, costs and other economic aspects, fuels and lubricants, ecology and energy efficiency, within three fields:

**VEHICLES AND OTHER MEANS OF TRANSPORTATION, LOGISTICS AND
TRANSPORT, MILITARY INDUSTRY.**

YOURS 2019 highlights the presentation of new trends, advances and research in all mentioned areas bringing together prosperous researchers with leading professionals, academicians, universities, industry experts from around the region. The International Conference **YOURS 2019** is dedicated towards supporting young researchers and their results in its broadest sense and promotes innovative practices that advance academic achievements.

CONFERENCE ORGANIZERS

Ministry of Education, Science and Technological Development

Editorial Board of Journal of Applied Engineering Science

Belgrade Fair

CONFERENCE SPONZORS

Thermal Science

Lola Institute

PCC Cert Balkan

President of Program Committee:

Prof. dr Vladimir Popović, State secretary for science of the Ministry of education, science and technological development of Serbia, and full professor at the Faculty of Mechanical engineering, University of Belgrade

Members of Program Committee:

Prof. dr Radivoje Mitrović, Dean of the Faculty of Mechanical engineering, Belgrade, SRB
Prof. dr Petar Uskoković, Dean of the Faculty of Technology and Metallurgy, Belgrade, SRB
Prof. dr Nebojša Bojović,
Dean of the Faculty of Transport and traffic engineering, Belgrade, SRB
Prof. dr Milo Tomašević, Dean of the School of Electrical Engineering, Belgrade, SRB
Prof. dr Aleksandar Milašinović, Faculty of Mechanical engineering, Banja Luka, BiH
Prof. dr Aleksandar Sedmak,
Innovation Center, Faculty of Mechanical engineering, Belgrade, SRB
Prof. dr Aleksandar Vujović, Faculty of Mechanical engineering, MNE
Prof. dr Boran Pikula, Faculty of Mechanical engineering, Sarajevo, BiH
Prof. dr Branko Vasić, Faculty of Mechanical engineering, Belgrade, SRB
Prof. dr Časlav Mitrović, Faculty of Mechanical engineering, Belgrade, SRB
Prof. dr Danijela Miloradović, Faculty of Engineering, Kragujevac, SRB
Doc. dr Darko Kozarac,
Faculty of Mechanical Engineering and Naval Architecture, Zagreb, CRO
Prof. dr Davor Vujanović, Faculty of Transport and traffic engineering, Belgrade, SRB
Prof. dr Dragan Aleksendrić, Faculty of Mechanical engineering, Belgrade, SRB
Prof. dr Dragan Jovanović, Faculty of Technical Sciences, Novi Sad, SRB
Prof. dr Dragan Lončar, Faculty of Economics, Belgrade, SRB
Prof. dr Dragoslav Janošević, Faculty of Engineering, Niš, SRB
Prof. dr Dragoslava Stojiljković, Faculty of Mechanical engineering, Belgrade, SRB
Prof. dr Dževad Bibić, Faculty of Mechanical engineering, Sarajevo, BiH
Doc. dr Emil Veg, Faculty of Mechanical engineering, Belgrade, SRB
Prof. dr Ivan Filipović, Faculty of Mechanical engineering, Sarajevo, BiH
Prof. dr Jasna Glišović, Faculty of Engineering, Kragujevac, SRB
Prof. dr Jovan Filipović, Faculty of Organizational Sciences, Belgrade, SRB
Prof. dr Ljubiša Vasov, Faculty of Transport and traffic engineering, Belgrade, SRB
Prof. dr Milan Kostelac,
Faculty of Mechanical Engineering and Naval Architecture, Zagreb, CRO
Doc. dr Milanko Damjanović, Faculty of Mechanical engineering, MNE
Prof. dr Miliša Suknović, Faculty of Organizational Sciences, Belgrade, SRB
Prof. dr Milorad Burić, Faculty of Mechanical engineering, MNE
Prof. dr Miomir Jovanović, Faculty of Engineering, Niš, SRB
Prof. dr Mirko Vujošević, Faculty of Organizational Sciences, Belgrade, SRB
Mladen Alvirović, SAT, SRB
Prof. dr Nikola Dondur, Faculty of Mechanical engineering, Belgrade, SRB
Prof. dr Pavle Gladović, Faculty of Technical Sciences, Novi Sad, SRB

Prof. dr Radivoje Pešić, Faculty of Engineering, Kragujevac, SRB
Prof. dr Radoje Vujadinović, Faculty of Mechanical engineering, MNE
Prof. dr Slaven Tica, Faculty of Transport and traffic engineering, Belgrade, SRB
Prof. dr Snežana Petković, Faculty of Mechanical engineering, Banja Luka, BiH
Doc. dr Sreten Simović, Faculty of Mechanical engineering, MNE
Prof. dr Mirko Komatina, Faculty of Mechanical engineering, Belgrade, SRB
Prof. dr Valentina Basarić, Faculty of Technical Sciences, Novi Sad, SRB
Prof. dr Vincenc Butala, Faculty of Mechanical Engineering, Ljubljana, SLO
Prof. dr Vladan Đokić, Faculty of Architecture, Belgrade, SRB
Prof. dr Vladimir Pajković, Faculty of Mechanical engineering, MNE
Prof. dr Vojkan Lučanić, Faculty of Mechanical engineering, Belgrade, SRB
Prof. dr Vuk Bogdanović, Faculty of Technical Sciences, Novi Sad, SRB
Prof. dr Željko Kamberović, Faculty of Technology and Metallurgy, Belgrade, SRB
Prof. dr Zoran Lulić, Faculty of Mechanical Engineering and Naval Architecture, Zagreb, CRO
Prof. dr Zvonko Herold,
University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, CRO
Prof. dr Gradimir Danon, Journal of Applied Engineering Science, SRB
Prof. dr Nenad Zrnić, Vice rector of the University of Belgrade, SRB
Doc. dr Ivan Rakonjac, Innovation Fund, SRB
Jovanka Jovanović, Bosch, SRB
Dr Miloš Petrović,
Consultant to the Minister of innovation and technological development, SRB
Zvonko Zindović, Dunav insurance, SRB
Boško Petrović, Generali insurance, SRB
Nada Stanojević, Journal of Applied Engineering Science Executive Editor, SRB
Dr Vukman Bakić, Thermal Science Editor-In-Chief, SRB
Dr Aleksandra Đukić Vuković, Faculty of Technology and Metallurgy, Belgrade, SRB
Prof. dr Boško Rašuo, Scientific Journal FME Transactions, SRB
Dr Dragan Kovačević, Electrical Engineering Institute NioKla Tesla, SRB
Dr Jelena Begović, Institute of molecular genetics and genetic engineering (IMGGI), SRB
Dr Srećko Manasijević, Research and Development institute Lola Ltd, SRB
Dr Miroslav Sokić,
Institute for Technology of Nuclear and other Mineral Raw Materials, SRB
Prof. dr Mile Savković,
Dean of the Faculty of Mechanical and Civil Engineering, Kraljevo, SRB
Dr Ljubinko Rakonjac, Institute of Forestry, Serbia
Dr Olgica Nedić, Institute for Application of Nuclear Energy, Belgrade, Serbia
Dr Aleksandar Bogojević, Institute of Physics, Serbia
Prof. dr Gordana Čirić-Marjanović, Faculty of Physical Chemistry, Belgrade, SRB
Dr Ivana Vasović, Research and Development institute Lola Ltd, SRB
Prof. dr Jonel Subić, Institute of Agricultural Economics, SRB
Prof. dr Đorđe Janačković, Innovation center, Faculty of Technology and Metallurgy, SRB

Aleksandar Čitić, Miljana Popović, Jelenka Vitomir, Mirjana Filipović, Tamara Radetić, Endre Romhanji STRENGTHENING OF Al-Mg-Si AA6082 TYPE ALLOY BY ARTIFICIAL AND INTERRUPTED AGING PROCESSES	8
Anđela Cvetković GASOLINE FILTRATION ANOMALIES AND THE EFFECT ON THE OPERATION AND SUBASSEMBLIES OF ENGINES	9
Daniel Mijailović, Uroš Lačnjavec, Vladimir Jović, Dušica Stojanović, Vuk Radmilović, Velimir Radmilović, Petar Uskoković SYNTHESIS AND SUPERCAPACITIVE PERFORMANCES OF ELECTROSPUN CARBON NANOFIBERS DECORATED WITH SPINEL CO _{1.5} MN _{1.5} O ₄ NANOCRYSTALS	10
Marko Orošnjak FUEL CONSUMPTION AND EMISSION REDUCTION IN BUS FLEET MANAGEMENT: CBM VERSUS TBM	11
Danijela Glušac RISKS IN CARGO INSURANCE	12
Marko Ćirić, Ivan Ivanković REDUCTION IN WALL THICKNESS IN TANKS FOR TRANSPORT OF DANGEROUS GOODS DUE TO THE INFLUENCE OF THE TRANSPORTED SUBSTANCE - INSPECTION AND RECLASSIFICATION	13
Saša Vasiljević, Nadica Stojanović, Ivan Grujić KARTING VEHICLE DESIGN PHASES WITH A SPECIAL FOCUS ON TESTING OF VEHICLE PERFORMANCE AND APPLICATION OF CAE TECHNOLOGY IN VEHICLE DESIGN	14
Radoslav Rajković ANALYSIS OF CONTAINER LOADING – ROUTING IN GROUPAGE SHIPPING (CHINA – BELGRADE HUB – EUROPE)	15
Milena Pijović CATALYST SUPPORT BASED ON COMO CARBIDE	16
Miloš Maljković, Ivan Blagojević ANALYSIS OF VARIOUS IMPACTS ON ENERGY CONSUMPTION OF ELECTRIC VEHICLES	17
Vladimir Sindjelić, Radovan Bulatović, Milan Bižić, Dragan Petrović APPLICATION OF WHALE OPTIMIZATION ALGORITHM (WOA) IN OPTIMAL DESIGN OF LEAF SPRINGS OF RAILWAY VEHICLES	18
Miloš Vasić, Slobodan Mišanović, Nada Stanojević MAINTENANCE OF ELECTRIC CITY BUSES – COST BENEFIT ANALYSIS	19
Jelena Svorcan, Zorana Trivković, Toni Ivanov, Marija Baltić, Ognjen Peković MULTI-OBJECTIVE CONSTRAINED OPTIMIZATIONS OF VERTICAL-AXIS WIND TURBINE COMPOSITE BLADES BASED ON FINITE ELEMENT ANALYSIS AND PARTICLE SWARM OPTIMIZATION	20
Dušan Nedeljković, Živana Jakovljević, Zoran Miljković THE DETECTION OF SENSOR SIGNAL ATTACKS IN INDUSTRIAL CONTROL SYSTEMS	21

Nataša Tomić, Marija Vuksanović, Aleksandar Marinković, Neven Tubić, Nikola Brborić, PRODUCTION OF INTELLIGENT PEDESTRIAN CROSSINGS WITH IMPROVED PHYSICAL AND MECHANICAL PROPERTIES	22
Radmila Janković, Ivan Mihajlović, Nada Štrbac MODELING THE INFLUENCE OF THE ENERGY SOURCES AND CONSUMPTION ON THE RESULTING ECOLOGICAL FOOTPRINT	23
Ivana Živanović, Zoran Poduška, Filip Jovanović, Branka Spasojević, Tatjana Ratknić, Renata Gagić-Serdar, Đorđe Jović, Vlado Čokeša POTENTIALS IN EVALUATION OF THE WOOD QUALITY IN LIVING TREES BY USING SEMI- AND NON-DESTRUCTIVE METHODS IN ORDER TO REDUCE WOOD- PROCESSING COSTS	24
Miloš Tošić, Željka Nikolić, Mina Seović, Dubravka Milovanović, Vladimir Nikolić, Milica Marčeta Kaninski NOVEL TECHNOLOGY WITH SOLVENT EXTRACTION OF USED TIMBER RAILWAY TIES TO OBTAIN RAW MATERIAL	25
Petar Laušević NOVEL PEM FUEL CELL CATALYSTS FOR MILITARY APPLICATIONS	26
Branka Spasojević, Vlado Čokeša, Đorđe Jović, Ivana Živanović, Filip Jovanović, Zoran Poduška SELECTION OF POTENTIAL AREAS FOR ESTABLISHING FOREST PLANTATIONS FOR SATISFACTION OF ENERGY NEEDS – THE EXAMPLE OF LAZAREVAC MUNICIPALITY	27
Tatjana Ratknić, Nikola Rakonjac, Ivana Živanović DEVELOPMENT OF A NATIONAL INDEX OF FOREST FIRE RISK ASSESSMENT	28
Dragana Vasić Aničijević, Slađana Maslovara, Snežana Brković, Vladimir Nikolić, Gvozden Tasić, Milica Marčeta Kaninski ON THE IN SITU IONIC ACTIVATORS FOR ALKALINE HYDROGEN EVOLUTION	29
Miloš Vasić SOFTWARE SUPPORT FOR MANAGEMENT OVER MANAGEMENT SYSTEMS IN LARGE VEHICLE FLEETS	30
Marko Stokić, Vladimir Momčilović, Davor Vujanović EVALUATION OF DRIVER'S ECO-DRIVING SKILLS BASED ON FUZZY LOGIC MODEL – A REALISTIC EXAMPLE OF VEHICLE OPERATION IN REAL-WORLD CONDITIONS	31
Nenad Šurjanac, Natalija Momirović, Marija Milosavljević, Filip Jovanović, Milan Kabiljo APPLICATION OF SMALL UNMANNED AERIAL SYSTEMS IN LOGISTICS AND PLANNING	32
Aleksandar Jovanović, Igor Pašti, Lidija Rafailović, Tomislav Trišović HIGH SURFACE AREA TRANSITION METAL FOAMS FUNCTIONALIZED BY PD FOR HYDROGEN PRODUCTION AND ALCOHOL OXIDATION	33

Dragan Vašalić, Zoran Masoničić, Sanja Petronjić, Ivan Lazović, Branko Spajić, Aleksandar Dragutinović	34
RESULTS OF TESTING OF AN SAFETY VALVE WITH A PASSIVE RUPTURE DISC OF THE IC ENGINE EXHAUST GAS CONDITIONING CHAMBER	
Renata Gagić-Serdar, Ivana Živanović, Zoran Poduška, Ilija Đorđević, Goran Češljar, Natalija Momirović, Tomislav Stefanović, Ljubinko Rakonjac	35
SEED PRESERVING AS A RESOURCE THROUGH BIOLOGICAL METHODS OF USING THE MOST EFFECTIVE BRUCHINE SUBFAMILY SEED BEATLES IN SERBIA - STORED PRODUCT INSECTS PESTS MANAGEMENT THROUGH NATURAL ENEMIES AS FAVORABLE LEGUMINOUS HOST PLANT TRAITS	
Kristina Jovičić	36
DESIGN OF SENSORIZED INSOLE FOR NEUROPROSTHETIC APPLICATION	
Aleksandra Joksimović, Aleksandar Janković, Emil Veg, Mladen Regodić	37
DEVELOPMENT OF THE ROBOT FOR THE EUROBOT 2019 COMPETITION	
Spajić Branko	38
THE INCREASE OF ENERGY EFFICIENCY IN TRANSPORT OF DANGEROUS GOODS USING INFORMATION SYSTEM AND COMPATIBILITY DATABASE	
Mladen Rasinac, Miodragović Tanja, Ivanović Marina, Tešević Milan	39
CALCULATION OF COSTS AT RESISTANCE SPOT WELDING WHEN PRODUCING A CAR BODY	
Milica Vasić, Raísa C. P. Oliveira, Diogo M. F. Santos, Radmila Hercigonja, Cesar A.C. Sequeira, Biljana Šljukić	40
Pd-IMPREGNATED X ZEOLITE AS ANODE ELECTROCATALYST FOR DIRECT BOROHYDRIDE-PEROXIDE FUEL CELLS	
Jovana Mandić, Jovana Đokić, Nataša Gajić, Željko Kamberović	41
THERMODYNAMIC MODELING OF Pb/Ag - JAROSITE SULFIDATION FOR VALUABLE METALS RECOVERY	
Maja Mandić, Jovana Đokić, Nataša Gajić, Jelena Uljarević, Željko Kamberović,	42
PRODUCTION OF TECHNOLOGY METALS FROM WASTE ELECTRONICS	
Đorđe Radojković, Biljana Cvetić, Miloš Danilović, Oliver Ilić	43
A NEW TOOL FOR EVALUATING THE GOODNESS OF HEURISTIC SOLUTIONS IN MANUFACTURING CELL FORMATION	
CONFERENCE PROGRAM	44

POTENTIALS IN EVALUATION OF THE WOOD QUALITY IN LIVING TREES BY USING SEMI- AND NON-DESTRUCTIVE METHODS IN ORDER TO REDUCE WOOD-PROCESSING COSTS

Ivana Živanović, Zoran Poduška, Filip Jovanović, Branka Spasojević, Tatjana Ratknić, Renata Gagić-Serdar, Đorđe Jović, Vlado Čokeša

Institute of Forestry, Belgrade, Serbia

Summary: Being a natural, ecological and renewable resource, wood is increasingly replacing artificial and toxic materials in the manufacture of various types of packaging and other products; thus, its proper and economically justified use has become necessary. The best utilization of wood raw materials has been sought both in practice and theory, which led to development of a number of non-destructive and semi-destructive methods for the wood quality assessments in various stages of wood exploitation. In this paper, two instruments for inspection of the internal condition of standing trees were analyzed. Resistograph was designed for detection of the internal defects. In addition to assessing the condition of living trees of different species, the instrument is used to assess the wood density in various materials. The observed resistance during drilling is proportional to the change in the wood density or the relative mass of the element analyzed. The results of drilling in different spots or directions, through the cross-section and along the element, can be used to map the properties of the element. Fractometer is a device designed for measuring the strength and other mechanical properties of wood in core samples taken by increment borer from a certain part of the tree or branch examined. Fractometer can determine the maximum fracture force and bending and pressure strength of wood. It is also possible to identify the stage of decay. Due to its heterogeneous structure and anisotropy, the wood compressive and bending strengths differ between different anatomical directions even within a single species. The results of previous research in literature indicate that there is a significant positive correlation between the radial bending strength and the longitudinal compressive strength of wood. This actualizes the need for the use of different types of trees in construction, depending on the load that the wood element will be exposed. These devices provide high precision and quality in measurement and can achieve good correlation between the measured values and the mechanical properties of wood. This way, science and practice could be provided by significant data on the properties and quality of wood, while its consumption is minimized.

Keywords: fractometer, resistograph, wood quality determination and evaluation, wood consumption, wood-processing costs.



IMPRESUM

Editor: Prof. dr Vladimir Popović

Publisher: INSTITUT ZA ISTRAŽIVANJA I PROJEKTOVANJA U PRIVREDI, Beograd

For the publisher: Nada Stanojević, dipl.inž.maš.

Printed edition processing and design: iipp

Conference language: English

Volume: 50 copies

Publishig year: 2019

Printed edition: Sibra Star, Beograd

ISBN 978-86-84231-48-4;