



FACULTY OF MECHANICAL
AND CIVIL ENGINEERING IN KRALJEVO
UNIVERSITY OF KRAGUJEVAC



X TRIENNIAL INTERNATIONAL CONFERENCE HEAVY MACHINERY - HM 2021

June 23 - 25 2021, Vrnjačka Banja, Serbia

Conference Programme

HM 2021



UNIVERSITY OF KRAGUJEVAC
FACULTY OF MECHANICAL AND CIVIL ENGINEERING
IN KRALJEVO
REPUBLIC OF SERBIA



PROGRAMME

X TRIENNIAL INTERNATIONAL CONFERENCE

HEAVY MACHINERY - HM 2021

23 June– 25 June 2021, Vrnjačka Banja, Serbia

Supported by:

Republic of Serbia
Ministry of Education, Science and Technological Development

23.06.2021. – WEDNESDAY		
09:00 – 12:00	Registration of participants	Reception
12:00 – 13:00	Opening Ceremony	Hall 1
13:00 – 13:30	Cocktail	Lobby
13:30 – 15:00	PLENARY SESSION	Hall 1
<p>MODAL SPACE BASED REAL-TIME FE SIMULATIONS OF COMPLEX AND MULTIFUNCTIONAL STRUCTURES Dragan Marinković</p> <p>INDUSTRY 4.0 CONTEXT OF HEAVY MACHINERY Vidosav D. Majstorović, Radivoje M. Mitrović, Žarko Z. Mišković</p> <p>WAYS TO IMPROVE THE EFFICIENCY OF DUMP TRUCKS FOR TRANSPORTING ASPHALT MIX A.I. Dotsenko</p>		
15:00 -16:00	Lunch	Restaurant
16:00 -	Free activities	

24.06.2021. – THURSDAY		
09:00 – 10:30	Registration of participants	Reception
10:30 – 12:00	Session 1 - PRODUCTION TECHNOLOGIES	Hall 1
Chairman:	<i>Dragoljub LAZAREVIĆ, Milan KOLAREVIĆ</i>	
<p>A SURVEY OF RESEARCH ON INDUSTRY 4.0 IN INTRALOGISTICS Nenad Đ. Zrnić, Tamara M. Popović, Goran Z. Milojević, Nenad Ž. Kosanić</p>		

DETERMINATION OF THE PROBABILITY OF A GEAP PUMP FAULT USING THE BAYES NETWORK AND NETICA SOFTWARE

Jovana Perić, Mirko Djapić, Tanja Miodragović, Stefan Pajović

JET LAGGING IN ABRASIVE WATER JET CUTTING OF HIGH-SPEED TOOL STEEL

Ramiz Kurbegovic, Mileta Janjic

APPLICATION OF TAGUCHI METHOD TO BEVEL ANGLE OPTIMIZATION DURING PLASMA ARC CUTTING

Dragoljub Lazarevic, Andjela Lazarevic

INFLUENCE OF TECHNICAL-TECHNOLOGICAL CHARACTERISTICS OF WORKPIECES ON THE CHOICE OF CNC MACHINE TOOLS

Marina Ivanović, Mladen Rasinac, Stefan Pajović

FREQUENCY ANALYSIS OF NOISE AT DIFFERENT MILLING PARAMETERS OF STEEL

Mladen Rasinac, Branko Radičević, Milan Kolarević, Aleksandra Petrović, Mišo Bjelić

INFLUENCE OF 3D PRINTING PARAMETERS ON THE GEOMETRY AND SURFACE QUALITY OF MANUFACTURED PARTS ON AN FDM 3D PRINTER

Petar Đekić, Biljana Milutinović, Mladen Tomić, Saša S. Nikolić

PREDICTION OF THE STRAIN HARDENING EXPONENT OF HP40-NB ALLOY

Milica Timotijević, Mišo Bjelić, Dragan Rajnović, Olivera Erić Cekić

EFFECT OF CHEMICAL COMPOSITION ON THE MICROSTRUCTURE, HARDNESS AND ELECTRICAL CONDUCTIVITY PROFILES OF THE BI-GE-IN ALLOYS

Dusko Minic, Milena Premovic, Aleksandar Djordjevic, Milan Milosavljevic

EXPERIMENTAL INVESTIGATION AND THERMODYNAMIC DESCRIPTION OF THE TERNARY CU-GE-PB SYSTEM

Milan Milosavljevic, Milena Premovic, Dusko Minic, Aleksandar Djordjevic

MECHANICAL AND ELECTRICAL PROPERTIES OF THE BI-GE-SN ALLOYS

Aleksandar Djordjevic, Dusko Minic, Milena Premovic, Milan Kolarevic, Milan Milosavljevic

10:30 – 12:00**Session 2 - APPLIED MECHANICS****Hall 2****Chairman:*****Slaviša ŠALINIĆ, Aleksandar NIKOLIĆ*****NONLINEAR OSCILLATIONS OF A PENDULUM WRAPPED AROUND A CYLINDER**

Anastas Ivanov Ivanov

ANALYSIS OF CENTRIFUGAL COMPRESSOR TESTING CAPABILITIES

Stojko Biočanin, Milica Timotijević

APPLICATION OF DENAVIT-HARTENBERG METHOD TO ROBOT MODEL KUKA IR 161/15.0

Đorđe Jovanović, Branislav Milenković

APPLICATION OF GRASSHOPPER ALGORITHM FOR SOLVING OPTIMIZATION PROBLEMS IN ENGINEERING

Branislav Milenković, Radovan Bulatović, Ivana Atanasovska

CONTRIBUTION TO THE PROBLEM OF IN-PLANE VIBRATION OF CIRCULAR ARCHES WITH VARYING CROSS-SECTIONS

Slaviša Šalinić, Aleksandar Obradović

THE INFLUENCE OF SPATIAL ALIASING TO EXPERIMENTAL DETERMINATION OF DISPERSION RELATIONSHIP OF FLEXURAL WAVES IN BEAMS BY CORRELATION METHOD

Vladimir Sinđelić, Snežana Ćirić Kostić, Branko Radičević, Zlatan Šoškić

EXPERIMENTAL DETERMINATION OF DISPERSION RELATIONSHIP OF POLYAMIDE THIN BEAMS

Jelena Tomić, Vladimir Sinđelić, Aleksandar Nikolić, Nebojša Bogojević

FREE VIBRATION OF DOUBLE-CRACKED UNIFORM BEAM

Aleksandar Nikolić

12:00 – 12:30	Coffee break	Lobby
12:30 – 14:00	Session 3 - EARTH-MOVING AND TRANSPORTATION MACHINERY	Hall 1
Chairman:	<i>Nenad ZRNIĆ, Goran MARKOVIĆ</i>	
<p>EXPERIMENTAL STUDY OF THE INFLUENCE OF A COMBINATION OF OPERATING PARAMETERS OF A MOBILE LIFT ON OSCILLATORY PROCESSES OCCURRING AFTER LOCKING THE WORKING PLATFORM Igor Kyrychenko, Oleksandr Reznikov, Dmytro Klets, Anton Kholodov</p> <p>FINITE ELEMENT AND ANALYTICAL MODELLING OF SHIP UNLOADER Zrnić Nenad, Gašić Vlada, Urošević Marko, Arsić Aleksandra</p> <p>THE DEFLECTION OF THE COLUMN-MOUNTED JIB CRANE WITH TAPERED BOOM BY FINITE DIFFERENCE METHOD Nebojša B. Zdravković, Boris Jerman, Mile Savković, Goran Marković, Marko Todorović, Goran Pavlović</p> <p>ANALYSIS OF ELEVATORS DYNAMIC PARAMETERS WITH SOLUTION OF SUMMARY DATA ACQUISITION DURING EXPERIMENTAL RESEARCH Radimir Đokić, Jovan Vladić, Dragan Živanić, Tanasije Jojić, Vesna Jovanović, Nebojša Zdravković</p> <p>LOAD ANALYSIS OF STEERING MECHANISM OF WHEEL LOADER Jovan Pavlović, Dragoslav Janošević, Boban Nikolić, Vesna Jovanović, Nikola Petrović</p> <p>IMPROVEMENT OF CASTING TECHNOLOGY OF CONTINUOUS TRACKS SEGMENT USING CAD/CAE/CAM SOFTWARE TOOLS Aleksandar Jovičić, Nedeljko Dučić, Radimir Radiša, Ivan Milićević, Marko Popović, Vojislav Vujičić</p> <p>STRENGTH OF THE WELDED JOINT WITH IMPROVED MECHANICAL PROPERTIES OF WELD METAL AND HEAT AFFECTED ZONE Miodrag Arsić, Nebojša B. Zdravković, Vencislav Grabulov, Srđan Bulatović, Mladen Mladenović</p>		

PROJECT OF MODERNIZATION OF LABORATORY MODEL OF TWO-GIRDER OVERHEAD BRIDGE CRANE

Dragan Živanić, Nikola Ilanković, Atila Zelić, Radomir Đokić

BASIS FOR THE DESIGN OF DRIVE-IN AND DRIVE-THROUGH RACKING

Rodoljub Vujanac, Nenad Miloradović, Pavle Živković, Luka Petrović

STATISTICAL COMPARISON OF THE EVALUATION PROCESS RESULTS OF LOCATION ALTERNATIVES IN CASE OF FLAT AND HIERARCHY STRUCTURE OF CRITERIA

Goran Marković, Čatālin Frāncu, Mile Savković, Nebojša Zdravković, Radomir Đokić, Marko Popović

BASIC PARAMETERS OF A TENSILE TESTING DEVICE FOR CONVEYOR BELTS

Nikola Ilanković, Dragan Živanić, Atila Zelić, Mirko Katona

APPLICATION OF WATER CYCLE ALGORITHM ON RAMSHORN HOOK OPTIMIZATION PROBLEM

Goran Pavlović, Mile Savković, Nebojša B. Zdravković

FINDING THE OPTIMAL SHAPE OF HYDRAULIC SCISSORS LIFT LEGS USING HHO OPTIMIZATION METHOD

Marko Todorović, Radovan Bulatović, Mile Savković, Goran Marković

12:30 – 14:00

Session 4 - AUTOMATIC CONTROL AND FLUID TECHNIQUE

Hall 2

Chairman:

Dragan PRŠIĆ, Vladimir STOJANOVIĆ

TRAJECTORY TRACKING OF A TWO – LINK GRIPPING MECHANISM

Radiša Jovanović, Uglješa Bugarić, Lara Laban, Mitra Vesović

FEEDBACK LINEARIZATION CONTROL OF A TWO – LINK GRIPPING MECHANISM

Mitra Vesović, Radiša Jovanović, Lara Laban, Uglješa Bugarić

A NONLINEAR MODEL PREDICTIVE CONTROL TRACKING APPLICATION FOR A SYSTEM OF CASCADED TANKS

Guilherme N. G. dos Reis, Marcelo M. Morato, Julio E. Normey-Rico, Vladimir Stojanovic

CONTROL OF A LIQUID LEVEL SYSTEM BASED ON CLASSICAL AND FUZZY PID LIKE CONTROLLER USING THE GREY WOLF OPTIMIZATION ALGORITHM

Vladimir Zarić, Natalija Perišić, Radiša Jovanović

SYSTEM IDENTIFICATION USING HAMMERSTEIN-WIENER MODEL WITH ORTHOGONAL POLYNOMIALS

Anđela D. Đorđević, Saša S. Nikolić, Marko T. Milojković, Miodrag D. Spasić, Staniša Lj. Perić

ADAPTIVE DYNAMIC PROGRAMMING BASED OPTIMAL CONTROL FOR HYDRAULIC SERVO ACTUATOR

Vladimir Djordjevic, Marcelo Menezes Morato, Vladimir Stojanovic

SPEED-CONTROLLED HYDRAULIC DRIVE SYSTEMS FOR HEAVY MACHINERY

Darko Lovrec, Vito Tič

DESIGN OF PID CONTROLLERS FOR THE SYSTEM OF A PUMP CONTROLLED HYDRO-MOTOR

Ljubiša Dubonjić, Saša Prodanović, Novak Nedić

STRUCTURAL LINEAR MODELING OF ELECTROHYDRAULIC ACTUATION SYSTEM WITH HYDRAULIC CYLINDER

Dragan Nauparac

TRIBOLOGICAL TEST DEVICES AS HEAVY MACHINERY

Vito Tič, Darko Lovrec

THE ANALYSIS OF A SUSTAINED OSCILLATION IN THE HEAT PUMP SYSTEM WITH BUFFER TANK

Dragan Pršić, Aleksandar Vičovac, Marko Nešković

OFFLINE ROBOT PROGRAMMING USING ABB ROBOTSTUDIO

Vojislav Vujičić , Ivan Milićević, Milan Marjanović, Nedeljko Dučić, Aleksandar Jovičić , Snežana DRAGIĆEVIĆ

14:00 – 14:30	Coffee break	Lobby
15:00 – 16:00	Lunch	Restaurant

16:00 – 17:30	Session 5 - RAILWAY ENGINEERING	Hall 1
Chairman:	<i>Dobrinka ATMADZHOVA, Dragan PETROVIĆ</i>	
<p>A METHOD FOR TRANSFORMATION OF BETWEEN THE CRITERIA AGAINST DERAILMENT OF RAIL VEHICLES OF VARIOUS CLASS Dobrinka Atmadzhova</p> <p>RESEARCH AND ANALYSIS OF ELECTRICITY QUALITY PARAMETERS FOR TRACTION OF TRAINS WITH MULTISYSTEM LOCOMOTIVE "SIEMENS VECTRON X4-E-LOC-AB, A26" Branislav S. Gavrilović, Zoran Bundalo, Aleksandar B. Blagojević</p> <p>DETERMINATION OF OPTIMAL LAYOUT, NUMBER AND WAY OF CONNECTION OF STRAIN GAUGES ON INSTRUMENTED RAILWAY WHEELSETS Milan Bižić, Dragan Petrović</p> <p>FAILURE ANALYSIS IN PASSENGER BOGIES FROM THE RAILWAY SYSTEM OF THE REPUBLIC OF BULGARIA Vanio Ralev, Dobrinka Atmadzhova</p> <p>BRAKING – PRECONDITION FOR FASTER MOVEMENT OF RAILWAY VEHICLES Dragan Petrović, Milan Bižić</p> <p>NUMERICAL ANALYSIS OF WAGON LEAF SPRING USING ANSYS SOFTWARE PACKAGE Mladen Krstić, Branislav Milenković, Đorđe Jovanović</p> <p>EXPERIMENTAL AND NUMERICAL STRENGTH ANALYSIS OF FREIGHT WAGON TYPE SHIMMNS INTENDED FOR THE TRANSPORTATION OF THE SHEET COILS Vladimir Milovanović, Miroslav Živković, Snežana Vulović, Aleksandar Dišić, Marko Topalović</p> <p>INFLUENCE OF THE TRACTION FORCE AND THE SPEED OF MOVEMENT ON THE STRENGTH CHARACTERISTICS OF THE LOCOMOTIVE AXLES Vasko Nikolov</p>		

RESEARCH AND ANALYSIS OF THE WEARING OF THE ELEMENTS OF AXLE ROLLER BEARINGS

Lyudmil Paskalev

REGARDING REQUIREMENTS FOR THE DESIGN AND INSTALLATION OF ELEMENTS FOR PASSIVE SAFETY OF PASSENGER TRAINS OPERATED BY THE BULGARIAN STATE RAILWAYS

Venelin Pavlov

DETERMINING THE LONGITUDINAL FORCE IN COLLISION OF TWO WAGONS

Milica Timotijević

25.06.2021. - FRIDAY

09:00 – 10:30	Registration of participants	Reception
10:30 – 12:00	Session 6 - THERMAL TECHNIQUE AND ENVIRONMENT PROTECTION	Hall 1
Chairman:	<i>Rade KARAMARKOVIĆ, Miljan MARAŠEVIĆ</i>	

THE IMPORTANCE AND BENEFIT OF THE ENERGY MANAGEMENT STANDARD IMPLEMENTATION

Andjela Lazarevic, Ivana Marinovic Matovic

SOME ASPECTS OF THE IMPLEMENTATION OF ACTIONS PLANS FOR NOISE PREVENTION AND REDUCTION IN URBAN AREAS

Vasile Bacria, Nicolae Herisanu

APPLICATION OF BIOLOGICALLY INSPIRED ALGORITHMS FOR DETERMINING THE COEFFICIENTS OF EMPIRICAL MODELS FOR DETERMINING SOUND ABSORPTION

Kolarević Milan, Radičević Branko, Mišo Bjelić, Tanja Miodragović, Goran Miodragović

COMPOSITE MATERIALS THAT ARE GOOD SOUND ABSORBERS

Tanja Miodragović, Olivera Erić-Cekić, Branko Radičević, Vladan Grković

NON-EXHAUST PM EMISSIONS FROM HEAVY-DUTY VEHICLES

Jasna Glišović, Saša Vasiljević, Nenad Miloradović, Nadica Stojanović, Ivan Grujić

STANDARDS, REGULATIONS AND LEGISLATION OF USED MOTOR OIL MANAGEMENT AND DISPOSAL – A REVIEW

Jelena Mihajlović, Nevena Marković, Goran Petrović, Danijel Marković, Žarko Čojbašić

THE USAGE OF SHALLOW GROUNDWATER HEAT BY HEAT PUMPS IN A HIGH-TEMPERATURE DISTRICT HEATING SYSTEM

Dragiša Šimunović, Rade Karamarković, Miloš Nikolić, Đorđe Novčić, Anđela Lazarević

OPTIMIZATION OF COMPACT HEAT EXCHANGERS

Miljan Marašević, Nebojša Bogojević, Nenad Stojić, Stefan Adžić, Dragiša Šimunović,

GRADUAL COMBUSTION OF WOOD LOGS BY THE USE OF PREHEATED AIR

Đorđe Novčić, Miloš Nikolić, Rade Karamarković, Dragiša Šimunović

10:30 – 12:00 **Session 7 - CIVIL ENGINEERING**

Hall 2

Chairman: *Iva DESPOTOVIĆ, Bojan MILOŠEVIĆ*

INTERACTION DIAGRAMS IN LIMIT AND SHAKEDOWN ANALYSIS

Bojan Milošević, Žarko Petrović, Saša Marinković

THE INFLUENCE OF DIFFERENT TYPE OF AGGREGATE, FLY ASH AND FIBER REINFORCED POLYMER ON SPLITTING RESISTANCE IN PRETENSIONED CONCRETE RAILROAD TIES

Adrijana Savić, Robert J. Peterman

LOAD-BEARING CAPACITY AND THERMAL CONDUCTIVITY OF AXIALLY LOADED WALLS IN ACCORDANCE WITH EC6

Iva Despotović, Bojan Milošević, Marina Nikolić – Topalović, Vladimir Mandić, Stefan Mihajlović

ANALYSIS OF COST AND TIME REQUIRED FOR THE CONSTRUCTION OF RC DIAPHRAGMS DEPENDING ON THE METHOD OF EXECUTION

Stefan Mihajlović, Saša Marinković, Vladimir Mandić, Iva Despotović, Marijana Janičijević

SERVICEABILITY LIMIT STATE ANALYSIS OF A CRACKED CROSS-SECTION IN ACCORDANCE WITH SRPS EN1992-1-1 AND PBAB'87

Saša Marinković, Bojan Milošević, Stefan Mihajlović, Marijana Janičijević, Žarko Petrović

EFFICIENCY ANALYSIS OF TWO SPATIAL INTERPOLATION METHODS OF PRECIPITATION ON THE KOLUBARA RIVER BASIN

Vladimir Mandić, Iva Despotović, Miloš Šešlija, Stefan Mihajlović, Slobodan Kolaković

12:00 – 12:30	Coffee break	Lobby
15:00 – 16:00	Lunch	Restaura nt
16:30 – 18:30	<i>Round Table</i>	Hall 1
18:30 – 19:30	Conference closing	Hall 1





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