

University of Niš  
Faculty of Mechanical Engineering



## PROGRAM

# XIX SCIENTIFIC-EXPERT CONFERENCE ON RAILWAYS RAILCON '20



October 15-16, 2020, Niš, Serbia



- 1 Faculty of Mechanical Engineering
- 2 Downtown
- 3 Bus Station
- 4 Fortress
- 5 University of Niš

**The XIX Conference RAILCON '20**  
**Faculty of Mechanical Engineering,**  
**Aleksandra Medvedeva 14, Niš, Serbia**  
**(GPS: 43°19'49.7"N+21°53'42.6"E)**



The Faculty of Mechanical Engineering Niš, Serbia wishes you a pleasant participation to the

### **INTERNATIONAL XIX SCIENTIFIC-EXPERT CONFERENCE ON RAILWAYS - RAILCON '20.**

The RAILCON continues the tradition through its nineteenth anniversary. As in previous years, the RAILCON hopes to gather scientists and experts from the region, to observe the ongoing changes in developed railways and suggest directions for further railway development in Serbia and the region.

According to this year's Conference Program there are 54 papers written by 124 authors from Railway, University and Industry, from 11 countries, dealing with actual topics from fields of rolling stock, traffic, infrastructure, maintenance, informatics, strategy, policy and other aspects related to Railway.

We wish the participants successful participation in the Conference and a good health.

#### **Organizing Committee of RAILCON '20**

##### **Patron**

Ministry of Education, Science and Technological Development of the Republic of Serbia

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KRUCH RAILWAY INNOVATIONS  
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Privat doz. Andreas Schöbel, Technical University Wien, AT  
Prof. Miloš Simonović, Faculty of Mechanical Engineering Niš, RS  
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Prof. Kiril Velkov, Technical University of Sofia, BG

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Miša Tomić  
Srđan Mladenović  
Dušanka Nikolić  
Vesna Grozdanović

# PROGRAM

THURSDAY, October, 15 2020

**9<sup>00</sup> – 10<sup>00</sup> Application of Participants**  
(Lobby)

**10<sup>00</sup> – 10<sup>30</sup> Welcome Cocktail**  
(Lobby)

**10<sup>30</sup> – 10<sup>45</sup> Opening Ceremony (livestream)**  
(Amphitheatre A and B)

**10<sup>45</sup> – 13<sup>15</sup> Plenary Session (livestream with Q&A)**  
(Amphitheatre A and B)

*Chairmen:*

*Prof. Milan Banić, Prof. Miloš Simonović*

- EU SHIFT2RAIL ACTIVITIES AND ITS IMPACT ON EUROPEAN RAIL SYSTEM  
Carlo BORGHINI  
Executive Director of the Shif2Rail Joint Undertaking, Belgium
- ADVANCEMENTS IN THE FIELD OF RAILWAY VEHICLES  
Simon IWNICKI  
Institute of Railway Research, Univer. of Huddersfield, United Kingdom
- LIGHTWEIGHT VEHICLES – A NEW PARADIGM IN RAIL FREIGHT  
Cristian ULIANOV  
Newcastle University, United Kingdom
- OBSTACLE DETECTION FOR RAILWAYS: LESSONS LEARNED FROM PROJECT SMART  
Danijela RISTIĆ DURRANT  
Institute of Automation, University of Bremen, Germany

**13<sup>15</sup> – 13<sup>30</sup> Commercial Presentations (livestream)**  
(Amphitheatre A and B)

- KRUCH RAILWAY INNOVATIONS

**13<sup>30</sup> – 16<sup>30</sup> Break**

**16<sup>30</sup> – 18<sup>00</sup> Session 1 (livestream with Q&A)**  
(Room 611)

*Chairmen:*

*Prof. Miloš Milošević*

- 1.2. NUMERICAL RESEARCH OF IMPACT OF TUBE WALL THICKNESS AND POLYURETHANE FOAM DENSITY ON ABSORPTION CHARACTERISTICS  
Jovan TANASKOVIĆ, Dragan MILKOVIĆ,  
Vojkan LUČANIN  
Faculty of Mechanical Engineering, Belgrade, Serbia
- 1.7. RANDOM VIBRATION ANALYSIS OF THE DEMONSTRATOR HOUSING  
Milan BANIĆ, Aleksandar MILTENOVIĆ, Miloš SIMONOVIĆ  
Miloš MILOŠEVIĆ, Marko PERIĆ  
Faculty of Mechanical Engineering, Niš, Serbia
- 1.4. INFLUENCE OF HEAD WIND ON THE BRAKING DISTANCE OF SINGLE RAILWAY VEHICLE  
Dragan MILKOVIĆ, Saša RADULOVIĆ,  
Goran SIMIĆ, Jovan TANASKOVIĆ  
Faculty of Mechanical Engineering, Belgrade, Serbia
- 1.5. SPECIFIC ASPECTS OF THE RAIL VEHICLE PASS-BY NOISE MEASUREMENT  
Goran SIMIĆ, Saša RADULOVIĆ, Vojkan LUČANIN  
Faculty of Mechanical Engineering, Belgrade, Serbia
- 4.3. DEVELOPING ADVANCED SUBSYSTEM FOR SECURING STEEL COIL CARGO ON SHIMMNS WAGON CRADLES  
Vladimir MILOVANOVIĆ, Milan BOJOVIĆ, Miroslav ŽIVKOVIĆ  
Faculty of Engineering, Kragujevac, Serbia  
Marko TOPALOVIĆ, Snežana VULOVIĆ  
Institute for Information Technologies, University of Kragujevac, Serbia

- 4.7. OPTIMIZATION OF THE SADDLE SUPPORT STRUCTURE OF THE FREIGHT WAGON TYPE SHIMMNS  
Vladimir MILOVANOVIĆ, Nikola JOVANOVIĆ, Miroslav ŽIVKOVIĆ  
Faculty of Engineering, Kragujevac, Serbia  
Aleksandar DIŠIĆ, Marko TOPALOVIĆ  
Institute for Information Technologies, University of Kragujevac, Serbia
- 5.1. DETERMINING THE RISK ACCEPTANCE CRITERIA FOR OPERATIONAL CHANGES IN THE RAILWAY SYSTEM USING THE "SAFETY II" PRINCIPLE  
Slobodan ROSIĆ  
Serbian Railways Infrastructure, Belgrade, Serbia  
Melanija MITROVIĆ, Dušan STAMENKOVIĆ  
Faculty of Mechanical Engineering, Niš, Serbia
- 5.3. USING MULTIPLE CRITERIA DECISION-MAKING TECHNIQUE TO EVALUATE SERBIAN RAILWAY SYSTEM OPERATION PERFORMANCE  
Nikola PETROVIĆ, Vesna JOVANOVIĆ, Jovan PAVLOVIĆ  
Faculty of Mechanical Engineering, Niš, Serbia  
Tanja ŽIVOJINOVIĆ  
Faculty of Transport and Traffic Engineering, Belgrade, Serbia

**16<sup>30</sup> – 18<sup>00</sup> Session 2**  
(Room 305)

*Chairmen:*

*Prof. Dragutin Kostić*

- 1.3. ANALYSIS OF THE IMPACT OF ELECTRIC LOCOMOTIVES ON ENERGY PARAMETERS IN THE POWER SUPPLY SYSTEM  
Dragutin KOSTIĆ, Petar MARKOVIĆ  
Faculty of Transport and Traffic Engineering, Belgrade, Serbia
- 1.6. NUMERICAL ANALYSIS OF WAGON LEAF SPRINGS  
Milan BIŽIĆ, Dragan PETROVIĆ  
Faculty of Mechanical and Civil Engineering in Kraljevo, Serbia
- 4.4. RELIABILITY AND SAFETY OF AXLE-WHEEL ASSEMBLY  
Mladen TODIĆ, Valentina GOLUBOVIĆ-BUGARSKI,  
Tihomir LATINOVIĆ  
Faculty of Mechanical Engineering, Banja Luka, Bosnia and Hercegovina

- 4.5. APPLICATION OF REVERSING OUTPUT DUAL BRAKE PLANETARY TRANSMISSIONS  
Jelena STEFANOVIĆ-MARINOVIĆ  
University of Niš, Faculty of Mechanical Engineering, Niš, Serbia  
Željko VRCAN, Sanjin TROHA  
Faculty of Engineering, Rijeka, Croatia
- 4.6. THE MARKET CONCEPT OF RAILWAY VEHICLES MAINTENANCE ON THE RAILWAYS OF REPUBLIC OF SRPSKA  
Vladimir MALČIĆ, Ratko ĐURIČIĆ,  
Faculty of Transport and Traffic Eng. Doboj, Bosnia and Hercegovina  
Rade CVIJANOVIĆ  
Railways of Republic of Srpska, Doboj, Bosnia and Hercegovina
- 6.2. APPLICATION OF 3D PRINTING IN RAILWAY INDUSTRY  
Marko PERIĆ, Aleksandar MILTENOVIĆ,  
Dušan STAMENKOVIĆ, Jovan ARANĐELOVIĆ  
Faculty of Mechanical Engineering, Niš, Serbia
- 6.3. APPLICATION OF METALLOGRAPHIC TECHNIQUES IN ORDER TO IDENTIFY DEFECTS IN THE MICROSTRUCTURE OF WELDED JOINTS OF AL ALLOYS  
Marko SAVIĆ, Andreja RADOVANOVIĆ, Nikola MARINKOVIĆ  
Ivan VUČKOVIĆ, Branka JORDOVIĆ  
IMW Institute, Lužnice, Serbia
- 6.7. CHARACTERIZATION OF BUTT WELD JOINT BY MIG WELDING PROCESS ON THE EXAMPLE OF ALUMINIUM ALLOY EN AW 6082  
Nikola MARINKOVIĆ, Andreja RADOVANOVIĆ, Ivan VUČKOVIĆ,  
Marko SAVIĆ, Branka JORDOVIĆ  
IMW Institute, Lužnice, Serbia
- 6.8. HOT FORMING PROCESS OF UPPER PIVOT OF FREIGHT CARS  
Saša RANĐELOVIĆ, Vladislav BLAGOJEVIĆ, Srđan MLADENOVIĆ  
Faculty of Mechanical Engineering, Niš, Serbia  
Mladimir MILUTINOVIĆ  
Faculty of Technical Science, Novi Sad, Serbia

**18<sup>00</sup> – 18<sup>15</sup> Coffee Break**  
(6<sup>th</sup> floor)

**18<sup>15</sup> – 19<sup>30</sup> Session 3 – (online)**  
(Room 611)

*Chairmen:*

*Prof. Aleksandar Miltenović*

- 1.1. SPECIAL FEM SUPERELEMENT IMPACT ON THE TOPOLOGY OPTIMIZATION TIME CONSUMPTION  
Marcin KALINOWSKI  
Alstom Konstal S.A. Poland  
Miroslaw SZCZEPANIK  
Silesian University of Technology, Poland
- 2.6. ENHANCING CAPACITY ON ETCS LINES  
Andreas SCHÖBEL, Olga PERMIAKOVA  
OpenTrack Railway Technology GmbH, Vienna, Austria
- 4.2. MODELLING AND NON-DESTRUCTIVE TESTING OF HEAD CHECK DAMAGE OF RAILWAYS  
Csaba TAKACS, Reka ERDEI  
Mechanical Testing Laboratory, Miskolc, Hungary
- 5.2. MULTICRITERIA APPROACH FOR PSO SERVICES SELECTION IN RAIL SECTOR  
Dragana MACURA, Predrag JOVANOVIĆ  
Faculty of Transport and Traffic Engineering, Belgrade, Serbia
- 6.1. NUMERICAL SIMULATION OF THE WELDING PROCESS, THE INFLUENCE OF CONSTRAINT POINTS LOCATIONS ON THERMAL DEFORMATIONS  
Tomasz ZADOROŻNY  
Alstom Konstal S.A. Poland  
Miroslaw SZCZEPANIK  
Silesian University of Technology, Poland
- 6.10. USAGE OF ÖBB ELECTRIC LOCOMOTIVES ON THE CROATIAN RAILWAY NETWORK  
Milan BRKIĆ, Dragan MILJANOVIĆ  
Rail Cargo Carrier-Croatia, Zagreb, Croatia

**18<sup>15</sup> – 19<sup>30</sup> Session 4**  
(Room 305)

*Chairmen:*

*Prof. Branislav Bošković*

- 2.1. RANKING OF LEVEL CROSSINGS IN THE PLANNING PROCESS TO SAFETY IMPROVEMENT USING THE VIKOR  
Norbert PAVLOVIĆ, Ivan BELOŠEVIĆ, Sanjin MILINKOVIĆ  
Faculty of Transport and Traffic Engineering, Belgrade, Serbia
- 2.2. APPLICATION OF OPENTRACK AT RAILWAYS OF REPUBLIC OF SRPSKA (RAILROAD TRACKS ŠAMAC – DOBOJ)  
Rade CVIJANOVIĆ, Jelena KUZMANOVIĆ, Nikola MALINOVIĆ  
Željeznice Republike Srpske, Doboj, Bosnia and Herzegovina  
Andreas SCHÖBEL  
OpenTrack Railway Technology GmbH, Austria
- 2.3. CLASSIFYING COUNTRIES FOR RAILWAY PERFORMANCE BENCHMARKING: A HIERARCHICAL CLUSTERING APPROACH  
Miroslav PROKIĆ, Katarina HALAJ, Mira PASKOTA  
Faculty of Transport and Traffic Engineering, Belgrade, Serbia
- 3.1. EVALUATION OF TIMETABLE ROBUSTNESS CONSIDERING BUFFER TIMES' AMOUNT AND DISTRIBUTION  
Predrag JOVANOVIĆ, Norbert PAVLOVIĆ  
Faculty of Transport and Traffic Engineering, Belgrade, Serbia
- 3.2. ELECTRONIC AXLE COUNTER  
Dejan LUTOVAC  
Signalling & Control, Belgrade, Serbia
- 5.5. FOURTH RAILWAY PACKAGE – NEW CONCEPTS IN THE FIELD OF SAFETY AND INTEROPERABILITY AND THEIR TRANSPOSITION INTO THE LEGAL FRAMEWORK OF THE REPUBLIC OF SERBIA  
Milan POPOVIĆ, Nataša CEROVIĆ, Olivera ZDRAVKOVIĆ  
Directorate for Railways, Belgrade, Serbia
- 5.6. THE ROLE OF TREATY ESTABLISHING TRANSPORT COMMUNITY IN DEVELOPMENT OF RAIL TRANSPORT MARKET IN SERBIA  
Lazar MOSUROVIĆ, Branka NEDELJKOVIĆ, Zorica RADOVIĆ  
Directorate for Railways of the Republic of Serbia, Belgrade, Serbia

5.7. WESTERN BALKAN RAILWAY MARKET THROUGH THE SCOPE OF THE REGULATORY BODY – BENCHMARK WITH EUROPE  
 Jakša POPOVIĆ  
 Directorate for Railways of Republic of Serbia, Belgrade, Serbia  
 Mirjana BUGARINOVIĆ  
 Faculty of Transport and Traffic Engineering, Belgrade, Serbia

FRIDAY October, 16 2020

9<sup>00</sup> – *Application of Participants*  
 (Lobby)

10<sup>00</sup> – 12<sup>00</sup> *Poster Session*  
 (6<sup>th</sup> floor)

1.8. A METHOD FOR DIRECT THEORETICAL DETERMINATION OF THE CRITERION AGAINST ROLLING STOCK DERAILMENT BASED ON THE DATA OBTAINED IN A THEORETICAL OR EXPERIMENTAL WAY  
 Dobrinka ATMADZHOVA  
 University of Transport (VTU Todor Kableshkov), Sofia, Bulgaria

1.9. ASSESSING THE IMPACT OF THE LATERAL SWINGING OF THE TRAM TO ITS ELECTRICAL CURRENT COLLECTOR  
 Emil M. MIHAYLOV, Emil IONTCHEV, Boris PETKOV  
 University of Transport (VTU Todor Kableshkov), Sofia, Bulgaria  
 Rosen MILETIEV  
 Technical University of Sofia, Bulgaria

1.9. HAZARDS AND RISKS DUE TO TANK CAR EXPLOSION  
 Mirko ĐELOŠEVIĆ, Goran TEPIĆ  
 Faculty Technical Sciences, Novi Sad, Serbia

2.5. ASSESSMENT OF THE DEGREE OF SAFETY AT RAILWAY CROSSINGS IN SERBIA CONDUCTED BY DRIVERS  
 Sandra KASALICA, Goran TRIČKOVIĆ, Milan MILOSAVLJEVIĆ  
 Dušan JEREMIĆ, Dušan VUJOVIĆ  
 Academy of Technical and Art Applied Studies Belgrade, Serbia

2.7. TRAFFIC SAFETY AT LEVEL CROSSINGS  
 Filip ŠĆEKIĆ, Lazar MOSUROVIĆ, Nebojša MIHAJLOVIĆ  
 Jovo STELJIĆ  
 Directorate for Railways, Belgrade, Serbia

3.3. ESTIMATION OF RAILWAY BELGRADE RING OPTIC NETWORK USING NETWORK PLANNING TOOL  
 Sanja JEVTIĆ, Marko BURSACIĆ  
 Academy of Technical and Art Applied Studies Belgrade, Serbia  
 Dragan JEVTIĆ  
 Serbian Railway Infrastructure, Belgrade, Serbia  
 Mileša SREČKOVIĆ  
 Faculty of Electrical Engineering, Belgrade, Serbia

3.4. CABLEWAYS AND RAILWAYS – ECOLOGICAL ASPECTS  
 Jovo STELJIĆ, Nataša CEROVIĆ, Filip ŠĆEKIĆ  
 Directorate for Railways, Belgrade, Serbia

3.5. ANALYSIS OF THE INTERFACE BETWEEN NATIONAL APPLICABLE GAUGE IN THE BULGARIAN NETWORK AND GAUGE GC, BG AND GA  
 Milcho LEPOEV, Lazar GEORGIEV  
 University of Architecture, Sofia, Bulgaria  
 Vladimir ZHEKOV  
 National railway infrastructure company, Sofia, Bulgaria

4.1. ANALYSIS OF THE FAILURES OF BOGIES TYPE T73-AD AND Y32 FROM OF BULGARIAN STATE RAILWAYS  
 Dobrinka ATMADZHOVA, Vanio RALEV  
 University of Transport (VTU Todor Kableshkov), Sofia, Bulgaria

4.8. RELIABILITY COMPARISON OF CLASSICAL BRAKE FOR FREIGHT WAGONS AND THE INTEGRATED BOGIE BRAKE TYPE IBB 10  
 Erdinč RAKIPOVSKI, Dragan MILČIĆ  
 Faculty of Mechanical Engineering, Niš, Serbia  
 Tasko SMILESKI  
 Faculty of Mechanical Engineering, Skopje, North Macedonia

5.4. EUROPEAN RAILWAYS THROUGH TIME AND “STORMS”  
 Branka NEDELJKOVIĆ, Ksenija DUNJIĆ PAVLOVIĆ, Nina IVKOVIĆ  
 Directorate for Railways, Belgrade, Serbia

- 6.4. ANALYSIS OF LOGISTICS CHAINS, SERVICED BY RAILWAY TRANSPORT AND APPROACHES FOR TECHNOLOGICAL DESIGN OF PROCESSES  
Andrey BORISOV, Violina VELYOVA  
University of Transport (VTU Todor Kableshev), Sofia, Bulgaria
- 6.5. THE REVIEW OF HARMONIZED STANDARDS OF PERSONAL PROTECTIVE EQUIPMENT FOR SAFE WORK ON RAILWAY  
Vesna PAVELKIĆ  
Academy of Technical and Art Applied Studies Belgrade, Serbia  
Dragan MAJKIĆ  
Serbian Railways Infrastructure, Belgrade, Serbia  
Marija ILIĆ  
Faculty of Mining and Geology, Belgrade, Serbia  
Aleksandar BLAGOJEVIĆ  
Academy of Technical and Art Applied Studies Belgrade, Serbia
- 6.6. NOVEL RECOMMENDATIONS OF UIC FOR CALCULATION OF CARBON CONTENT IN RAILWAY INFRASTRUCTURE  
Vesna PAVELKIĆ, Sandra KASALICA, Aleksandar BLAGOJEVIĆ  
Academy of Technical and Art Applied Studies Belgrade, Serbia  
Marija ILIĆ  
Faculty of Mining and Geology, Belgrade, Serbia
- 6.9. APPLICATION OF LASER TECHNOLOGY IN PRODUCTION AND MAINTENANCE OF RAILWAY VEHICLES  
Marija VUKŠIĆ POPOVIĆ, Sanja JEVTIĆ  
Academy of Technical and Art Applied Studies Belgrade, Serbia
- 7.1. MAAS IN EU RESEARCH PROJECTS FOR A BETTER POSITION OF RAILWAYS IN PROVIDING TRANSPORT SERVICES  
Student: Teodora MILENKOVIĆ  
Mentor: Branislav BOŠKOVIĆ  
Faculty of Transport and Traffic Engineering, Belgrade, Serbia
- 7.2. PERFORMANCES AND INDICATORS OF THE RAILWAY SISTEM OF THE SERBIA IN THE TRANSPORT OF GOODS  
Student: Marija SELAKOVIĆ  
Mentor: Branislav BOŠKOVIĆ  
Faculty of Transport and Traffic Engineering, Belgrade, Serbia

- 7.3. DETERMINATION OF BOTTLE-NECKS FOR THE BEOGRAD CENTAR-NOVI SAD-SUBOTICA RAILWAY THAT LED TO MODERNIZATION DEMAND  
Student: Milan JOVETIĆ  
Mentor: Predrag JOVANOVIĆ  
Faculty of Transport and Traffic Engineering, Belgrade, Serbia
- 7.4. RISK RATING IN THE TRANSPORT OF DANGEROUS GOODS  
Student: Stefan SREDOJEVIĆ  
Mentor: Branislav BOŠKOVIĆ  
Faculty of Transport and Traffic Engineering, Belgrade, Serbia
- 7.5. TECHNOLOGY AND PERFORMANCE INDICATORS OF NATIONAL AGENCIES AT BORDER CROSSINGS  
Student: Dalibor PETKOVSKI  
Mentor: Branislav BOŠKOVIĆ  
Faculty of Transport and Traffic Engineering, Belgrade, Serbia

### *Organizing Secretariat*

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