

**CETRA** 2018

**Final Programme**

# 5<sup>th</sup> International Conference on Road and Rail Infrastructure

17–19 May 2018  
Zadar, Croatia

[www.grad.unizg.hr/cetra](http://www.grad.unizg.hr/cetra)

Organizator



Sveučilište u Zagrebu  
Građevinski fakultet  
Zavod za prometnice

Potporna organizaciji



International Road Federation



Forum of European National  
Highway Research Laboratories

## ORGANISATION AND COMMITTEES

### CHAIRMEN

Prof. Stjepan Lakušić  
University of Zagreb  
Faculty of Civil Engineering

Prof. emer. Željko Korlaet  
University of Zagreb  
Faculty of Civil Engineering

### ORGANIZING COMMITTEE

Prof. Stjepan Lakušić  
Prof. emer. Željko Korlaet  
Prof. Vesna Dragčević  
Prof. Tatjana Rukavina  
Assist. Prof. Ivica Stančerić  
Assist. Prof. Maja Ahac  
Assist. Prof. Saša Ahac  
Assist. Prof. Ivo Haladin  
Assist. Prof. Josipa Domitrović  
Prof. Rudolf Eger  
Prof. Kenneth Gavin  
Prof. Janusz Madejski  
Prof. Nencho Nenov  
Prof. Andrei Petriaev  
Prof. Otto Plašek  
Assist. Prof. Andreas Schoebel  
Prof. Adam Szeląg  
Brendan Halleman  
Tamara Džambas  
Viktorija Grgić  
Šime Bezina  
Katarina Vranešić  
Željko Stepan

### INTERNATIONAL ACADEMIC SCIENTIFIC COMMITTEE

Stjepan Lakušić, University of Zagreb, president  
Borna Abramović, University of Zagreb  
Maja Ahac, University of Zagreb  
Saša Ahac, University of Zagreb  
Darko Babić, University of Zagreb  
Danijela Barić, University of Zagreb  
Davor Brčić, University of Zagreb  
Domagoj Damjanović, University of Zagreb  
Sanja Dimter, J. J. Strossmayer University of Osijek  
Aleksandra Deluka Tibljaš, University of Rijeka  
Josipa Domitrović, University of Zagreb  
Vesna Dragčević, University of Zagreb  
Rudolf Eger, RheinMain Univ. of App. Sciences, Wiesbaden  
Adelino Ferreira, University of Coimbra  
Makoto Fujii, Kanazawa University  
Laszlo Gaspar, Széchenyi István University in Győr  
Kenneth Gavin, Delft University of Technology  
Nenad Gucunski, Rutgers University  
Ivo Haladin, University of Zagreb  
Staša Jovanović, University of Novi Sad  
Lajos Kisgyörgy, Budapest Univ. of Tech. and Economics  
Anastasia Konon, St. Petersburg State Transport Univ.  
Željko Korlaet, University of Zagreb  
Meho Saša Kovačević, University of Zagreb  
Zoran Krakutovski, Ss. Cyril and Methodius Univ. in Skopje  
Dirk Lauwers, Ghent University  
Janusz Madejski, Silesian University of Technology  
Goran Mladenović, University of Belgrade  
Tomislav Josip Mlinarić, University of Zagreb  
Nencho Nenov, University of Transport in Sofia  
Mladen Nikšić, University of Zagreb  
Andrei Petriaev, St. Petersburg State Transport University  
Otto Plašek, Brno University of Technology  
Mauricio Pradena, University of Concepcion  
Carmen Racanel, Tech. Univ. of Civil Eng. Bucharest  
Tatjana Rukavina, University of Zagreb  
Andreas Schoebel, Vienna University of Technology  
Ivica Stančerić, University of Zagreb  
Adam Szeląg, Warsaw University of Technology  
Marjan Tušar, National Institute of Chemistry, Ljubljana  
Audrius Vaitkus, Vilnius Gediminas Technical University  
Andrei Zaitsev, Russian University of transport, Moscow

## WELCOME TO CETRA 2018 AND WELCOME TO ZADAR

The intention of CETRA 2018 conference is to bring together scientists and experts in the fields of road and railway engineering and give them one more opportunity to present the results of their researches, findings and innovations. Road and railway infrastructures are closely related, but scientific and professional gatherings that include both fields simultaneously have rarely been organized until now. The development of a society, particularly its economic development, at present is unthinkable without a developed road and railway infrastructure.

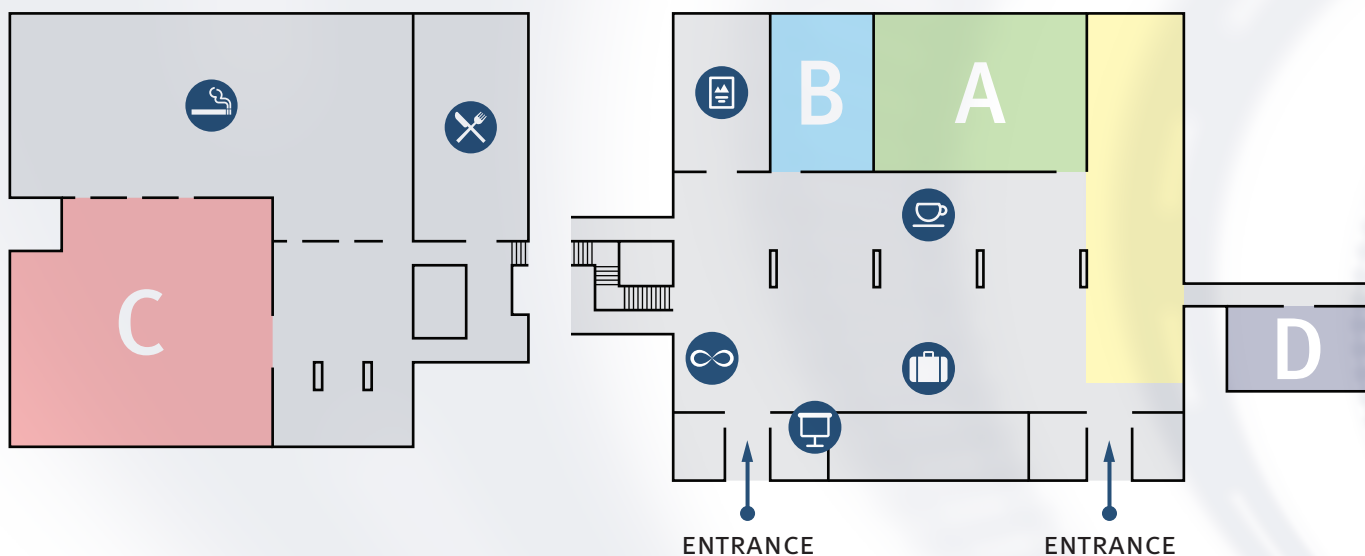
Great interest of participants in topics from the field of road and rail infrastructure during previous CETRA conferences (CETRA 2010, CETRA 2012, CETRA 2014, CETRA 2016), confirmed the soundness of the Department for Transportation Engineering's decision to once again organize such an international event. Positive comments received from participants in the previous CETRA conferences motivated the Department for Transportation Engineering, Faculty of Civil Engineering - University of Zagreb, to continue with the organization of such event in 2018 also. The Organizing Committee has been working hard to make CETRA 2018 a very interesting conference, which will provide not only fruitful, scientific and professional experience but a chance to meet old friends and make new ones in Zadar. We would like to thank the various institutions, scientific committee members, sponsoring and donor companies and of course, the indefatigable staff of the Department of Transportation at Faculty of Civil Engineering in Zagreb, who have helped in the preparation and organization of CETRA 2018 Conference.

One of our goals regarding the International Conference on Road and Rail Infrastructure - CETRA is to have all published papers indexed in scientific databases in order to achieve greater recognition for the conference itself, for published papers, and for their authors. As the serial publication entitled Road and Rail Infrastructure was achieved with a previous conference (CETRA 2014), the precondition was fulfilled to obtain the International Standard Serial Number (ISSN), which is needed to start the procedure for registering this publication in scientific databases. All CETRA Conference Proceedings, including CETRA 2018, are indexed in WoS Core Collection (CPCI-S), Google Scholar, and TRID database. Also, a great novelty regarding the CETRA 2018 conference is that the DOI (Digital Object Identifier) number will be assigned to each published paper. 243 excellent papers were published in the proceedings Road and Rail Infrastructure IV. The full papers are being published by the Department of Transportation, Faculty of Civil Engineering at University of Zagreb in hardcopy and USB version of the conference proceedings. We wish you all a pleasant and productive time in Zadar at CETRA 2018 Conference.



*Lakušić S. Korlaet*

Stjepan Lakušić and Željko Korlaet  
Chairmen of CETRA 2018 Conference



- CONFERENCE HALLS
- EXHIBITION AREA
- REGISTRATION DESK
- HOTEL RECEPTION
- PRESENTATION ADMITTANCE ROOM
- POSTER AREA
- RESTAURANT
- BAR
- TERRACE

**REMARK:** Official languages of the conference are Croatian and English. We kindly ask the participants to acquire devices for simultaneous translation that will be available in front of congress hall A and C.

**NAPOMENA:** Službeni jezici konferencije su hrvatski i engleski. Ljubazno molimo sudionike konferencije da koriste uređaje za simultano prevođenje koji će biti dostupni u konferencijskoj dvorani A i C.

## CONFERENCE PROGRAMME – SHORT VERSION

DAY 0 – Wednesday, May 16 <sup>th</sup>		
15:00 – 20:00	Registration of the Participants	HOTEL LOBBY
15:00 – 17:00	<b>STAKEHOLDERS WORKSHOP</b> “Defining an integrated Users’ Demand Analysis at Network level” <a href="https://www.surveymonkey.com/r/SAFE10T">https://www.surveymonkey.com/r/SAFE10T</a>	CONFERENCE HALL “C”
19:00 – 21:00	A welcome cocktail for participants and guests	HOTEL TERRACE
DAY 1 – Thursday, May 17 <sup>th</sup>		
07:30 – 08:30	Registration of the Participants	HOTEL LOBBY
09:30 – 10:00	Opening Ceremony	CROATIAN NATIONAL THEATRE ZADAR
10:00 – 10:30	<b>KEYNOTE LECTURE 1</b>	CROATIAN NATIONAL THEATRE ZADAR
10:30 – 11:00	Coffee Break	
11:00 – 11:30	<b>KEYNOTE LECTURE 2</b>	CROATIAN NATIONAL THEATRE ZADAR
11:30 – 12:00	<b>KEYNOTE LECTURE 3</b>	CROATIAN NATIONAL THEATRE ZADAR
12:30 – 14:00	Lunch Break	HOTEL RESTAURANT

14:00 – 15:30	1A Transport Infrastructure – Design, Management, Monitoring and Maintenance (Poster Session)	CONFERENCE HALL “A”
	1B Pavements – Innovation and New Technology	CONFERENCE HALL “B”
	1C Rail Infrastructure – Monitoring, Modelling and Maintenance	CONFERENCE HALL “C”
	1D Safe-10-T: Safety of Transport Infrastructure on the Ten-T Network, H2020 Project	CONFERENCE HALL “D”
15:30 – 16:00	Coffee Break	
16:00 – 17:30	2A Transport Planning, Modelling, Design and Safety (Poster Session)	CONFERENCE HALL “A”
	2B Geotechnics	CONFERENCE HALL “B”
	2C Bridges – Design, Management, Monitoring and Maintenance	CONFERENCE HALL “C”
18:00 – 20:00	ORGANIZED SIGHTSEEING	
<b>DAY 2 – Friday, May 18<sup>th</sup></b>		
09:00 – 10:30	3A Road Infrastructure – Projects, Construction and Management (Poster Session)	CONFERENCE HALL “A”
	3B Geotechnics and Infrastructure Systems Components Degradation	CONFERENCE HALL “B”
	3C Traffic Planning and Modelling – Computer Techniques and Simulations	CONFERENCE HALL “C”
10:30 – 11:00	Coffee Break	
11:00 – 12:30	4A Rail Infrastructure – Planning, (Re)Construction, Modernization, Monitoring, Modelling and Maintenance	CONFERENCE HALL “A”
	4B Pavements – Laboratory Testing, Optimization and Monitoring	CONFERENCE HALL “B”
	4C Transport Infrastructure – Management, Monitoring and Maintenance	CONFERENCE HALL “C”
12:30 – 13:00	Coffee Break	HOTEL RESTAURANT
13:00 – 14:30	5A Rail Track Structure – Design	CONFERENCE HALL “A”
	5B Road Traffic Safety	CONFERENCE HALL “B”
	5C Power Supply of Transport Systems and Traction Vehicles	CONFERENCE HALL “C”
14:30 – 15:30	Lunch Break	
15:30 – 17:00	6A Transport Infrastructure Management (Poster Session)	CONFERENCE HALL “A”
	6B Road Infrastructure – Planning, Construction, Management and Maintenance	CONFERENCE HALL “B”
	6C Traffic Planning and Modelling – Design, Travel Time and Service Quality	CONFERENCE HALL “C”
17:00 – 17:30	Coffee Break	
17:30 – 19:00	7A Structures – Management, Monitoring and Maintenance	CONFERENCE HALL “A”
	7B Rail Transport Management – Operation, Integration and Intermodality	CONFERENCE HALL “B”
20:30 – 23:00	Gala Dinner	
<b>DAY 3 – Saturday, May 19<sup>th</sup></b>		
09:00 – 10:30	8A Rail Infrastructure – Monitoring, Modelling and Maintenance (Poster Session)	CONFERENCE HALL “A”
	8B Urban Transport – Modelling, Integration, Intermodality and Mobility	CONFERENCE HALL “B”
	8C Pavements – Monitoring and Condition Assessment	CONFERENCE HALL “C”
10:30 – 11:00	Coffee Break	
11:00 – 12:15	9A Rail Transport Management – Operation, Integration and Intermodality	CONFERENCE HALL “A”
	9B Road Infrastructure Management – Construction and Maintenance	CONFERENCE HALL “B”
	9C Traffic Safety	CONFERENCE HALL “C”
12:30 – 13:00	Best Poster Awards and Conference Closure	

## CONFERENCE PROGRAMME – DETAILED VERSION

### DAY 1 – Thursday, May 17<sup>th</sup>

#### Venue – HOTEL KOLOVARE

07:30 – 08:30	Registration of the Participants	HOTEL LOBBY
08:30	Departure to Croatian National Theatre Zadar – both walking (15 min) and bus transfer option (5 min bus ride + 5 min walk) will be available	

#### Venue – CROATIAN NATIONAL THEATRE ZADAR (in old town Zadar)

09:30 – 10:00	OPENING CEREMONY	
10:00 – 10:30	KEYNOTE LECTURE 1: SENSING MECHANISM AND REAL TIME (SMART) COMPUTING FOR GRANULAR MEDIA Prof. Hai Huang, Pennsylvania State University	
10:30 – 11:00	Coffe Break	
11:00 – 11:30	KEYNOTE LECTURE 2: INNOVATIVE TRANSPORT INFRASTRUCTURE DEVELOPMENT Dr. Thierry Goger, FEHRL – the Forum of European National Highway Research Laboratories	
11:30 – 12:00	KEYNOTE LECTURE 2: CHALLENGES OF PORT INFRASTRUCTURES AND MULTI MODAL TRANSPORT Egbert van der Wal, Port of Rotterdam	
12:00	Departure to Hotel Kolovare – both walking (15 min) and bus transfer option (5 min bus ride + 5 min walk) will be available	

#### Venue – HOTEL KOLOVARE

12:30 – 14:00	Lunch Break
---------------	-------------

### Co-organizer and Support of the Conference



University of Zagreb  
Trg maršala Tita 14, 10000 Zagreb,  
Croatia



Ministry of the Sea, Transport and  
Infrastructure  
Prisavlje 14, 10000 Zagreb, Croatia



Faculty of Civil Engineering  
University of Zagreb  
Kačićeva 26, 10000 Zagreb, Croatia  
www.grad.hr



Ministry of Construction and Physical  
Planning  
Ulica Republike Austrije 20, 10000  
Zagreb, Croatia



Croatian Academy of Engineering  
Kačićeva 28, 10000 Zagreb, Croatia  
www.hatz.hr



The city of Zadar



International Road Federation  
www.irf.global



Ministry of Science and Education  
Donje Svetice 38, 10000 Zagreb,  
Croatia



FEHRL - the Forum of European  
National Highway Research  
Laboratories  
www.fehrl.org



Thursday, May 17<sup>th</sup>  
14:00 – 15:30

Session 1.A  
TRANSPORT INFRASTRUCTURE – DESIGN, MANAGEMENT,  
MONITORING AND MAINTENANCE (POSTER SESSION)

Session room:  
CONFERENCE HALL “A”

Chairmen: **Andrei Zaitsev and Domagoj Damjanović**

Time	Ref. No.	Paper Title / Author(s)
14:00 – 15:30	642	THE IMPORTANCE OF GROUND INVESTIGATION FINDINGS IN THE DESIGN FOR OVERHEAD LINE ELECTRIFICATION FOUNDATIONS Saeed Murray, Slobodan Mickovski
	794	MODELLING OF TUNNEL LINING DEGRADATION Martin Závacký, Juraj Chalmovský, Jan Štefaňák, Lumír Miča, Petr Bílek
	844	MONITORING OF LONG TERM DEFORMATIONS IN BOBOVA TUNNEL Meho Saša Kovačević, Ken Gavin, Irina Stipanović Oslaković, Lovorka Librić
	685	STABILIZATION OF CLAYEY SOIL USING GGBF SLAG WITH PORTLAND CEMENT AND HYDRATED LIME Alpa Shah, Ankit Adwani
	949	INFLUENCE OF FLY ASH ON THE ENGINEERING PROPERTIES OF SILTY CLAY AND HEAVY LOAM IN SHANGHAI Jili Qu, Da Hu
	896	INTERACTION COEFFICIENT FOR RESISTANCE TO FRAGMENTATION BY GOST AND EN TEST RESULTS Julia Koreneva, Julija Shommet
	705	BRIDGE SMS – INNOVATIVE SOLUTION FOR MANAGEMENT OF BRIDGES OVER WATER Damir Bekić, Igor Kerin, Paul Cahill, Panagiotis Michalis, John Laphorne, Hrvoje Šolman, Gordon Gilja, Kristina Potočki, Vikram Pakrashi, Eamon McKeogh
	694	FIELD TESTING OF FBG BASED DEFORMATION SENSORS EMBEDDED IN CONCRETE BRIDGE STRUCTURE Kristýna Čápová, Lukáš Velebil, Jan Včelák, Jaroslav Demuth
	780	NO–CLEARANCE COMPOSITE SUPERSTRUCTURE AND STEEL BRIDGE CONJOINT BEHAVIOUR AS A RESULT OF SPRINGTIME TEMPERATURE CHANGE Nándor Liegner, Helga Papp
	931	DESIGN DEVELOPMENT OF 9.759KM LONG SIX LANE EXTRADOSED BRIDGE PROJECT CROSSING RIVER GANGA IN THE STATE OF BIHAR, INDIA P. R. Vital Veera, Inki Choi, R. Kasi Viswanath
	928	CASE STUDY: RAIL STRUCTURE INTERACTION OF BRIDGE ACROSS BALRAM RIVER IN THE STATE OF GUJRAT, INDIA Anuj Asati, Vasanth Kumar S., Subir Das
	959	THE ANALYSIS OF VIBRATIONS INDUCED BY PEDESTRIAN TRAFFIC AND THE APPLICATION OF DAMPING SYSTEMS ON FOOTBRIDGES Petra Mužic, Anđelko Vlašić
	735	POTENTIALS AND ADVANTAGES OF APPLYING GEOGRAPHIC INFORMATION SYSTEMS IN VARIOUS FIELDS OF TRAFFIC ENGINEERING Samir Čaušević, Abidin Deljanin, Muhamed Begović, Emir Deljanin
15:30 – 16:00		Coffee Break



Thursday, May 17<sup>th</sup>  
14:00 – 15:30

Session 1.B  
PAVEMENTS – INNOVATION AND NEW TECHNOLOGY

Session room:  
CONFERENCE HALL “B”

Chairmen: Josipa Domitrović and Sanja Dimter

Time	Ref. No.	Paper Title / Author(s)
14:00 – 15:30	649	ACOUSTICAL AGEING OF LOW NOISE PAVEMENTS EXPRESSED BY DIFFERENT MEASURING TECHNIQUES Audrius Vaitkus, Tadas Andriejauskas, Viktoras Vorobjovas, Ovidijus Šernas, Dovydas Skrodenis
	726	PREDICTION OF SHORT-TERM AGING LEVEL BY AGING QUANTITY MODEL USING TIME AND TEMPERATURE OF HOT-MIX ASPHALT Yeongsam Kim, Baeseon Dong, Sungun Kim, Jaewon Jo, Kwang Kim
	785	STIFFNESS AND FATIGUE RESISTANCE OF HOT MIX ASPHALT CONTAINING HIGH RATES OF RECLAIMED ASPHALT PAVEMENT Nelson Alvarado Patiño, Juan Martinez, Emile Lopez
	798	USABILITY OF HEMP FIBER IN DENSE GRADED HOT MIX ASPHALT MIXTURE Sebnem Karahancer, Ekinhan Eriskin, Kemal Armagan, Nihat Morova, Mehmet Saltan, Serdal Terzi
	831	TESTING AND INTERPRETATION OF THE PERMEABILITY OF ASPHALT MIXES Zsuzsanna Igazvölgyi, Zoltán Soós, Csaba Tóth, Réka Nádas
	859	INCREASE OF ASPHALT RECYCLING BY USING PYROLYSIS PRODUCTS OF WASTE TIRES Lidija Ržek, Dušan Klinar, Marjan Tušar
	914	MIX DESIGN AND PRELIMINARY VALIDATION OF SUSTAINABLE ASPHALT CONCRETE MANUFACTURED WITH ELECTRIC ARC AND LADLE FURNACE STEEL SLAGS Marta Skaf, Vanesa Ortega-López, Juan Manso, Emiliano Pasquini, Marco Pasetto
15:30 – 16:00	Coffee Break	

### Golden Sponsors



Geobrugg AG  
Aachstrasse 11, 8590 Romanshorn,  
Switzerland  
[www.geobrugg.com](http://www.geobrugg.com)



Monterra d.o.o.  
Vukovarska 76, 51000 Rijeka, Croatia  
[www.monterra.hr](http://www.monterra.hr)

### Silver Sponsor



Department of Transportation  
Engineering  
Faculty of Civil Engineering  
University of Zagreb  
Kačićeva 26, 10000 Zagreb, Croatia  
[www.grad.unizg.hr](http://www.grad.unizg.hr)

### Bronze Sponsors



Siemens d.d.  
Heinzelova 70a, 10000 Zagreb,  
Croatia  
[www.siemens.com](http://www.siemens.com)



Beton Lučko d.o.o.  
Puškarićeva 1b, 10250 Lučko, Croatia  
[www.betonlucko.hr](http://www.betonlucko.hr)



Nin Saltworks  
Ilirska cesta 7, 43232 Nin, Croatia  
[www.solananin.hr](http://www.solananin.hr)





Thursday, May 17<sup>th</sup>  
14:00 – 15:30

Session 1.C  
RAIL TRAFFIC MODELLING AND TIMETABLES

Session room:  
CONFERENCE HALL “C”

Chairmen: Janusz Madejski and Otto Plašek

Time	Ref. No.	Paper Title / Author(s)
14:00 – 15:30	SPL	<b>SPONSOR LECTURE – TENSAR &amp; MONTERRA</b> Michal Golos
	664	ASYMMETRICAL EFFECTS ON RAILWAY TURNOUT BEARERS DUE TO WHEELSET IMPACT OVER A CROSSING NOSE Sakdirat Kaewunruen, Keiichi Goto, Chayut Ngamkhanong, Rims Janeliukstis
	676	VIBRATION-BASED CONDITION MONITORING OF TRAMWAY TRACK FROM IN SERVICE VEHICLE USING TIME-FREQUENCY PROCESSING TECHNIQUES Péter Bocz, Ákos Vinkó, Zoltán Posgay
	704	UNCERTAINTY AND RISK QUANTIFICATION IN RAILWAY MAINTENANCE MODELLING Rick Vandoorne, Petrus Gräbe
	749	IMPROVING TRACK CONDITION BY APPLICATION OF QUASI CUMULATIVE DISTRIBUTION FUNCTION (QCDF) Gregory Krug, Janusz Madejski
	770	AN INTEGRATED MONITORING SYSTEM FOR CONTINUOUS EVALUATION OF RAILWAY TRACKS FOR EFFICIENT ASSET MANAGEMENT Carlos Manuel Santos, Paulo Morais, André Paixão, Eduardo Fortunato, Francisco Asseiceiro, Paula Alvarenga, Luís Gomes
	970	PROPOSAL OF A NEW ANALYTICAL METHOD TO ESTIMATE THE VERTICAL IMPACT FORCES ON RAILWAY TRACKS DUE TO CHANGES IN TRACK PROFILE AND TRACK STIFFNESS Niyazi Özgür Bezgin
15:30 – 16:00		Coffee Break



Thursday, May 17<sup>th</sup>  
14:00 – 15:30

Session 1.D  
SAFE-10-T: SAFETY OF TRANSPORT INFRASTRUCTURE  
ON THE TEN-T NETWORK, H2020 PROJECT

Session room:  
CONFERENCE HALL “D”

Time	Ref. No.	Paper Title / Author(s)
14:00 – 15:30	1	SAFE-10-T PROJECT INTRODUCTION Paul Doherty, Gavin & Doherty Geosolutions
	2	MONITORING AND MODELLING OF CRITICAL INFRASTRUCTURE Lorcan Connolly, Roughan & O'Donovan Innovative Solutions
	3	MULTI-MODAL NETWORK ANALYSIS Irina Stipanovic, Infra Plan konzalting
	4	GLOBAL SAFETY FRAMEWORK Ken Gavin, TU Delft
	5	DEMONSTRATION PROJECTS Julie Clarke, Gavin & Doherty Geosolutions
	6	OPEN DISCUSSION
15:30 – 16:00		Coffee Break



Thursday, May 17<sup>th</sup>  
16:00 – 17:30

Session 2.A  
TRANSPORT PLANNING, MODELLING, DESIGN  
AND SAFETY (POSTER SESSION)

Session room:  
CONFERENCE HALL "A"

Chairmen: Zoran Krakutovski and Borna Abramović

Time	Ref. No.	Paper Title / Author(s)
16:00 – 17:30	850	OPERATIONAL ANALYSIS OF INNOVATIVE ROUNDABOUT LAYOUTS Tânia Mendes, Ana Bastos Silva, António Vasconcelos, Raul Almeida
	889	THE IMPACT OF SELECTED ROAD AND TRAFFIC FEATURES ON TRAVEL SPEED ON TWO LANE HIGHWAY Krzysztof Ostrowski, Janusz Chodur
	890	SPEED MODELS AT ENTRIES TO SIGNALISED RURAL INTERSECTIONS Janusz Chodur, Krzysztof Ostrowski
	878	RESEARCH OF CRITICAL GAPS OF TRAFFIC FLOWS ON FREEWAY INTERCHANGE Aleksey Kostsov
	849	MICROSIMULATION-BASED EVALUATION OF A 30 KM/H ZONE Carina Chaves, António Vasconcelos, Ana Silva, Raul Almeida
	961	USING OF DIFFERENT ROAD VEHICLE COMBINATIONS FOR ABNORMAL TRANSPORTS BASED ON THE ASSESSMENT OF LOAD RATING OF BRIDGES IN SLOVAKIA FOR THE MOST CRITICAL VEHICLE COMBINATION Juraj Jagelcak, Jan Vrabel, Monika Kiktova
	800	THE EFFECT OF ROAD RESTRAINT SYSTEMS ON THE LEVEL OF ROAD SAFETY – POLISH EXPERIENCE Marcin Budzynski, Kazimierz Jamroz, Lukasz Jelinski
	967	EVALUATION OF DIFFICULTY IN MAKING HOSPITAL BY EACH TRANSPORTATION MODE IN DEPOPULATED AREA – USING NATIONAL HEALTH INSURANCE DATA – Yuma Morisaki, Makoto Fujiu, Junichi Takayama, Kiyoko Yanagihara, Tatsuya Niahino, Masahiko Sagae, Kohei Hirako
	942	RAIL TRAFFIC TECHNOLOGY DURING THE CONSTRUCTION OF LJUBLJANA PASSENGER CENTER Luka Šošo, Gorazd Dolšek
	746	IMPACT OF EXCLUSIVE BUS LANE ON URBAN ARTERIAL PERFORMANCE MEASURES Deana Breški, Dražen Cvitanić, Daniela Dumanić
	945	CONCEPTUAL DESIGN FOR ESTABLISHING TRAM IN THE PUBLIC TRANSPORT IN SKOPJE Zoran Krakutovski, Darko Moslavac, Zlatko Zafirovski, Stjepan Lakušić
	769	POSSIBILITIES TO INTRODUCE A TOURIST TRAM LINE IN THE CITY OF ZAGREB Marko Slavulj, Dino Šojat, Božo Radulović, Filip Sirovica
	887	ZAGREB METRO PLANS – CURRENT ISSUES AND FUTURE DEVELOPMENT Saša Ahac, Maja Ahac, Tea Cvitanović, Barbara Trupković
	18:00 – 20:00	

## Media Partners

**GRAĐEVINAR**

Journal of Croatian Association  
of Civil Engineers  
Berislavićeva 6, 10000 Zagreb, Croatia  
www.casopis-gradjevinar.hr



Railway Gazette International  
Chancery House, St Nicholas Way,  
Sutton, Surrey SM1 1JB  
United Kingdom



Thursday, May 17<sup>th</sup>  
16:00 – 17:30

Session 2.B  
GEOTECHNICS

Session room:  
CONFERENCE HALL “B”

Chairmen: **Kenneth Gavin and Meho Saša Kovačević**

Time	Ref. No.	Paper Title / Author(s)
16:00 – 17:30	707	REHABILITATION TECHNIQUES FOR AGED RAILWAY TUNNELS Meho Saša Kovačević, Mario Bačić, Danijela Jurić Kačunić
	877	SUBGRADE TREATED BY ALTERNATIVE TECHNOLOGIES BASED ON FLY ASH FROM FLUIDIZED COMBUSTION Jakub Šedina, Jan Valentin, Petr Mondschein
	934	GEOGRIDS – WHAT IS IMPORTANT Mensur Mulabdić, Krunoslav Minažek, Jelena Kaluđer
	954	STRUCTURAL REINFORCEMENT OF GEOTEXTILES BY HIGH-TENSILE STEEL WIRE MESHES Vjekoslav Budimir, Armin Roduner
	958	PROBLEM SOLUTION FOR EXPLOITATION OF ROAD STRUCTURES AT THE RUSSIAN FAR EAST NORTHERN AREAS Svetlana Zhdanova, N. I. Gorchkov
	964	ISSUES OF VIBRO-DYNAMIC IMPACT ON ROADBED DEFORMABILITY IN PERMAFROST CONDITIONS Svetlana Zhdanova, N. I. Gorchkov, Elena D. Goncharova, M. A. Krasnov
	965	COMPRESSIBILITY CHARACTERISTICS OF SOFT CLAY USING LARGE SIZED MODEL CONSOLIDATION TEST THROUGH VERTICAL GEO-DRAIN Nirav Rathod, Abhay Gandhi, Manish Shah
18:00 – 20:00		ORGANIZED SIGHTSEEING Tour 1: Zadar Tour 2: Nin



Thursday, May 17<sup>th</sup>  
16:00 – 17:30

Session 2.C  
TRAFFIC PLANNING AND MODELLING

Session room:  
CONFERENCE HALL “C”

Chairmen: **Domagoj Damjanović and Anđelko Vlašić**

Time	Ref. No.	Paper Title / Author(s)
16:00 – 17:30	655	APPLICATION OF FINITE ELEMENT METHODS TO MASONRY BRIDGES Steve Rhodes, Philip Icke, Paul Lyons
	723	PARAMETRIC ANALYSIS OF PEDESTRIAN TIMBER BEAM BRIDGES AND SELECTION OF THEIR OPTIMAL DESIGN Adriana Bjelanović, Filip Franolić, Tomislav Franković, Ivana Štimac Grandić
	901	OPERATIONAL MODAL ANALYSIS OF TWO IDENTICAL SINGLE SPAN ROAD BRIDGES Domagoj Damjanović, Ivan Duvnjak, Marko Bartolac, Janko Koščak
	960	FATIGUE ASSESSMENT DUE TO NON-STANDARD DETAILING OF ORTHOTROPIC BRIDGE DECKS Anđelko Vlašić, Nijaz Mujkanović, Gordana Hrelja Kovačević
18:00 – 20:00		ORGANIZED SIGHTSEEING Tour 1: Zadar Tour 2: Nin



Friday, May 18<sup>th</sup>  
09:00 – 10:30

Session 3.A  
“ROAD INFRASTRUCTURE – PROJECTS, CONSTRUCTION  
AND MANAGEMENT (POSTER SESSION)”

Session room:  
CONFERENCE HALL “A”

Chairmen: Sanja Dimter and Marjan Tušar

Time	Ref. No.	Paper Title / Author(s)
09:00 – 10:30	647	LABORATORY PERFORMANCE-BASED APPRAISAL OF HALF-WARM MIX RECYCLED ASPHALT MIXTURES CONTAINING UP TO 50% OF RECLAIMED ASPHALT PAVEMENT José Lizárraga, Antonio Ramírez, José Marcobal, Juan Gallego
	651	OPTIMIZING ASPHALT PAVEMENTS FOR HEAVILY TRAFFICKED ROADS László Gáspár, Zsolt Bencze
	788	THE INVESTIGATION OF POLYAMIDE FIBER AS AN ADDITIVE IN HMA EKINHAN ERISKIN, SEBNEM KARAHANCER, KEMAL ARMAGAN, CAGLAR SIVRI, SERDAL TERZI, MEHMET SALTAN
	876	LOW TEMPERATURE PROPERTIES OF PAVING GRADE BITUMEN Mojca Ravnikar Turk, Marjan Tušar
	681	MODULAR EXPANSION JOINTS FOR JOINT OPENINGS IN THE ROAD Miroslav Šimun, Sandra Mihalinac, Nikola Golojuh, Ninoslav Stajkov
	756	ECOLOGICAL ASPECT OF BIOASHES AS ROAD BUILDING MATERIAL Martina Zagvozda, Sanja Dimter, Tatjana Rukavina, Adriana Estokova
	703	USE OF COAL WASTE IN ROAD CONSTRUCTION Valerii Vyrozhemskiy, Iryna Voloshyna, Nataliia Bidnenko, Vasyl Nagaychuk
	732	BIM IN INFRASTRUCTURE Gregor Kralj
	759	SUPERVISION OF ROAD INFRASTRUCTURE BY APPLYING INTELLIGENT TRANSPORT SYSTEMS WITH SPECIAL REVIEW ON BOSNIA AND HERZEGOVINA Abidin Deljanin, Ermin Muharemović, Mirza Berković, Kludija Kuliš
	661	DEGRADED ROAD PAVEMENT SURVEY USING GPR Sandro Colagrande, Danilo Ranalli, Marco Tallini
	873	INVESTIGATING THE USE OF GPR FOR PAVEMENT CONDITION ASSESSMENT Josipa Domitrovic, Šime Bezina, Tatjana Rukavina, Ivica Stančerić
10:30 – 11:00		Coffee Break





Friday, May 18<sup>th</sup>  
09:00 – 10:30

**Session 3.B**  
**GEOTECHNICS AND INFRASTRUCTURE SYSTEMS**  
**COMPONENTS DEGRADATION**

**Session room:**  
**CONFERENCE HALL “B”**

**Chairmen:** Kenneth Gavin and Andrei Petriaev

Time	Ref. No.	Paper Title / Author(s)
09:00 – 10:30	SPL	<b>SPONSOR LECTURE – GEOBRUGG</b>
	711	IMPLEMENTATION OF NON–DESTRUCTIVE METHODS FOR THE DETERMINATION OF TRAMWAY EMBANKMENT CONDITION Mario Bačić, Meho Saša Kovačević, Stjepan Lakušić
	741	SET UP OF A THERMAL NETWORK METHOD MODEL FOR THE CALCULATION OF TEMPERATURE DISTRIBUTION IN HEATED POINTS Markus Schladitz, Robert Adam, Steffen Grossmann
	842	CROATIAN EXPERIENCE IN APPLICATION OF UAS FOR LANDSLIDE REMEDIATION MEASURES Danijela Jurić Kačunić, Marijan Car, Luka Pušić, Stjepan Matić
	903	PASSIVE AND ACTIVE INFRARED THERMOGRAPHY SURVEY IN THE RAILWAY TRANSPORT FIELD Anna Stoyanova, Nencho Nenov, Borislav Bonev
	957	APPLICATION OF NUMERICAL SIMULATION FOR CALCULATING THE LOAD–BEARING CAPACITY OF BRIDGE SUPPORTS ON PERMAFROST SOILS Sergey Kudryavtsev, Denis Pogodin
10:30 – 11:00		Coffee Break



Friday, May 18<sup>th</sup>  
09:00 – 10:30

**Session 3.C**  
**TRAFFIC PLANNING AND MODELLING**  
**– COMPUTER TECHNIQUES AND SIMULATIONS**

**Session room:**  
**CONFERENCE HALL “C”**

**Chairmen:** Ivo Haladin and Andreas Schöbel

Time	Ref. No.	Paper Title / Author(s)
09:00 – 10:30	683	VISUALIZE THE EFFECT OF INPUT VARIABILITY ON MODEL OUTPUT IN TRAFFIC ASSIGNMENT Mundher Seger, Lajos Kisgyorgy
	684	PLATFORM INFRASTRUCTURE – INFLUENCE ON PASSENGER BEHAVIOUR Bernhard Rüger, Thomas Eigner
	687	THE USE OF LOGIT MODEL FOR MODAL SPLIT ESTIMATION: A CASE STUDY Davor Kراسić
	692	INNOVATIVE BAGGAGE DROP OFF FOR INTERMODAL AIR–RAIL TRIPS Bernhard Rüger, Christian Albl
	714	IMPACTS OF AUTONOMOUS VEHICLES ON THE URBAN FUNDAMENTAL DIAGRAM Qiong Lu, Tamás Tettamanti
	839	APPLICATION OF MICROSIMULATION IN ANALYSIS OF THE TRAFFIC LOAD OF THE BRIDGE Irena Ištoka Otković, Damir Varevac
	835	SIMPLIFIED PROCEDURE FOR MAXIMUM ACCELERATION DETERMINATION ON SIMPLE BRIDGE STRUCTURES Ivana Štimac Grandić, Davor Grandić, Nina Čepić
10:30 – 11:00		Coffee Break



Friday, May 18<sup>th</sup>  
11:00 – 12:30

**Session 4.A**  
**RAIL INFRASTRUCTURE – PLANNING, (RE)CONSTRUCTION,  
MODERNIZATION, MONITORING, MODELLING AND MAINTENANCE**

**Session room:**  
**CONFERENCE HALL “A”**

**Chairmen:** Janusz Madejski and Tomislav Josip Mlinarić

Time	Ref. No.	Paper Title / Author(s)
11:00 – 12:30	665	COMPLEX–SYSTEM DECISION FRAMEWORK FOR MANAGING RISKS TO RAIL STATIONS AT AIRPORTS FROM TERRORIST THREATS Hamad Alawad, Silviu Codru, Sakdirat Kaewunruen
	933	NUMERICAL SIMULATIONS OF THE RAILWAY BALLAST Viktorija Grgic, Stjepan Lakusic, Damir Lazarevic
	755	PRIORITIZATION OF RAILWAY INFRASTRUCTURE PROJECTS USING THE ANP APPROACH – CASE STUDY SERBIAN RAILWAY NETWORK Miroslav Prokić, Dragana Macura, Branislav Bošković
	804	RAILWAY TRANSPORT SUSTAINABILITY WITH AUTOMATED HIPOT FAILURE DETECTION Agnes Wangai
	885	EFFECTS OF UNDER–SLEEPER–PADS ON LONG–TERM TRACK QUALITY BEHAVIOUR Johannes Neuhold, Matthias Landgraf
	886	FROM MANUAL INSPECTION TO PERMANENT MONITORING OF TURNOUTS Petra Wilfling
	938	SOME TECHNICAL ASPECTS OF THE CONSTRUCTION OF THE NEW HIGH SPEED RAILWAY IN MEXICO Roberto Gomez, J. Alberto Escobar, Victor Cecilio, Marco Mendoza, Luis Arenas
12:30 – 13:00	Coffee Break	



Friday, May 18<sup>th</sup>  
11:00 – 12:30

**Session 4.B**  
**PAVEMENTS – LABORATORY TESTING,  
OPTIMIZATION AND MONITORING**

**Session room:**  
**CONFERENCE HALL “B”**

**Chairmen:** Vesna Dragčević and Lajos Kisgyörgy

Time	Ref. No.	Paper Title / Author(s)
11:00 – 12:30	648	DETERMINATION OF ROAD SURFACE CHARACTERISTICS USING PHOTOGRAMMETRY TECHNIQUE Mirza Pozder, Sanjin Albinovic, Ammar Saric, Dzevad Krdzalic
	706	PAVEMENT SURFACE MACROTEXTURE ANALYSIS Ivana Pranjić, Aleksandra Deluka Tibljaš, Marijana Cuculić, Robert Skender
	728	PERFORMANCE EVALUATION OF VOID– FREE ASPHALT CONCRETE FOR HEAVY DUTY PAVEMENT Injung Kim, Kyeongjin Kim, Sungjin Lee, Kwang Kim
	761	ON THE IMPORTANCE OF AGGREGATE MINERALOGY IN ASPHALT PAVEMENT DISTRESS Nicolae Ciont, Nicolae Har, Mihai Iliescu
	939	TESTING OF PERVIOUS CONCRETE WITH NON–DESTRUCTIVE METHODS Miloš Šešljija, Vlastimir Radonjanin, Nebojša Radović
	940	ANALYSIS OF BITUMEN AGEING PROCESSES AND INNOVATIVE TECHNIQUES FOR THE REJUVENATION Rita Kleiziene, Audrius Vaitkus, Miglė Paliukaitė
12:30 – 13:00	Coffee Break	



Friday, May 18<sup>th</sup>  
11:00 – 12:30

Session 4.C  
TRANSPORT INFRASTRUCTURE – MANAGEMENT,  
MONITORING AND MAINTENANCE

Session room:  
CONFERENCE HALL “C”

Chairmen: Aleksandra Deluka Tibljaš and Laszlo Gaspar

Time	Ref. No.	Paper Title / Author(s)
11:00 – 12:30	KNL	<b>KEYNOTE LECTURE: THE PELJESAC BRIDGE – MAJOR INFRASTRUCTURE PROJECT IN CROATIA</b> Mr.sc. Goran Legac, Hrvatske ceste d.o.o.
	690	MANAGEMENT OF DEFECTIVE WORKS IN INFRASTRUCTURE PROJECTS Esat Gashi
	852	EXPROPRIATION OF LAND FOR THE CONSTRUCTION OF THE “LOWLAND RAILWAY ZAGREB – RIJEKA” Damir Kontrec, Davor Rajčić
	863	OVERVIEW ON THE MAIN RAILWAY LINKS IN SOUTHEAST EUROPE Mathias Niedermaier, Ana Perić
	913	LIFE CYCLE MANAGEMENT MODEL FOR TUNNELS Sandra Skarić Palić, Irina Stipanović Oslaković, Meho Saša Kovačević, Kenneth Gavin
	932	RISK MANAGEMENT IN TRANSPORT INFRASTRUCTURE PROJECTS Ksenija Čulo, Vladimir Skendrović
12:30 – 13:00		Coffee Break



Friday, May 18<sup>th</sup>  
13:00 – 14:30

Session 5.A  
RAIL TRACK STRUCTURE – DESIGN

Session room:  
CONFERENCE HALL “A”

Chairmen: Anastasia Konon and Janusz Madejski

Time	Ref. No.	Paper Title / Author(s)
13:00 – 14:30	721	EXPERIMENTAL VERIFICATION OF AN OPTIMISED HEATING SYSTEM FOR HOLLOW SLEEPERS CONTAINING POINTS POSITIONING SYSTEMS Julian Heger, Franz Kurzweil, Markus Schladitz, Robert Adam, Steffen Großmann
	765	IN-SITU TESTING OF RC TRACK SLAB IN TUNNEL IVAN AND NUMERICAL MODELING Senad Medic, Adis Skejić, Sanjin Albinović
	773	ISSUES IN DESIGNING PAVEMENT SURFACES FOR PUBLIC TRANSPORT LANES Péter Balog, Nándor Dr. Liegner
	836	RAILWAY BUFFER STOPS PLANNING Otto Plášek, Vlastislav Salajka, Vladimír Adamec, Miroslava Hruzíková, Petr Hradil, Barbora Schüllerová, Petr Guziur
	861	ALLOWABLE WHEEL LOADS OF PRESTRESSED CONCRETE SLEEPERS STANDARDIZED BY JIS Keiichi Goto, Watanabe Tsutomu, Masamichi Sogabe
	905	ANALYSIS OF DYNAMIC IMPACT FORCES ON RAILWAY TRACKS DUE TO WHEEL FLATS Cengiz Kolukirik, Niyazi Bezin
	972	TRACK STRUCTURE RECONSTRUCTION PRACTICE FOR THE SUBGRADE ON WEAK FOUNDATION SOIL Andrey Zaytsev, Andrei Petriaev, Laura Černiauskaite
14:30 – 15:30		LUNCH BREAK HOTEL RESTAURANT



Friday, May 18<sup>th</sup>  
13:00 – 14:30

Session 5.B  
ROAD TRAFFIC SAFETY

Session room:  
CONFERENCE HALL “B”

Chairmen: Rudolf Eger and Ivica Stančerić

Time	Ref. No.	Paper Title / Author(s)
13:00 – 14:30	674	ADDRESSING SIGHT–DISTANCE–RELATED SAFETY EFFECTS OF INSTALLING MEDIAN BARRIERS AT HORIZONTAL CURVES OF UNDIVIDED HIGHWAYS UNDER A 3D APPROACH César De Santos–Berbel, Keila González–Gómez, Maria Castro, José Anta
	751	ANALYSIS OF SELECTED TYPES OF ADVERTISEMENT INFLUENCING THE DRIVER’S ATTENTION IN REAL ROAD TRAFFIC Kateřina Bucsuházy, Ivo Stáňa, Marek Semela, Veronika Svozilová, Olga Vallová
	766	RESTRICTIONS OF USING SPEEDOMETER READINGS FOR DETERMINING VEHICLE COLLISION SPEED Michal Krizak, Albert Bradac, Marek Semela, Roman Mikulec
	796	ACCIDENT PREDICTION MODELS CONSIDERING PAVEMENTS QUALITY Rita Justo–Silva, Adelino Ferreira
	832	ROAD SAFETY MANAGEMENT IN ROMANIA Adrian Burlacu, Alina Burlacu, Carmen Racanel
	882	COMPARISON OF PEDESTRIAN BEHAVIOR AT SIGNALIZED INTERSECTIONS AND OVERPASS LOCATIONS Yalcin Alver, Pelin Onelcin
	911	PILOT PROJECT FOR ROAD SAFETY IN ROMANIA USING THE CABLE ROAD BARRIER Flavius Paval, Mihai Toma
14:30 – 15:30	LUNCH BREAK	HOTEL RESTAURANT



Friday, May 18<sup>th</sup>  
13:00 – 14:30

Session 5.C  
POWER SUPPLY OF TRANSPORT SYSTEMS AND TRACTION VEHICLES

Session room:  
CONFERENCE HALL “C”

Chairmen: Adam Szelaĝ and Mladen Nikšić

Time	Ref. No.	Paper Title / Author(s)
13:00 – 14:30	SPL	<b>SPONSOR LECTURE – SIEMENS</b> <b>PROTECTION OF LEVEL CROSSING SYSTEMS WITH PARTICIPATION OF THE DOMESTIC INDUSTRY</b> Roman Lavrić
	894	COMPARATIVE STRENGTH ANALYSIS OF THE RAILWAY CANTILEVER Svetoslav Slavchev, Vladislav Maznichki, Oleg Krastev, Kiril Velkov, Sanel Purgic
	899	A CALCULATION OF ELECTRIC DRIVES REQUIREMENTS IN A HYBRID SWEEPER Niksa Cavar, Tomislav Ivanis, Mario Vrazic
	910	APPLICATION OF A SPECTRAL THEORY FOR ANALYSIS OF IMPULSE STOCHASTIC PROCESSES OF VOLTAGE AND CURRENT OF ELECTRIC ROLLING STOCK IN TRACTION–REGENERATIVE MODES Adam Szelaĝ, Mykola Kostin, Anatolii Nikitenko, Włodzimierz Jefimowski, Maciej Wieczorek
	912	STRENGTH ASSESSMENT OF POWERED AXLE USING DIFFERENT CALCULATION METHODS Sanel Purgić, Svetoslav Slavchev, Valeri Stoilov, Kiril Velkov
	922	TRAM POWER SUPPLY INFRASTRUCTURE MODERNIZATION FOR IMPROVING ITS ENERGY EFFICIENCY – POLISH CASE Adam Szelaĝ, Tadeusz Maciołek, Zbigniew Draĝek, Marcin Steczek
	927	THE OPTIMIZATION OF SUPERCAPACITOR MODULE PARAMETERS OF A STATIONARY ENERGY STORAGE SYSTEM IN DC POWER SUPPLY Jefimowski Włodzimierz, Adam Szelaĝ, Nikitenko Anatolij, Wieczorek Maciej
14:30 – 15:30	LUNCH BREAK	HOTEL RESTAURANT



Friday, May 18<sup>th</sup>  
15:30 – 17:00

Session 6.A  
TRANSPORT INFRASTRUCTURE MANAGEMENT  
(POSTER SESSION)

Session room:  
CONFERENCE HALL "A"



Chairmen: **Željko Korlaet and Adelino Ferreira**

Time	Ref. No.	Paper Title / Author(s)
15:30 – 17:00	777	ERGONOMIC MODEL OF ACTION'S DETERMINANTS AND APPLICATION IN SECURITY SYSTEM (DYNAMIC INTUITIONISTIC FUZZY MULTI-ATTRIBUTE DECISION MAKING METHOD) Jihad Ouahli, Abdelghani Cherkaoui
	643	MATHEMATICAL MODEL OF MEASUREMENT OF POSITIVE EFFECTS ON THE APPLICATION OF ELECTRICAL VEHICLES IN CITY LOGISTICS. Amel Kosovac, Azra Ferizovic
	666	COMPARISON OF THE MODELS FOR ANALYSING SIGNALIZED INTERSECTIONS Dražen Cvitanić, Mario Maretić, Jure Zekan, Ivan Bošnjak
	819	AUGMENTED TRANSPORTATION: IMPLICATIONS OF AUTONOMOUS VEHICLES OUTSET IN TRAFFIC Tullio Giuffrè, Sanja Šurdonja, Aleksandra Deluka–Tibljša
	853	OPERATING SPEED ON URBAN ROAD NETWORK – CASE STUDY IN RIJEKA, CROATIA Aleksandra Deluka–Tibljša, Sanja Šurdonja, Dario Malatestinić, Luka Strineka
	816	COMPARISON OF THE OPERATING INTERVALS ON THE RAILWAY LINE BETWEEN ŽILINA AND RAJEC AFTER THE APPLICATION OF A NEW DIRECTIVE BY THE SLOVAK RAILWAY INFRASTRUCTURE MANAGER Juraj Čamaj, Anna Dolinayová
	733	IMPACT OF INPUT PARAMETERS ON FINAL SELECTION OF INFRASTRUCTURE OBJECTS AND TECHNOLOGICS OF TRAFFIC Ivo Poljak
	869	DIVIDING INVESTMENTS INTO SUSTAINABLE DEVELOPMENT OF RAILWAY TRANSPORT SYSTEM AS LINEAR PROGRAMMING PROBLEM Vitalii Naumov, Hanna Vasiutina
	917	APPLICATION OF BIM TECHNOLOGY IN LINEAR CONSTRUCTION PROJECTS Filip Ruška, Zlata Dolaček–Alduk, Sanja Dimter, Martina Zagvozda
	923	CONTEMPORARY APPROACH TO ENGINEERING EDUCATION IN THE FIELD OF TRANSPORT INFRASTRUCTURE Sanja Dimter, Zlata Dolaček–Alduk, Ivana Barišić, Filip Ruška
	847	MONITORING OF TRAFFIC NOISE ON URBAN ROAD INTERSECTION – CASE STUDY Tamara Džambas, Vesna Dragčević, Jure Čuljak
	897	THEORETICAL – CALCULATION MODEL FOR DETERMINATION ON STRESS AND LOAD-BEARING CAPACITY IN RAIL TRACK WITH CORROSION Antonio Shopov
	900	CHANGE OF SPRING CONSTANT FOR SPRINGS WITH CORROSION Antonio Shopov, Borislav Bonev, Nikolay Brayonov
	936	STRAY CURRENT CORROSION ACTIVITY ON RAIL TRANSIT SYSTEM IN URBAN AREAS Katarina Vranešić, Stjepan Lakušić, Marijana Serdar
17:00 – 17:30		Coffee Break



Friday, May 18<sup>th</sup>  
15:30 – 17:00

Session 6.B  
ROAD INFRASTRUCTURE – PLANNING, CONSTRUCTION,  
MANAGEMENT AND MAINTENANCE

Session room:  
CONFERENCE HALL “B”

Chairmen: Vesna Dragčević and Aleksandra Deluka Tipljaš

Time	Ref. No.	Paper Title / Author(s)
15:30 – 17:00	672	PREDICTING TRAFFIC SIGNS FUNCTIONAL SERVICE LIFE USING SURVIVAL ANALYSIS METHOD Anđelko Šćukanec, Milan Patrlj, Mario Fiolić, Dario Babić
	708	FUTURE CHALLENGES FOR THE ROAD ASSET MANAGEMENT Denitsa Osichenko, Roland Spielhofer
	731	ECODRIVING POTENTIAL OF ROADS ACCORDING TO THEIR SPEED SECTIONING : BOSNIA AND FRANCE CASES Emir Deljanin, Pierre–Olivier Vandanjon, Alex Coiret, Samir Causevic
	739	GENERAL DESIGN OF THE BANJA LUKA – PRIJEDOR – NOVI GRAD HIGHWAY IN THE REPUBLIC OF SRPSKA – SELECTION OF THE OPTIMUM CORRIDOR Isidora Pančić, D. Dragičević, S. Đokić, R. Matić, N. Stevanović
	772	INTELLIGENT TRANSPORT SYSTEMS IN SOUTH EAST EUROPE: TOWARDS A COMMON STRATEGIC FRAMEWORK FOR IMPLEMENTATION Nedim Begović, Marios Domoxoudis, Efthimios Liberopoulos, Uroš Marjanović, Marios Miltiadou, Dušan Mladenović, Žaneta Ostojić Barjaktarević, Aleš Pavšek, Miroslav Petrović, Božica Radoš
	909	A SEMI–AUTOMATIC METHOD OF ASSESSING THE TECHNICAL STATE OF THE STREET NETWORK THROUGH THE SOFTWARE „E.S.T.S.” Flavius Paval
	944	NEW MATERIALS AND TECHNOLOGIES USED IN CIVIL INFRASTRUCTURE Dubravka Bjegović, Nina Štirmer
17:00 – 17:30	Coffee Break	



Friday, May 18<sup>th</sup>  
15:30 – 17:00

Session 6.C  
TRAFFIC PLANNING AND MODELLING – DESIGN,  
TRAVEL TIME AND SERVICE QUALITY

Session room:  
CONFERENCE HALL “C”

Chairmen: Davor Brčić and Borna Abramović

Time	Ref. No.	Paper Title / Author(s)
15:30 – 17:00	713	AN APPLICATION OF ANALYTIC NETWORK PROCESS FOR EVALUATING PUBLIC TRANSPORT SUPPLY QUALITY Sarbast Moslem, Szabolcs Duleba
	744	APPLICATION OF PASSING SIGHT DISTANCE IN ROAD DESIGN Boris Čutura, Dražen Cvitanić, Ivan Lovrić
	750	SURVEY ON RAIL SERVICE QUALITY – CASE STUDY SERBIAN RAILWAYS Dragana Macura, Milica Šelmić, Nebojša Bojović, Nikola Mijailović, Milutin Milošević
	808	ESTABLISHMENT OF THE CONGESTION CHARGING ZONE IN THE CITY OF DUBROVNIK Marko Šoštarić, Davor Brčić, Orsat Lale
	865	MOBILETIMES – CONCEPTS FOR THE MULTIFUNCTIONAL USE OF TRAVEL TIME Harald Frey, Manuela Winder, Edeltraud Haselsteiner, Petra Wetzels, Margarete Havel
17:00 – 17:30	Coffee Break	



Friday, May 18<sup>th</sup>  
17:30 – 19:00

Session 7.A  
STRUCTURES – MANAGEMENT, MONITORING AND MAINTENANCE

Session room:  
CONFERENCE HALL “A”

Chairmen: **Tatjana Rukavina and Makoto Fujii**

Time	Ref. No.	Paper Title / Author(s)
17:30 – 19:00	645	THE FIRST BRIDGE WITH POLYMER FIBRE REINFORCED CONCRETE RIDING SURFACE IN THE CZECH REPUBLIC Petr Bily, Josef Fládr, Pavel Ryjáček, Vojtěch Stančík
	650	PROACTIVE CONDITION-BASED BRIDGE REHABILITATION PLANNING INCLUDING LCA AND LCC Antonia Gordt, Stephanie Maier, Kristina Henzler, Stephanos Camarinopoulos, Vassilis Kallidromitis, Corrado Sanna, Panagiotis Panetsos, Theodora Karali, Kostas Bouklas
	828	A STUDY ON IMAGE DIAGNOSTIC TECHNOLOGY FOR BRIDGE INSPECTION USING ULTRA HIGH RESOLUTION CAMERA Takahiro Minami, Makoto Fujii, Jyunichi Takayama, Shinya Suda, Shuya Okumura
	892	ACOUSTIC EMISSION FOR MONITORING OF STRENGTHENED RC BEAM-COLUMN JOINTS Sena Tayfur, Emre Ercan, Kentaro Ohno, Ninel Alver
	915	TENSILE STRENGTH FOR EVALUATING DETERIORATION IN CONCRETE Andrew Boyd, Andrew Komar, Gaowei Xu, Andrea Leone
	948	IN-SERVICE PERFORMANCE OF ROAD CONCRETE BRIDGES – SET UP OF CASE STUDIES FOR NOVEL PRO-ACTIVE MAINTENANCE METHODOLOGY Marija Kušter Marić, Jelena Bleiziffer, Anđelko Vlašić, Joško Ožbolt, Ana Mandić Ivanković, Mladen Srbić, Dominik Skokandić, Gordana Hrelja Kovačević, Nijaz Mujkanović, Stjepko Devald, Danijel Tenžera, Krunoslav Tepeš, Mladen Burić, Luka Lacković
	969	VIBRODYNAMIC IMPACT ON THE RAILWAY SUBSTRUCTURE AND METHODS OF ITS REDUCTION Andrei Petriaev

20:30 – 23:00

GALA DINNER



Friday, May 18<sup>th</sup>  
17:30 – 19:00

Session 7.B  
RAIL TRANSPORT MANAGEMENT – OPERATION,  
INTEGRATION AND INTERMODALITY

Session room:  
CONFERENCE HALL “B”

Chairmen: **Andreas Schöbel and Borna Abramović**

Time	Ref. No.	Paper Title / Author(s)
17:30 – 19:00	658	THE ANALYSIS OF THE ORGANISATION OF RAILWAY PASSENGER TRANSPORT ON THE LIBERALISED MARKET Borna Abramović, Denis Šipuš, Marko Leko
	760	ERTMS DEPLOYMENT PARADIGM WITH A SPECIAL REVIEW OF APPLIED EU DIRECTIVES Božica Radoš
	860	BIOMETRICS FOR SEAMLESS URBAN PUBLIC TRANSPORTATION Gaurav Agarwal
	888	THE ROLE OF THE RAILWAY INFRASTRUCTURE IN PORTS OF HUNGARY Gábor Horváth, Lajos Szabó
	907	EVALUATION MODEL OF RAILWAY INFRASTRUCTURE POTENTIAL FOR ESTABLISHMENT OF FREIGHT INTERMODAL TERMINALS Svetoslav Martinov
	916	VIBRATIONAL ACCELERATION DISTRIBUTION IN RAILWAY BALLAST IN TERMS OF HEAVY AXLE LOAD OPERATION Anastasia Konon

20:30 – 23:00

GALA DINNER



Chairmen: Maja Ahac and Janusz Madejski

Time	Ref. No.	Paper Title / Author(s)
09:00 – 10:30	826	PERCEPTION OF TRAFFIC NOISE AND PROTECTION MEASURES BY PEOPLE LIVING ALONG THE ROAD Krystian Woźniak
	841	MIXTURE DISTRIBUTION MODEL OF DEPARTURE TIME DECISION FOR RAILWAY COMMUTERS Kota Miyauchi, Kazuyuki Takada
	858	PERFORMANCE EVALUATION OF A PRECISE TIME SYNCHRONIZATION TECHNOLOGY FOR TRAINS Pusik Park, Jeongdo Lee, Jongho Yoon
	867	POSSIBILITY FOR RUNNING FREIGHT TRAINS AT SPEED 80 KM/H ON EXISTING SAUDI RAILWAYS FREIGHT LINE Fitim Shala, Muhammad Umair Shaukat
	908	RAIL INFRASTRUCTURE CHARGES IN THE V4 COUNTRIES Anna Dolinayova, Juraj Camaj
	712	IMPACT OF RAILWAY TRACK PARAMETERS ON ENERGY CONSUMPTION AND GHG PRODUCTION OF PASSENGER TRAIN OPERATION Martin Kendra, Tomáš Skrúcaný, Juraj Grenčík, Peter Šulko
	646	REHABILITATION OF RAILWAY TRACK QUALITY IN CONDITIONS OF THE SLOVAK REPUBLIC Janka Šestáková, Libor Ižvolt
	667	EFFECTS OF VERTICAL AND THROUGH HOLES ON CYCLIC BEHAVIOUR OF RAILWAY CONCRETE SLEEPERS Dan Li, Ruilin You, Sakdirat Kaewunruen
	668	FATIGUE LIFE LOSSES OF RAILWAY CONCRETE SLEEPERS DUE TO SURFACE ABRASIONS Rui You, Dan Li, Sakdirat Kaewunruen
	902	APPLICATION OF OSIJEK’S TRAM TRACKS GEOMETRY ANALYSIS RESULTS IN THEIR RECONSTRUCTION STRATEGY DEVELOPMENT Maja Ahac, Stjepan Lakušić, Janusz Madejski, Ivo Haladin
10:30 – 11:00		Coffee Break



**CETRA<sup>2018</sup>** 17-19 May 2018, Zadar, Croatia  
Participants from 52 countries





Saturday, May 19<sup>th</sup>  
09:00 – 10:30

Session 8.B  
URBAN TRANSPORT – MODELLING, INTEGRATION,  
INTERMODALITY AND MOBILITY

Session room:  
CONFERENCE HALL “B”

Chairmen: Rudolf Eger and Davor Brčić

Time	Ref. No.	Paper Title / Author(s)
09:00 – 10:30	653	IMPLEMENTATION AND BENEFITS OF A LOW COST PMS FOR MUNICIPAL ROAD NETWORKS Carl Van Geem, Tim Massart
	689	DATA NEEDS FOR LONG-TERM URBAN MOBILITY PLANNING: DIFFICULTIES OBSERVED IN PRACTICES Takeru Shibayama, Martin Dan, Helmut Lemmerer, Mihaly Lados, Thomas Macoun
	762	INSTALLATION OF AN INNOVATIVE RAILWAY FASTENING SYSTEM Tomislav Tesla
	812	THE ROLE OF SMART MOBILITY IN SMART CITIES Davor Brčić, Marko Slavulj, Dino Šojat, Julijan Jurak
	955	MOBILITY MANAGEMENT AT RHEINMAIN UNIVERSITY – AN EXAMPLE FOR THE STRATEGIC IMPLEMENTATION OF MOBILITY MANAGEMENT AT UNIVERSITIES Maximilian Birk, Sabrina Walther, Rudolf Eger
10:30 – 11:00		Coffee Break



Saturday, May 19<sup>th</sup>  
09:00 – 10:30

Session 8.C  
PAVEMENTS – MONITORING AND CONDITION ASSESMENT

Session room:  
CONFERENCE HALL “C”

Chairmen: Tatjana Rukavina and Lajos Kisgyorgy

Time	Ref. No.	Paper Title / Author(s)
09:00 – 10:30	791	FIELD PERFORMANCE EVALUATION OF UNBOUND GRANULAR MATERIALS USING THE FAST FALLING WEIGHT DEFLECTOMETER Silvia Giuntoli, Chiara Pratelli, Giacomo Betti, Alessandro Marradi
	792	INFLUENCE OF THE OVERLOADED VEHICLES ELIMINATION ON THE ROAD PAVEMENT DURABILITY Piotr Zieliński, Malwina Sptawińska, Piotr Burnos, Janusz Gajda
	814	STUDY OF THE RELATIONSHIP BETWEEN THE AGGREGATES GRADATION, BINDER PROPERTIES AND DENSIFICATION INDEXES FOR AN ASPHALT CONCRETE RUTTING RESISTANCE Laynara Barroso, Lilian Rezende, Márcio Farias
	846	STRESS-STRAIN AND FAILURE MODES OF ASPHALT CONCRETE IN COMPRESSION DUE TO GEOMETRICAL CHANGES Lee Leon, Dr Derek Gay, Nicola Simpson, Shian Edwin
	918	PRELIMINARY INVESTIGATION OF MECHANICAL AND FUNCTIONAL PROPERTIES OF COLORED ASPHALT PAVEMENT SURFACES Marco Pasetto, Emiliano Pasquini, Giovanni Giacomello, Andrea Baliello
	937	TESTING OF BITUMINOUS PAVEMENT LAYERS REINFORCED WITH FIBERGLASS GRIDS Josef Holomek, Pavel Šperka, Jan Kudrna, Štěpán Bohuš, Jiří Sachr
10:30 – 11:00		Coffee Break



<b>Saturday, May 19<sup>th</sup></b> 11:00 – 12:15	<b>Session 9.A</b> RAIL TRANSPORT MANAGEMENT – OPERATION, INTEGRATION AND INTERMODALITY	<b>Session room:</b> CONFERENCE HALL “A”
---	---	---

<b>Chairmen:</b> <b>Borna Abramović and Andreas Schöbel</b>		
Time	Ref. No.	Paper Title / Author(s)
11:00 – 12:15	698	APPLICATION OF KRONECKER ALGEBRA FOR RAILWAY LINE ZAGREB – RIJEKA Andreas Schöbel, Hans Blieberger, Christian Schöbel
	829	A STUDY ON THE TRANSPORTATION MODE CHOICE AFTER NEW EXTENSION OF HIGH SPEED RAIL IN JAPAN Gen Hayamizu, Makoto Fujiu, Junichi Takayama
	837	SUBSTITUTION EFFECT OF HIGH SPEED RAIL FOR AIR TRANSPORT IN CASE OF CONTINUOUS FLIGHT CANCELLATIONS Kazuyuki Takada, Kota Miyauchi, Makoto Fujiu
	906	STUDY OF THE POSSIBILITIES FOR DEVELOPING PASSENGER TERMINAL BY APPLYING A MODEL FOR EVALUATION OF THE RAILWAY INFRASTRUCTURE PARAMETERS Radina Nikolova, Oleg Krastev, Rositza Kenova
	924	RAIL INFRASTRUCTURE DEVELOPMENT AND CLIMATE CHANGE – CHALLENGES FOR RAIL OPERATORS Tibor Princz–Jakovics, Dora Bachmann
12:30 – 13:00	BEST POSTER AWARDS AND CONFERENCE CLOSURE	CONFERENCE HALL “C”



<b>Saturday, May 19<sup>th</sup></b> 11:00 – 12:15	<b>Session 9.B</b> ROAD INFRASTRUCTURE MANAGEMENT – CONSTRUCTION AND MAINTENANCE	<b>Session room:</b> CONFERENCE HALL “B”
---	--	---

<b>Chairmen:</b> <b>Saša Ahac and Željko Korlaet</b>		
Time	Ref. No.	Paper Title / Author(s)
11:00 – 12:15	654	EXPLORING CHALLENGES FACING ROAD CONTRACTORS IN EXECUTION OF GOVERNMENT OF GHANA (GOG) FUNDED PROJECTS Nicholas Marteye, Ernest Kissi, Daniel Yamoah, Asare Samuel
	696	WAYS TO CREATE A COMPETITIVE ENVIRONMENT IN THE AREA OF OPERATIONAL MAINTENANCE OF ROADS Artem Bezuglyi, Sergii Illiash, Oleksandr Tymoshchuk
	803	COSTS OF PERFORMANCE BASED MAINTENANCE FOR UNPAVED LOCAL ROADS: CASE STUDY ALBANIA Igor Jokanovic, Bojana Grujić, Dragana Zeljić, Žarko Grujić, Mila Svilar
12:30 – 13:00	BEST POSTER AWARDS AND CONFERENCE CLOSURE	CONFERENCE HALL “C”



Chairmen: **Ivica Stančerić and Sanja Dimter**

Time	Ref. No.	Paper Title / Author(s)
11:00 – 12:15	717	THE COMPREHENSIVE ANALYSIS OF A HIGH RISK SITE: A CASE STUDY Kateřina Bucsuházy, Ivo Stáňa, Michal Zelený, Rybka Jidřich, Semela Marek
	719	GEOSPATIAL ANALYSIS OF TRAFFIC ACCIDENTS IN URBAN AREAS – CASE STUDY OF CITY OF SISAK Mario Ćosić, Ljupko Šimunović, Božo Radulović
	738	CASE STUDY OF VEHICLE SIDE CRASHES WITH TRAMS Roman Mikulec, Marek Semela, Stanislav Tokař
	920	ANALYSIS OF REASONS OF ACCIDENTS BETWEEN CYCLISTS AND PUBLIC TRANSPORT VEHICLES IN CITIES Marek Bauer, Wiesław Dźwigoń, Romanika Okraszewska
	975	SAFE-10-T: SAFETY OF TRANSPORT INFRASTRUCTURE ON THE TEN-T NETWORK Julie Clarke, Paul Doherty, Lorcan Connolly, Kenneth Gavin, Marieke van der Tuin, Pieter van Gelder, Stephen Wells, Rade Hajdin, Meho Saša Kovačević, Timo Hartmann, Irina Stipanović Oslaković, Ruediger Ehlers, Chiara Bianchizza, Miglė Paliukaite, Colin Sims, Giel Klanker, Dražen Vinščak
12:30 – 13:00	BEST POSTER AWARDS AND CONFERENCE CLOSURE	CONFERENCE HALL "C"

## Exhibitors



Geobrugg AG  
Aachstrasse 11, 8590 Romanshorn,  
Switzerland  
[www.geobrugg.com](http://www.geobrugg.com)



KotonTeks d.o.o.  
Josipa Pupačića 3, 42000 Varaždin,  
Croatia  
[kotonteks.hr](http://kotonteks.hr)



Journal of Croatian Association  
of Civil Engineers  
Berislavićeva 6, 10000 Zagreb,  
Croatia  
[www.casopis-gradjevinar.hr](http://www.casopis-gradjevinar.hr)



Department of Transportation  
Engineering  
Faculty of Civil Engineering  
University of Zagreb  
Kačićeva 26, 10000 Zagreb, Croatia  
[www.grad.unizg.hr](http://www.grad.unizg.hr)



Monterra d.o.o.  
Vukovarska 76, 51000 Rijeka, Croatia  
[www.monterra.hr](http://www.monterra.hr)



Beton Lučko d.o.o.  
Puškarićeva 1b, 10250 Lučko, Croatia  
[www.betonlucko.hr](http://www.betonlucko.hr)



Pietrucha Sp. z o.o.  
International sp. komandytowa  
Ul. Przemysłowa 10,  
98-235 Blaszki, Poland  
[www.pietrucha.pl](http://www.pietrucha.pl)



Hauraton d.o.o.  
Zelinska 7, 10000 Zagreb, Croatia  
[www.hauraton.hr](http://www.hauraton.hr)

