



**CETRA**<sup>2010</sup>

# First International Conference on Road and Rail Infrastructure

17–18 May 2010, Opatija, Croatia

Final Programme



ORGANISED BY:



Department of Transportation  
Faculty of Civil Engineering  
UNIVERSITY OF ZAGREB

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# ORGANISATION AND COMMITTEES

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All members of CETRA 2010 Conference Organizing Committee are professors and assistants of the Department of Transportation, Faculty of Civil Engineering at University of Zagreb.

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## WELCOME TO CETRA 2010 AND WELCOME TO OPATIJA

The intention of CETRA 2010 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.

The Organizing Committee has been working hard to make CETRA 2010 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 Opatija ("opatija" is Croatian word for "abbey"). Opatija is the leading tourist destination on the Adriatic Coast in the Republic of Croatia and attracts tourists from Europe and all over the world for more than 160 years. 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 2010 Conference.

We recognize the significant contribution of more than 270 authors from 29 countries and 26 Universities. More than 140 excellent papers were published in the proceedings Road and Rail Infrastructure. The full papers are being published by the Department of Transportation, Faculty of Civil Engineering at University of Zagreb in hardcopy and CD-ROM version of the conference proceedings.

We wish you all a pleasant and productive time in Opatija at CETRA 2010 Conference.



Željko Korlaet and Stjepan Lakušić  
Chairmen of CETRA 2010 Conference

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### DAY 1 – Monday, 17th May

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08:00 – 09:00 REGISTRATION OF THE PARTICIPANTS

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09:00 – 09:30 OPENING CEREMONY

Željko Korlaet, Chairman of CETRA 2010

Tomislav Mihotić, State Secretary for Infrastructure,

Ministry of the Sea, Transport and Infrastructure

Vladimir Medica, Croatian Academy of Engineering

Mladen Radujković, Dean of Faculty of Civil Engineering, University of Zagreb

Stjepan Lakušić, Chairman of CETRA 2010

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09:30 – 10:00 1<sup>st</sup> Keynote lecture: "Recent developments in high-speed track"

Prof. Coenraad Esveld, TU Delft

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10:00 – 10:30 2<sup>nd</sup> Keynote lecture: "Road construction and maintenance – two inseparable tasks"

Prof. emeritus Johann Litzka, TU Wien

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10:30 – 11:15 Coffee Break

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## CONFERENCE PROGRAMME

DAY 1 – Monday, 17th May		
Time	Session	Session room
11:15 – 12:45	1A Railway Design	CONGRESS HALL
	1B Structural Monitoring	FORTUNA
	1C Road Maintenance	CAMELIA II
12:45 – 14:00	Lunch Break	
14:00 – 15:30	2A Permanent Way	CONGRESS HALL
	2B Education And Environment (POSTER)	CAMELIA II
	2C Environmental Protection	FORTUNA
15:30 – 16:00	Coffee Break	
16:00 – 17:30	3A Railway Maintenance	CONGRESS HALL
	3B Geotechnical Works	CAMELIA II
	3C Road Traffic	FORTUNA
20:30 – 24:00	Conference Gala Dinner	

DAY 2 – Tuesday, 18th May		
Time	Session	Session room
09:00 – 10:30	4A Railway Design	CAMELIA II
	4B Road Maintenance	CONGRESS HALL
	4C Road Design	FORTUNA
10:30 – 11:00	Coffee Break	
11:00 – 12:30	5A Vehicles	CAMELIA II
	5B Road Pavement	CONGRESS HALL
	5C Road Design	FORTUNA
12:30 – 14:00	Lunch Break	
14:00 – 15:30	6A Railway Maintenance	CONGRESS HALL
	6B Planning And Construction (POSTER)	CAMELIA II
	6C Railway Traffic	FORTUNA
15:30 – 16:00	Coffee Break	
16:00 – 17:30	7A Road Maintenance And Crossings	CAMELIA II
	7B Permanent Way	CONGRESS HALL

### Remark · Napomena

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 each congress hall.

Službeni jezici konferencije su hrvatski i engleski. Ljubazno molimo sudionike konferencije da koriste uređaje za simultano prevodenje koji će biti dostupni u svakoj konferencijskoj dvorani.

<b>Monday, 17th May 11:15 – 12:45</b>		<b>Session 1A RAILWAY DESIGN</b>	<b>Session room: CONGRESS HALL</b>
<b>Chairman: Prof. Zoran Krakutovski</b>			
<b>Time</b>	<b>Ref. No.</b>	<b>Paper Title / Author(s)</b>	
11:15 – 11:30	063	HIGH PERFORMANCE RAILWAY CONSTRUCTION PROJECT: STATE BORDER-BOTOVO-ZAGREB-RIJEKA Tihomir Lažeta, Stjepan Kralj, T. Tomić, V. Šmit Novoselec, S. Kljajić	
11:30 – 11:45	108	MODERNISATION OF LJUBLJANA RAILWAY JUNCTION Darja Šemrov, Joerg Fimpler, Aleš Pavšek	
11:45 – 12:00	031	CONCEPT OF DEVELOPMENT FOR BELGRADE RAILWAY NODE IN 21ST CENTURY Dragan Božović, Boško Čoko	
12:00 – 12:15	156	INTEGRATION RAIL CONNECTION SILESIA AGGLOMERATION WITH KATOWICE – PYRZOWICE AIRPORT Sylwester Markusik, Maria Ciesla	
12:15 – 12:30	131	HIGH PERFORMANCE RAILWAY LINE FROM THE STATE BORDER-BOTOVO-ZAGREB-RIJEKA Stjepan Kralj, Tomislav Tomić, Marko Vajdić	
12:30 – 12:45	099	SIMULATION OF MODIFIED TIMETABLES FOR HIGH SPEED TRAINS STOCKHOLM – GÖTEBORG Hans Sipilä	
Each oral paper presentation is limited to 15 min.			
<b>12:45 – 14:00</b>	<b>Lunch Break</b>		

<b>Monday, 17th May 11:15 – 12:45</b>		<b>Session 1B STRUCTURAL MONITORING</b>	<b>Session room: FORTUNA</b>
<b>Chairman: Prof. Vesna Dragčević</b>			
<b>Time</b>	<b>Ref. No.</b>	<b>Paper Title / Author(s)</b>	
11:15 – 11:30	107	MONITORING OF RIVER CHANNEL MORPHODYNAMICAL CHANGES IN THE ZONE OF BRIDGE PIERS Neven Kuspilić, Damir Bekić, Eamon McKeogh, Gordon Gilja	
11:30 – 11:45	030	EXPERIMENTAL DETERMINATION OF TORSIONAL STIFFNESS IN RIBBED BRIDGE DECKS Davor Grandić, Ivana Štimac Grandić, Vildana Latić	
11:45 – 12:00	151	STATIC AND DYNAMIC TESTING OF OVERPASS ON SLAVONIAN AVENUE IN ZAGREB Marko Bartolac, Mladenko Rak, Đorđe Pavlica, D. Damjanović, I. Duvnjak	
12:00 – 12:15	155	THE MOST COMMON CAUSES FOR FASTER DETERIORATION OF BRIDGES Krunoslav Mavar, Sandra Škarić Palić, Jelena Bleiziffer	
12:15 – 12:30	162	BENDING MOMENT OF SIMPLE BRIDGES DUE TO MEASURED TRAIN LOAD Hyejin Yoon, Imjong Kwahk, Jong-Won Kwark	
12:30 – 12:45	152	INSPECTION OF RAILWAY BRIDGE OVER THE RIVER SLOBOŠTINA NEXT TO OKUČANI Ivan Duvnjak, Mladenko Rak, Ljudevit Herceg, Vladimir Frančić, Branko Margetić	
Each oral paper presentation is limited to 15 min.			
<b>12:45 – 14:00</b>	<b>Lunch Break</b>		

<b>Monday, 17th May</b> <b>11:15 – 12:45</b>	<b>Session 1C</b> <b>ROAD MAINTENANCE</b>	<b>Session room:</b> <b>CAMELIA II</b>
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**Chairman: Prof. Otakar Vacin**

<b>Time</b>	<b>Ref. No.</b>	<b>Paper Title / Author(s)</b>
11:15 – 11:30	087	THE UTILIZATION OF THE EFFICIENCY MEASURES FOR THE TRANSPORTATION PROCESSES IN THE ROAD CONSTRUCTION AND MAINTENANCE Marina Petrunina, Yury Sikerzhicky
11:30 – 11:45	054	OPTIMIZED ROAD MAINTENANCE FOR ROAD USERS Barbara Brožek, Johann Litzka
11:45 – 12:00	029	CONSIDERATION OF SAND POLISHING RESISTANCE IN THE AUSTRIAN STANDARDS–THE WEHNER/SCHULZE SAND POLISHING TEST Lukas Kirchmaier, Ronald Blab
12:00 – 12:15	097	LOW COST PAVEMENT MANAGEMENT SYSTEM (PMS) FOR SMALL COMMUNITIES WITH MICROSOFT EXCEL Markus Hoffmann
12:15 – 12:30	124	APPLICATION OF NEW TECHNOLOGIES IN VERTICAL TRAFFIC SIGNALIZATION DESIGN IN THE CITY OF ZAGREB Andelko Ščukanec, Davor Krasić, Davor Brčić
12:30 – 12:45	061	MANAGEMENT SYSTEM WITH THE SECONDARY ROAD CONSTRUCTION MATERIALS Dusan Stehlik, Petr Hyzl, Michal Varaus, Jan Valentin, Petr Mondschein

Each oral paper presentation is limited to 15 min.

**12:45 –14:00**                      **Lunch Break**

<b>Monday, 17th May</b> <b>14:00 – 15:30</b>	<b>Session 2A</b> <b>PERMANENT WAY</b>	<b>Session room:</b> <b>CONGRESS HALL</b>
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**Chairman: Prof. Otto Plašek**

<b>Time</b>	<b>Ref. No.</b>	<b>Paper Title / Author(s)</b>
14:00 – 14:15	113	RHEDA CITY SLAB TRACK SYSTEM SOLUTIONS FOR TRAM TRACKS Ryan Stolpmann, Wojciech Nawrat
14:15 – 14:30	125	APPLICATION OF MODERN SLAB TRACK SYSTEM ON THE HIGH PERFORMANCE RAILWAY LINE “STATE BORDER – ZAGREB – RIJEKA” – SYSTEM RHEDA 2000 Marko Vajdić, Wojciech Nawrat, Stjepan Kralj
14:30 – 14:45	138	APPLICATION OF MODERN BALLASTLESS TRACK SYSTEM ON BRIDGES OF THE HIGH PERFORMANCE RAILWAY LINE “STATE BORDER – ZAGREB – RIJEKA” Nina Popovac, Nina Acalin, Marina Marić, Stela Dubravac
14:45 – 15:00	146	SLAB TRACK SYSTEM “ÖBB-PORR” – ELASTICALLY SUPPORTED TRACK BASE PLATE Angela Kuo
15:00 – 15:15	051	THE TECHNOLOGY OF TRAM TRACK BUILDING IN OSIJEK Dejana Šipoš, Krešimir Vrselja, Drago Tadić
15:15 – 15:30	091	CONTRIBUTION TO MODELING OF SLEEPER BED Ján Mandula

Each oral paper presentation is limited to 15 min.

**15:30 –16:00**                      **Lunch Break**

Monday, 17th May 14:00 – 15:30		Poster Session 2B EDUCATION AND ENVIRONMENT		Session room: CAMELIA II
Chairman: Prof. Tatjana Rukavina				
Time	Poster	Ref. No.	Paper Title / Author(s)	
14:00 – 14:05	1	149	THE BOLOGNA PROCESS – FIRST EXPERIENCES Željko Korlaet	
14:05 – 14:10	2	045	TRANSPORTATION ENGINEERING COURSES AT UNIVERSITY STUDIES OF FACULTY OF CIVIL ENGINEERING UNIVERSITY OF RIJEKA Aleksandra Deluka-Tibljajaš, Sergije Babić	
14:10 – 14:15	3	111	INTERDISCIPLINARY APPROACH TO EDUCATION OF STUDENTS IN AREA OF ROAD CONSTRUCTION Sanja Dimter, Zlata Dolaček-Alduk, Ivana Barišić	
14:15 – 14:20	4	001	INFLUENCE OF DIFFERENT PAVEMENT SURFACE ON NOISE LEVELS IN PASSENGER CAR Stjepan Lakušić, Ivica Stančerić, Maja Ahac	
14:25 – 14:30	5	002	NOISE PROTECTION OF ZAGREB ZOO FROM ROAD AND RAIL TRANSPORT Stjepan Lakušić, Maja Ahac, Saša Ahac, Ivica Stančerić, Ivo Haladin	
14:30 – 14:35	6	142	STRATEGIC ENVIRONMENTAL ASSESSMENT FOR MODERNIZATION OF X PANEUROPEAN RAILWAY CORRIDOR Mario Pokrivač, Marta Brkić, Tajana Uzelac	
14:35 – 14:40	7	129	ISSUES RELATED TO ELABORATION OF ENVIRONMENTAL IMPACT ASSESSMENT STUDIES FOR CONSTRUCTION OF STATE ROADS Zoran Poljanec, Mario Pokrivač	
14:40 – 14:45	8	073	THE ROLE OF REGIONAL PLANNING DOCUMENTS IN SUSTAINABLE TRAFFIC NOISE PROTECTION DESIGN Ena Bičanić, Mario Jukić, Igor Grginić	
14:45 – 14:50	9	165	RELATION BETWEEN ROAD TRAFFIC AND ENVIRONMENT Ivo Jakovljević, Marinko Jakovljević	
14:50 – 14:55	10	004	TRAMWAY AND ELECTRICAL POWER SUPPLY WITHOUT OVERHEAD WIRES Stjepan Lakušić, Tatjana Stazić, Damir Škrinjar	
14:55 – 15:00	11	167	150 YEARS OF RAILWAY IN CROATIA – OVERVIEW OF CONSTRUCTION AND DEVELOPMENT OF RAILWAY SYSTEM Helena Bunijevac	
15:00 – 15:30	DISCUSSION IN FRONT OF THE POSTER			
Each oral paper presentation is limited to 5 min.				
15:30 – 16:00	Coffee Break			

<b>Monday, 17th May 14:00 – 15:30</b>		<b>Session 2C ENVIRONMENTAL PROTECTION</b>	<b>Session room: FORTUNA</b>
<b>Chairmen: Prof. Hrvoje Domitrović and Prof. Vesna Dragčević</b>			
<b>Time</b>	<b>Ref. No.</b>	<b>Paper Title / Author(s)</b>	
14:00 – 14:15	008	UNRELIABILITY OF INPUT PARAMETERS DURING THE RAILWAY NOISE BARRIERS DESIGN Zlatko Franolić, Maro Puljizević, Alan Štimac, Dinko Stipaničev	
14:15 – 14:30	009	NOISE AND VIBRATIONS PROTECTION ON CROATIAN RAILWAYS NETWORK Sanjin Novosel, Stjepan Lakušić, Hrvoje Domitrović	
14:30 – 14:45	015	THE APPLICABILITY OF 3D MODEL IN CALCULATION OF ROAD TRAFFIC NOISE LEVEL Vesna Dragčević, Stjepan Lakušić, Saša Ahac	
14:45 – 15:00	042	TRAFFIC NOISE CONTROL USING SOUND BARRIERS Ivan Bolkovac, Marko Horvat, Hrvoje Domitrović	
15:00 – 15:15	068	ROAD WEATHER INFORMATION SYSTEMS (RWIS) OF SLOVENIA Matjaž Ivačič, Andrej Beden, Alenka Šajn Slak, Rok Kršmanc, Samo Čarman, Marko Korošec	
15:15 – 15:30	090	EXPERIMENTAL ESTIMATION OF ECOLOGICAL CAPACITY OF ROAD FROM THE NOISE POINT OF VIEW Brigita Salaiová, Mária Kovalaková, Júlia Hlaváčová	
Each oral paper presentation is limited to 15 min.			
<b>15:30 – 16:00</b>	<b>Coffee Break</b>		

<b>Monday, 17th May 16:00 – 17:30</b>		<b>Session 3A RAILWAY MAINTENANCE</b>	<b>Session room: CONGRESS HALL</b>
<b>Chairmen: Prof. Janusz Madejski and Prof. Stjepan Lakušić</b>			
<b>Time</b>	<b>Ref. No.</b>	<b>Paper Title / Author(s)</b>	
16:00 – 16:15	012	SCANNING AND THERMOGRAPHIC SURVEYING FOR NEEDS OF ELABORATION OF PROJECT FOR RAILWAY TUNNELS REHABILITATION Stipe Šošo, Staško Humar	
16:15 – 16:30	040	SETTLEMENT ASSESSMENT OF CLASSICAL RAILWAY TRACK UNDER VERTICAL LOADING AND IT'S LINK WITH MAINTENANCE WORKS Zoran Krakutovski, Darko Moslavac, Zlatko Zafirovski	
16:30 – 16:45	047	SOFTWARE INNOVATION FOR ADVANCED APPROACH TOWARD MODERN RAILWAY MAINTENANCE PROJECTS Leon Leban, Žiga Ramšak	
16:45 – 17:00	119	MODERN CONDITION-BASED RAILWAY INFRASTRUCTURE ASSET MANAGEMENT Stasha Jovanovic, Arjen Zoeteman	
17:00 – 17:15	154	ARGOS® – INTELLIGENT LOCAL MEASUREMENT STATIONS FOR CONTINUOUS COLLECTION OF VEHICLE CONDITION Johannes Stephanides, Wolfgang Zottl, Dietmar Maicz	
17:15 – 17:30	020	RAIL CAR IDENTIFICATION AS A KEY ISSUE OF OPERATIONAL HANDLING Andreas Schöbel	
Each oral paper presentation is limited to 15 min.			
<b>End of DAY 1</b>			

<b>Monday, 17th May 16:00 – 17:30</b>	<b>Session 3B GEOTECHNICAL WORKS</b>	<b>Session room: CAMELIA II</b>
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**Chairman: Prof. Nenad Gucunski**

<b>Time</b>	<b>Ref. No.</b>	<b>Paper Title / Author(s)</b>
16:00 – 16:15	168	STATE OF THE ART SLOPE AND ROCK FACE PROTECTION SYSTEMS TO SECURE RAILWAY LINES Aron Vogel, Armin Roduner, Budimir Vjekoslav, Lukas Rohrer
16:15 – 16:30	145	USE OF SOIL NAILED STABILIZED WALLS AND SLOPES IN TRANSPORTATION PROJECTS Jerko Kocijan, Predrag Kvasnička, Mladen Vucetić
16:30 – 16:45	130	RATIONAL IMPROVEMENT OF LANDSLIDE IN CLAY Ibrahim Jašarević, Mario Njegovec, Hrvoje Perković, Hrvoje Krhen
16:45 – 17:00	147	INTEGRATING METHODS FOR SUBSURFACE CHARACTERIZATION IN SUPPORT OF LINEAR INFRASTRUCTURE PROJECTS Jerko Kocijan, Dima Amine, David Lutz, Christopher Hitchcock
17:00 – 17:15	153	DESIGN AND PRACTICE OF REINFORCED EARTH WALLS ALONG THE HIGHWAY IN THE CROATIAN KARST REGION Predrag Kvasnička, Dubravko Domitrović, Biljana Kovačević Zelić
17:15 – 17:30	136	ENGINEERING-GEOLOGICAL AND GEOTECHNICAL ASPECTS OF THE SAVA TERRACE SHOWN IN THE EXAMPLE OF THE TUZLA – ORAŠJE HIGHWAY PROJECT Sabid Zekan, Ibrahim Jašarević, Elvir Babajić, Nadžad Alić

Each oral paper presentation is limited to 15 min.

**End of DAY 1**

<b>Monday, 17th May 16:00 – 17:30</b>	<b>Session 3C ROAD TRAFFIC</b>	<b>Session room: FORTUNA</b>
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**Chairman: Prof. Damir Pološki**

<b>Time</b>	<b>Ref. No.</b>	<b>Paper Title / Author(s)</b>
16:00 – 16:15	043	APPLICATION OF SIMULATIONS AND VISUALIZATIONS IN ROAD TRAFFIC Zdenko Lanović, Željka Žagar, Silvio Žagar, Tomislav Salopek
16:15 – 16:30	062	TRAFFIC MODELS USED FOR THE PURPOSES EXECUTION OF SOCIO-ECONOMIC ANALYSIS OF ZAGREB-SISAK MOTORWAY Zvonimir Pejić, Krunoslav Perić, Slobodan Kljajić
16:30 – 16:45	115	STRATEGY OF PUBLIC PASSENGER TRANSPORT IN ZAGREB COUNTY – CURRENT STATUS PERSPECTIVES Davor Brčić, Branko Mikinac
16:45 – 17:00	098	DEFINING THE VEHICLE MOVEMENT PARAMETERS ON SIGNALIZED INTERSECTIONS APPROACHES Vuk Bogdanović, Zoran Papić, Nenad Ruškić, Milja Leković
17:00 – 17:15	140	RESEARCH RESULTS ON THE EFFECTIVENESS OF WIND PROTECTION STRUCTURES ON MOTORWAYS Goran Gjetvaj, Petar Sesar, Mirjana Mašala-Buhin
17:15 – 17:30	058	ROAD NETWORK OF DUBROVNIK REGION IN FUTURE Damir Pološki, Ana Nikolić, Igor Majstorović

Each oral paper presentation is limited to 15 min.

**End of DAY 1**

<b>Tuesday, 18th May 09:00 – 10:30</b>		<b>Session 4A RAILWAY DESIGN</b>	<b>Session room: CAMELIA II</b>
<b>Chairmen: Prof. Zoran Krakutovski and Prof. Stjepan Lakušić</b>			
<b>Time</b>	<b>Ref. No.</b>	<b>Paper Title / Author(s)</b>	
09:00 – 09:15	075	APPLICATION OF THE POLISH ACTIVE GNSS GEODETIC NETWORK FOR SURVEYING AND DESIGN OF THE RAILROAD Wladyslaw Koc, Cezary Specht	
09:15 – 09:30	082	REVIEW OF STATE OF RAILWAY INFRASTRUCTURE IN BOSNIA AND HERZEGOVINA – POSSIBILITIES FOR INCREASING SPEED AND EFFECTS WITH TILTING TRAINS TECHNOLOGY Sanjin Albinović	
09:30 – 09:45	106	ECONOMIC EVALUATION AND SELECTION OF ROUTE FOR NEW RAILWAY ZAGREB-RIJEKA Dušan Marušić, Nenad Mladineo, Tatjana Stazić	
09:45 – 10:00	133	OUTLINE OF THE SPATIAL-TRAFFIC STUDY OF THE ROAD AND RAILWAY TRAFFIC SYSTEM IN THE WIDER ZAGREB CITY AREA Stjepan Kralj, Miljenko Stanković, Zvonimir Pejić, Mirjana Mašala-Buhin	
10:00 – 10:15	116	APPLICATION OF NEW TECHNICAL SOLUTIONS FOR THE NEEDS OF MODIFICATION OF THE ELECTRIC TRACTION SYSTEM ON THE RAILWAY LINES OF CROATIAN RAILWAYS Zlatko Dokaza	
10:15 – 10:30	166	INTERMODAL INFRASTRUCTURAL NETWORK – BASE FOR INTERMODAL TRANSPORT DEVELOPMENT AND CREATION OF NEW ADDED VALUE Dragutin Šubat, Zrinka Vranar	
Each oral paper presentation is limited to 15 min.			
<b>10:30 – 11:00</b>		<b>Coffee Break</b>	
<b>Tuesday, 18th May 09:00 – 10:30</b>		<b>Session 4B ROAD MAINTENANCE</b>	<b>Session room: CONGRESS HALL</b>
<b>Chairman: Prof. Tatjana Rukavina</b>			
<b>Time</b>	<b>Ref. No.</b>	<b>Paper Title / Author(s)</b>	
09:00 – 09:15	102	COMPARISON OF STIFFNESS MODULI USING 2-POINT AND 4-POINT BENDING TESTS Michal Varaus, Petr Hyzl, Vaclav Soucek, Otakar Vacin	
09:15 – 09:30	013	APPLICATION OF RECYCLED AGGREGATES IN PAVEMENT BASE COURSES Andreas Stanić, Sanja Dimter	
09:30 – 09:45	032	ESTABLISHING OF WEARING COURSE ASPHALT MIXTURE STIFFNESS Carmen Racanel, Adrian Burlacu, Claudia Surlea	
09:45 – 10:00	036	IN SITU EVALUATION OF RUBBLIZED PCCP MODULUS BY SURFACE WAVES Nenad Gucunski, Ali Maher	
10:00 – 10:15	019	COMPARISON OF PAVEMENT LAYERS THICKNESS MEASURED BY GROUND PENETRATING RADAR AND CONVENTIONAL METHODS Tatjana Rukavina, Marko Ožbolt, Josipa Domitrović	
10:15 – 10:30	134	ASSET MANAGEMENT OF NATIONAL ROAD NETWORK IN CROATIA Miroslav Keller, Hrvoje Rukavina	
Each oral paper presentation is limited to 15 min.			
<b>10:30 – 11:00</b>		<b>Coffee Break</b>	

<b>Tuesday, 18th May</b> <b>09:00 – 10:30</b>	<b>Session 4C</b> <b>ROAD DESIGN</b>	<b>Session room:</b> <b>FORTUNA</b>
<b>Chairman: Prof. Željko Korlaet</b>		
<b>Time</b>	<b>Ref. No.</b>	<b>Paper Title / Author(s)</b>
09:00 – 09:15	044	DIGITAL TERRAIN MODEL APPLICATION IN ROAD PLANNING AND DESIGN Sergije Babić, Kristijan Ljutić
09:15 – 09:30	046	POSSIBLE RECONSTRUCTION OF INTERSECTIONS IN URBAN AREAS USING ROUNDABOUTS Aleksandra Deluka-Tibljaš, Sergije Babić, Marijana Cuculić, Sanja Šurdonja
09:30 – 09:45	056	FINDING SOLUTIONS FOR OVERBURDENED ROUNDABOUTS Damir Pološki, Igor Majstorović, Mario Njegovec
09:45 – 10:00	109	THE ROAD SAFETY AUDIT AND ITS INFLUENCE ON ROAD DESIGN PROCESS: IMPLEMENTATION OF EU DIRECTIVE 96/2008 Lutz Stefan Pfeiffer, Krsto Lipovac, Dejan Jovanov
10:00 – 10:15	114	CONTINGENCY PLANS IN URBAN MOBILITY SYSTEMS Ana Relva Pereira, Rosário Macário, Camila Garcia
10:15 – 10:30	118	ROAD DESIGN WITH 3D SOFTWARE Žarko Pintar, Nataša Špelić
Each oral paper presentation is limited to 15 min.		
<b>10:30 – 11:00</b>	<b>Coffee Break</b>	

<b>Tuesday, 18th May</b> <b>11:00 – 12:30</b>	<b>Session 5A</b> <b>TRAFFIC PLANNING AND VEHICLES</b>	<b>Session room:</b> <b>CAMELIA II</b>
<b>Chairmen: Prof. Otto Plašek and Jan Mandula</b>		
<b>Time</b>	<b>Ref. No.</b>	<b>Paper Title / Author(s)</b>
11:00 – 11:15	077	UTILIZATION OF RAILWAY CAPACITIES FOR SOLVING TRAFFIC PROBLEMS IN CITY AREAS Sanjin Albinović, Džebo Suada
11:45 – 12:00	071	LEAN MANAGEMENT METHODS PREVENT DEFAULTS ON PRODUCTION AND RECALLS OF VEHICLES ON ROAD Rafael S. Wollny, Roland Kaefer
12:00 – 12:15	128	ANALYSIS OF WAGON IMPACT Dragan Petrović, Arandel Babić, Milan Bižić, Marina Pljakić
11:15 – 11:30	164	DEVICE AND TECHNOLOGY OF WAGON BOGIE Y25LSD TESTING Nencho Nenov, Emil Dimitrov, Toma Ruzhekov
11:30 – 11:45	076	WAYS TO REDUCE FUEL CONSUMPTION AND EMISSIONS OF DIESEL MULTIPLE UNITS WITH HYDRAULIC POWER TRANSMISSION – PART 1 Günter Löffler, Martin Kache, Uwe Steglich
12:15 – 12:30	076	WAYS TO REDUCE FUEL CONSUMPTION AND EMISSIONS OF DIESEL MULTIPLE UNITS WITH HYDRAULIC POWER TRANSMISSION – PART 2 Günter Löffler, Martin Kache, Uwe Steglich
Each oral paper presentation is limited to 15 min.		
<b>12:30 – 14:00</b>	<b>Lunch Break</b>	

<b>Tuesday, 18th May 11:00 – 12:30</b>		<b>Session 5B ROAD PAVEMENT</b>	<b>Session room: CONGRESS HALL</b>
<b>Chairmen: Prof. Otakar Vacin and Prof. Nenad Gucunski</b>			
<b>Time</b>	<b>Ref. No.</b>	<b>Paper Title / Author(s)</b>	
11:00 – 11:15	052	THE INNOVATION OF CBR TEST FOR THE DESIGN OF LOW CAPACITY ROAD PAVEMENTS CONSTRUCTIONS Jaroslav Hauser, Lenka Ševelová, Alice Kozumplíková	
11:15 – 11:30	018	COMPARISON OF CEMENT STABILIZED PAVEMENT STRUCTURES BASE COURSES Slaviša Rajič, Tomislav Šolić	
11:30 – 11:45	026	RESISTANCE OF ASPHALT BINDER AND SURFACE COURSES TO HIGH AND LOW TEMPERATURES Aleksander Ljubič, Roman Bašelj	
11:45 – 12:00	059	EXPERIENCE WITH THE TRANSITION TO THE FUNCTIONAL TESTING OF ASPHALT MIXTURES Petr Hyzl, Michal Varaus, Dusan Stehlik	
12:00 – 12:15	083	SOME FINDINGS CONCERNING THE DETERMINATION OF GRANULAR BASE MODULI FOR FLEXIBLE PAVEMENT THICKNESS DESIGN Moshe Livneh	
12:15 – 12:30	010	EVENNESS OF THE MOTORWAY DRIVING SURFACE Miroslav Šimun, Tatjana Rukavina	
Each oral paper presentation is limited to 15 min.			
<b>12:30 –14:00</b>	<b>Lunch Break</b>		

<b>Tuesday, 18th May 11:00 – 12:30</b>		<b>Session 5C ROAD DESIGN</b>	<b>Session room: FORTUNA</b>
<b>Chairman: Prof. Vesna Dragčević</b>			
<b>Time</b>	<b>Ref. No.</b>	<b>Paper Title / Author(s)</b>	
11:00 – 11:15	027	THE FUNCTIONAL STRUCTURE OF THE NATIONAL AUTOMATIC TOLL COLLECTION SYSTEM Gabriel Nowacki, Malgorzata Walendzik	
11:15 – 11:30	069	APPLICATION OF THE MICROSCOPIC MODELS AS A PART OF THE DECISION SUPPORT SYSTEM AT ALL THE STAGES OF TRANSPORTATION SYSTEM EVALUATION Elena Yurshevich	
11:30 – 11:45	081	SIMULATION AS A TOOL OF DECISION SUPPORT PROCESS: LATVIA-BASED CASE STUDY Irina Yatskiv, Mihails Savrasovs, Elena Yurshevich, Alexander Medvedev	
11:45 – 12:00	086	CONSTRUCTING THE URBAN PUBLIC TRANSPORT SYSTEM QUALITY INDICATOR Irina Pticina, Irina Yatskiv	
12:00 – 12:15	141	TOWARDS NEW PRINCIPLES OF ROAD CATEGORIZATION – REFLECTIONS BASED ON PRACTICES IN BELGIUM AND EASTERN EUROPE Dirk Lauwers, Dominique Gillis	
12:15 – 12:30	DISCUSSION		
Each oral paper presentation is limited to 15 min.			
<b>12:30 –14:00</b>	<b>Lunch Break</b>		

<b>Tuesday, 18th May</b>		<b>Session 6A</b>	<b>Session room:</b>
<b>14:00 – 15:30</b>		<b>RAILWAY MAINTENANCE</b>	<b>CONGRESS HALL</b>
<b>Chairmen: Prof. Otto Plašek and Janusz Madejski</b>			
<b>Time</b>	<b>Ref. No.</b>	<b>Paper Title / Author(s)</b>	
14:00 – 14:15	055	ASPHALT PAVEMENTS OF TRAM TRACKS – CATALOGUE OF DEFECTS AND FAILURES Otto Plášek, Dušan Stehlík, Josef Buchta, Richard Svoboda, M. Hružíková	
14:15 – 14:30	005	THE IMPACT OF BALLAST DEPTH ON VERTICAL TRACK STABILITY Stjepan Lakušić, Tino Medvidović, Ivica Kožar	
14:30 – 14:45	007	EFFECT OF BALLAST POCKETS ON DECREASE IN BEARING CAPACITY AND STABILITY OF GEOTECHNICAL RAILWAY STRUCTURES Pero Šiša, Željko Sokolić	
14:45 – 15:00	074	THE EXPERIMENTAL INVESTIGATIONS AND MODELLING OF TRACK WORK WITH THE USE OF TAMPING MACHINE'S DIAGNOSTIC INFORMATIONS Wladyslaw Koc, Andrzej Wilk, Piotr Chrostowski, Slawomir Grulkowski	
15:00 – 15:15	159	DEVELOPING DETERIORATION PROBABILISTIC MODEL ON THE BASIS OF WEIBULL DISTRIBUTION FOR RAIL WEAR WITH CASE STUDY IN LORESTAN RAILWAY Jabbar Ali Zakeri, Shahrbanoo Shahriari, Hossein Asgari	
15:15 – 15:30	161	FIELD AND LABORATORY INVESTIGATION ON THE LATERAL RESISTANCE OF SLEEPERS BY EMPLOYING STPT TEST Jabbar Ali Zakeri, Behrouz Mirfattahi, Maryam Fakhari	
Each oral paper presentation is limited to 15 min.			
<b>15:30 – 16:00</b>		<b>Coffee Break</b>	

<b>Tuesday, 18th May</b>		<b>Session 6C</b>	<b>Session room:</b>
<b>14:00 – 15:30</b>		<b>RAILWAY TRAFFIC</b>	<b>FORTUNA</b>
<b>Chairman: Prof. Zoran Krakutovski</b>			
<b>Time</b>	<b>Ref. No.</b>	<b>Paper Title / Author(s)</b>	
14:00 – 14:15	006	STATE OF THE ART REPORT ON TRAIN AND TRAFFIC CONTROL ON COMMUTER LINES Andreas Schöbel, Hrvoje Haramina	
14:15 – 14:30	092	A STUDY OF THE PERFORMANCE AND UTILIZATION OF THE SWEDISH RAILWAY NETWORK Anders Lindfeldt	
14:30 – 14:45	139	AN INTEGRATED TIME TABLE FOR RAILWAYS A BENEFICIAL SOLUTION FOR CENTRAL-EASTERN-EUROPEAN COUNTRIES Peter Veit, Tomislav Josip Mlinarić	
14:45 – 15:00	089	INNOVATIVE SYSTEMS AND METHODS FOR A DEEP UNDERSTANDING OF RAILWAY ASSETS Pietro Pace, Franco Carpanese	
15:00 – 15:15	035	PERCEPTION OF THE TRAVEL TIME RELIABILITY OF THE URBAN RAILWAY SERVICE IN TOKYO Kazuyuki Takada, Makoto Fujju, Shigeki Yokoyama	
15:15 – 15:30	079	FORECASTING MODELS OF ACCIDENTS RISK ON THE RAILWAY Boriss Misnevs, Alla Melikyan	
Each oral paper presentation is limited to 15 min.			
<b>15:30 – 16:00</b>		<b>Coffee Break</b>	

Tuesday, 18th May 14:00 – 15:30		Poster Session 6B PLANNING AND CONSTRUCTION		Session room: CAMELIA II
<b>Chairman: Prof. Željko Korlaet</b>				
Time	Poster	Ref. No.	Paper Title / Author(s)	
14:00 – 14:05	1	011	TRAFFIC AND CIVIL ENGINEERING CONCEPT OF TWO LEVEL INTERSECTION OF SLAVONSKA AVENUE – STREET 7 IN ZAGREB Dinko Brdarić, Zdenko Lanović, Kazimir Rehlicki	
14:05 – 14:10	2	064	TRAFFIC MODELLING FOR THE FINANCIAL/MARKET ANALYSIS OF THE KRIŽIŠĆE – ŽUTA LOKVA MOTORWAY Zvonimir Pejić, Zdravko Duplančić, Aleksandar Lončarić	
14:10 – 14:15	3	057	ISSUES OF HIGHWAY ROUTE DESIGN Željko Stepan, Ana Nikolić, Mario Njegovec	
14:15 – 14:20	4	017	THE EFFECT OF TRAFFIC LOAD ON FLEXIBLE PAVEMENTS PERFORMANCE – CROATIAN CASE STUDIES Tatjana Rukavina, Josipa Domitrović, Marko Ožbolt	
14:25 – 14:30	5	053	SILICA FUME AS ADDITIVE TO THE CONCRETE USED FOR CONCRETE PAVEMENTS Danilo Popović	
14:30 – 14:35	6	084	APPLICATION OF STEEL CULVERTS IN SECTION OF OSIJEK-ĐAKOVO MOTORWAY Ivana Barišić, Mario Bogdan, Vesna Dragčević	
14:35 – 14:40	7	150	MONITORING AND LOAD TESTING OF THE CETINA BRIDGE Domagoj Damjanović, Mladenko Rak, Joško Krolo	
14:40 – 14:45	8	072	THE APPLIED CONCEPT OF LONG RAILWAY TUNNELS ON HIGH PERFORMANCE RAILWAY LINE “STATE BORDER–ZAGREB-RIJEKA” Tanja Mikulić, Darko Šarić, Marko Vajdić	
14:45 – 14:50	9	127	MODELLING OF MILLING TOOLS IN THE PROCESSION OF ROAD AND RAILWAY INFRASTRUCTURE FACILITIES Nemanja Ilić, Aleksandra Petrović, Arandel Babić, Marina Pljakić	
14:50 – 14:55	10	148	INFLUENCE OF ROAD INFRASTRUCTURE ON FUNCTIONING OF POSTAL TRAFFIC IN THE REPUBLIC OF CROATIA Pero Škorput, Marijan Binički, Davorin Vukadin	
14:55 – 15:00	11	066	TRAFFIC ANALYSIS OF SLAVONSKA AVENUE IN ZAGREB Zvonimir Pejić, Dominik Stamać, Stjepan Kralj	
15:00 – 15:30	DISCUSSION IN FRONT OF THE POSTERS			
Each oral poster presentation is limited to 5 min.				
15:30 – 16:00	Coffee Break			

Tuesday, 18th May 16:00 – 17:30		Session 7A ROAD MAINTENANCE AND CROSSINGS	Session room: CAMELIA II
<b>Chairmen: Prof. Tatjana Rukavina and Prof. Nenad Gucunski</b>			
Time	Ref. No.	Paper Title / Author(s)	
16:00 – 16:15	050	EXPERIENCES ACQUIRED IN THE COURSE OF DESIGNING AND EXECUTION OF WORKS ON RECONSTRUCTION OF LEVEL CROSSINGS WITHIN THE ON SERBIAN RAILWAY LINE NETWORK Tatjana Simić, Ivan Ristić, Tatjana Mikić	
16:15 – 16:30	028	MAIN DESIGNS OF BRIDGE REPAIRS ON MAIN ROAD M-8: SECTION: ALJINOVICI – SJENICA – NOVI PAZAR Slavica Vučetić – Abinun, Petar Spasić	
16:30 – 16:45	022	THE UČKA TUNNEL UPGRADE Gordana Tomašević	
16:45 – 17:00	023	EVALUATION OF TRAFFIC SAFETY AT THE CONSTRUCTION AND MAINTENANCE OF ROAD PROJECTS Bashir M. Aburawi	
17:00 – 17:15	014	PROGRAM OF SOLVING LEVEL CROSSINGS IN THE REPUBLIC OF CROATIA Marko Hoić	
17:15 – 17:30	132	SOME SOLUTIONS FOR THE ZAGREB RAILWAY TRAFFIC JUNCTION Stjepan Kralj	
Each oral paper presentation is limited to 15 min.			
<b>End of DAY 2</b>			

Tuesday, 18th May 16:00 – 17:30		Session 7B PERMANENT WAY	Session room: CONGRESS HALL
<b>Chairmen: Prof. Janusz Madejski and Prof. Stjepan Lakušić</b>			
Time	Ref. No.	Paper Title / Author(s)	
16:00 – 16:15	041	REDUCING VIBRATION IN LISBON'S TRAIN SYSTEM Patrick Carels, Koen Ophalfens, Paulo Pinto, Roger Kelly, Zoltan Horvath	
16:15 – 16:30	003	INFLUENCE OF PLANUM BEARING CAPACITY ON TRACK STRUCTURE BEHAVIOUR Slavko Živković, Stjepan Lakušić	
16:30 – 16:45	085	ANALYSIS OF THE DYNAMIC AFFECTS ON SWITCHES USING VIBRATION MEASUREMENT Jaroslav Smutný, Ivan Vukušić, Vladimir Tomandl	
16:45 – 17:00	160	INVESTIGATION OF DYNAMIC BEHAVIOR OF SUPERSTRUCTURE TRACK RAILWAY IN TRANSITION ZONE Jabbar Ali Zakeri, Vida Ghorbani	
17:00 – 17:15	163	INFLUENCE OF WHEEL AND RAIL PROFILES ON RAILWAY VEHICLE DYNAMICS Atmadzhova Dobrinka	
17:15 – 17:30		IMPORTANCE OF DIGITAL GEOMETRY MEASUREMENT READINGS OF TRACK AND TURNOUTS AND THEIR EFFECT ON TRAIN OPERATION SAFETY IMPROVEMENT Janusz Madejski	
Each oral paper presentation is limited to 15 min.			
<b>End of DAY 2</b>			



## CONFERENCE SOCIAL TOURS

### TOUR 1 – KRK ISLAND (Monday, May 17th 2010)

A full day tour, from 9:30 to 17:00 · Price per person: 55 €

Visit the biggest and most interesting Croatian island. Don't miss the chance to see the island of Košljun where Franciscans have lived for more than 500 years; Vrbnik with a long wine production tradition or Krk, which testifies to the power of the local Frankopan dukes. The excursion includes: bus ride, guide, boat ride and entrance to Košljun, wine tasting (local ham and cheese, wines, brandies) and organization of the excursion. This is relaxing and enjoyable excursion!



### TOUR 2 – BRIJUNI ISLANDS (Tuesday, May 18th 2010)

A full day tour, from 9:30 to 19:00 · Price per person: 60 €

Visit Brijuni National Park and the island of Veliki Brijun. Enjoy strolling around the island. Take a ride in the small tourist train and see fallow deer, axis deer and mouffl ons light-heartedly feeding in meadows. See archaeological sights, Verige bay with remains of a Roman villa dating from the 1st century AD and safari park with zebras, Somali sheep, zebu, camels, lamas and elephants. The excursion includes: bus ride to Fažana, boat trip to the island of Veli Brijuni, guide, and entrance to the National Park Brijuni with local guide and train ride and organization of excursion. Experience the luxurious lifestyle of jet-setters and the panorama of primeval nature!



**TOUR 3 – ISTRIA (Pula, Rovinj and Poreč); Wednesday, May 19th 2010**

A full day tour, from 9:30 to 18:30 · Price per person: 55 €

Go back in history and visit the most significant and most developed tourist region in Croatia and its beautiful towns: Hum has a population of only 6 people, but is officially a town, and is the Guinness World Record holder for the smallest town in the world; Motovun – a town monument, an ancient little Istrian town located atop a 277-meter-high hill. Its present appearance, with the city walls surrounding the center of the town, dates back to the Middle Ages. Rovinj – a typical medieval Venetian town, distinctive for its romantic narrow little streets and the imposing church of its patron saint, St. Euphemia; Pula – an ancient town with its well-preserved Arena, take a look at the Sergius Triumphal Arch and other numerous Roman remains. The excursion includes: bus ride, guide, lunch (soup, main dish and dessert) and organization of the excursion.



**Notes**

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ŽELJEZNICE 21

GRAĐEVINAR

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## EDUCATION

### Undergraduate courses:

- Roads
- Railways

### Graduate courses:

- Traffic Noise
- Traffic Technics
- Road Design
- Railway Design and Construction
- Pavements
- Permanent Way
- Road Intersections
- Earthworks
- Traffic Tunnels
- Airports
- Transportation Facility
- Traffic Systems
- Pavement Management
- Railway Maintenance

### Postgraduate courses - doctoral:

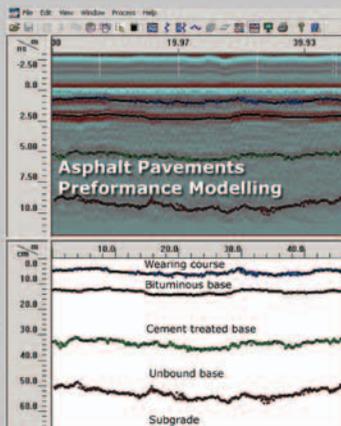
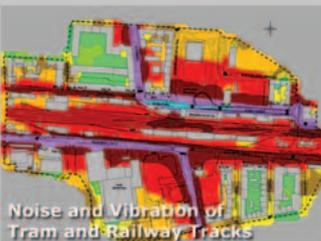
- Theory of Road Alignment
- Flexible Pavements
- Theory of Vehicle Movement on Rails
- Highway Capacity
- Intersection Design
- Concrete Pavements
- High Speed Tracks
- Special Chapters about Traffic Noise
- Pavement Surface Properties
- Theory of Road Vehicles Movement
- Optimization of Railway Lines

### Lifelong education:

- Dani prometivna (Transportation Infrastructure Days)
- 2008 • 2009 • 2010 •



## RESEARCH PROJECTS



**Road Traffic Noise Monitoring and Mitigation**

**Noise and Vibration of Tram and Railway Tracks**

## PROFESSIONAL PROJECTS



**Noise protection**



**Pavement survey**



**Laboratory for testing geosynthetic materials**



**Urban railways**



**Road design**

## OBRAZOVANJE

### Preddiplomski studij:

- Ceste
- Željeznice

### Diplomski studij:

- Prometna buka
- Prometna tehnika
- Projektiranje cesta
- Projektiranje i građenje željeznica
- Kolničke konstrukcije
- Gornji ustroj željeznica
- Cestovna čvorišta
- Donji ustroj prometnica
- Prometni tuneli
- Aerodromi
- Oprema prometnica
- Prometni sustavi
- Gospodaranje kolnicima
- Održavanje kolosijeka
- Promet u mirovanju
- Gradske prometnice

### Poslijediplomski doktorski studij:

- Teorija trasiranja
- Savitljive kolničke konstrukcije
- Teorija kretanja vozila na tračnicama
- Propusna moć prometnica
- Oblikovanje čvorišta
- Krute kolničke konstrukcije
- Kolosijeci za velike brzine
- Posebna poglavlja buke od prometa
- Površinska svojstva kolnika
- Teorija kretanja cestovnih vozila
- Optimalizacija željezničkih trasa

### Cjeloživotno obrazovanje:

- Dani prometnica
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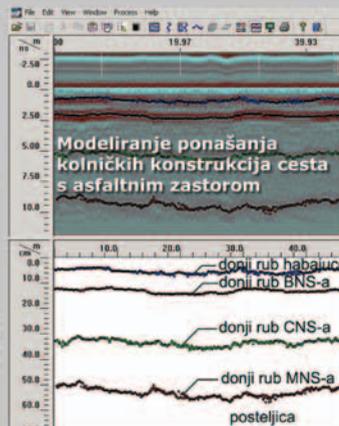
## ZNANSTVENI PROJEKTI



Buka cestovnog prometa - monitoring i mjere zaštite



Buka i vibracije na tramvajskim i željezničkim kolosijecima



## STRUČNI RAD



Zaštita od buke



Pregled stanja kolničke konstrukcije



Laboratorij za ispitivanja geosintetskih materijala



Kolosijeci u urbanim sredinama



Projektiranje cesta

