

CCC 2008  
Proceedings



Central European  
Congress on  
Concrete Engineering

2-3 October 2008  
Opatija, Croatia



Hosted by CSSE  
Croatian Society of  
Structural Engineers

**OPATIJA  
2008**



FOUNDING MEMBERS

**The 4th Central European Congress on Concrete Engineering**



**Concrete Engineering in Urban Development**

**Invitation & programme overview**

# 4CCC SYMPOSIUM – OPATIJA 2008

## Organisers



Croatian Society of Structural Engineers

*in association with*



fib Croatian Member Group

Croatian Society for Concrete Engineering and Construction Technology

Civil Engineering Institute of Croatia

University of Zagreb

## Scientific Committee

J. Radić (chairman), Croatia  
A. Mihanović, Croatia  
Z. Sorić, Croatia  
K. Bergmeister, Austria  
J. Kollegger, Austria  
L. Sparowitz, Austria

G. L. Balázs, Hungary  
G. Kolozsi, Hungary  
Z. Kovács, Hungary  
M. Kalný, Czech Republic  
P. Štepanek, Czech Republic  
J. L. Vitek, Czech Republic

## Organizing Committee

D. Kolić (chairman), Croatia  
D. Živni, Croatia  
T. Trputac, Croatia  
A. Kindij, Croatia  
A. Mandić, Croatia

J. Bleiziffer, Croatia  
M. Kušter, Croatia  
M. Pauser, Austria  
V. Šruma, Czech Republic  
L. Dancs, Hungary

Scientific Symposium “Concrete Engineering in Urban Development” is the fourth and last event of the first round of the congress series “Central European Congress on Concrete Engineering”. The four founding countries are Austria, Croatia, Czech Republic and Hungary, represented by the following associations:



# Message from the organizer

## Dear Colleagues

It is my great pleasure to invite you to Croatia on international scientific symposium “Concrete Engineering in Urban Development” in Opatija, from 2<sup>nd</sup> to 3<sup>rd</sup> of October 2008.

This is the fourth Central European Congress on Concrete Engineering which brings together scientists and professionals from Austria, Croatia, Czech Republic and Hungary, as well as around the world. This event marks the end of the first round of CCC which started in 2005 in Graz, was then continued in 2006 in Hradec Kralove, in 2007 in Visegrád and has now arrived to Opatija. The new cycle starts next year in Austria’s Baden. Several topics have been elaborated over the past years – fibre reinforced concrete in practice, concrete structures for traffic network, innovative materials and technologies for concrete structures, while Opatija symposium is focusing on the role of concrete engineering in urban development.

Urban development for attractive and sustainable environment is a major challenge for all European countries and cities. Advanced techniques and know-how is required to improve the health, comfort, security and safety of people in closed and open spaces of the urban environment. Innovative concrete engineering could be the key to build cities of the future by increasing quality and efficiency while respecting and preserving natural and man-made environment.

This symposium provides forum for presentation and discussion of current activities and further progress in concrete engineering in urban development. The topics on which the symposium will focus include:

- project development and financing
- traffic structures
- water and environment
- residential and office buildings
- architectural shapes in urbanistic views

More than 100 contributions have been received and reviewed by the symposium scientific committee. Once again, it is my pleasure to invite you to visit the pearl of Adriatic – the city of Opatija, to join our efforts in progressing towards set goals.

Jure Radić  
*Croatian Society of Structural Engineers Chairman*



## PROGRAMME OVERVIEW

(Preliminary 25 September 2008)

1 October 2008 WEDNESDAY	
17:00 – 20:00	Registration
20:00	Welcome cocktail
2 October 2008 THURSDAY	
08:00 – 09:30	Registration
09:30 – 11:30	■ Session 1: Opening & keynote lectures
11:30 – 12:00	Coffee break & Opening of 4CCC Stands, poster session & exhibition
12:00 – 13:30	■ Session 2A: Transport 1      ■ Session 2B: Design 1
13:30 – 14:45	Lunch break & exhibition
14:45 – 16:15	■ Session 3A: Transport 2      ■ Session 3B: Design 2+Architecture
16:15 – 16:45	Coffee break & exhibition
16:45 – 18:15	■ Session 4A: Transport 3      ■ Session 4B: Buildings 1
20:00	Banquet
3 October 2008 FRIDAY	
07:00 – 08:00	Water polo in the swimming pool on the terrace
09:00 – 10:30	■ Session 5A: Transport 4      ■ Session 5B: Materials 1
10:30 – 11:00	Coffee break & exhibition
11:00 – 12:30	■ Session 6A: Buildings 2      ■ Session 6B: Materials 2
12:30 – 13:45	Lunch break & exhibition
13:45 – 15:30	■ Session 7: Transport 5 & closing
15:30 – 18:30	Technical visit to Krk Bridge

■ Main Hall

■ Kamelija II Hall

# DAY 1: Thursday, October 2

<b>08:00 – 09:30</b>	<b>REGISTRATION</b> <i>Registration desk is located just opposite the hotel reception</i>
<b>09:30 – 11:30</b> <b>Main hall</b>	<i>Session 1</i>
	<b>CONGRESS OPENING &amp; PLENARY SESSION</b> <i>Chair: Z. Šavor (Croatia)</i>
09:30-10:15	<b>WELCOME ADDRESSES &amp; OVERVIEW OF 4 LAST YEARS OF CCC</b> <i>D. Kolić (Croatia)</i> <i>M. Pauser (Austria)</i> <i>M. Kalný (Czech Republic)</i> <i>G. L. Balázs (Hungary)</i>
10:15-10:35	<i>J. Radić &amp; J. Bleiziffer</i> <b>SUSTAINABILITY OF CONCRETE STRUCTURES IN URBAN DEVELOPMENT</b>
10:35-10:50	<i>H. Wetschnig</i> <b>CONCRETE ENGINEERING IN URBAN DEVELOPMENT IN VIENNA</b>
10:50-11:05	<i>J. L. Vitek &amp; P. Šourek</i> <b>CONTEMPORARY DEVELOPMENT OF TRAFFIC INFRASTRUCTURE IN PRAGUE</b>
11:05-11:20	<i>G. L. Balázs &amp; G. Tassi</i> <b>CONCRETE STRUCTURES FOR URBAN DEVELOPMENT IN HUNGARY</b>
<b>11:30 – 12:00</b>	<b>OPENING OF POSTER SESSION &amp; EXHIBITION</b> <i>Will be opened throughout the Congress</i>
	<i>Coffee will be served at the exhibition area</i>

## DAY 1: Thursday, October 2

<b>12:00 – 13:30</b> <b>Main hall</b>	<i>Session 2A</i>
	<b>TRANSPORT STRUCTURES I</b> <i>Chair: J. Bleiziffer (Croatia) &amp; G. L. Balázs (Hungary)</i>
12:00-12:15	<i>J. Radić, Z. Šavor &amp; G. Hrelja</i> <b>DESIGN OF PELJEŠAC BRIDGE</b>
12:15-12:30	<i>M. Kalný, J. Komanec &amp; V. Engler</i> <b>APPROACH BRIDGE AND PLATFORM AT THE PRAGUE RUZYNĚ AIRPORT - TERMINAL 2</b>
12:30-12:45	<i>G. Horváth</i> <b>THE NORTHERN DANUBE BRIDGE OF M0 MOTORWAY</b>
12:45-13:00	<i>Z. Kovacs, M. Ivanyi Jr. &amp; Z. Teiter</i> <b>NEW MOTORWAY BRIDGE OVER THE BORDER RIVER MURA</b>
13:00-13:15	<i>V. Ačanski &amp; J. Ačanski</i> <b>DESIGN AND CONSTRUCTION OF THE »10-3, 6-10 RONDO« VIADUCT</b>
13:15-13:30	<i>J. Radić, A. Kindij &amp; A. Mandić</i> <b>JARUN AND BUNDEK BRIDGE PROJECTS</b>

<b>13:30 – 14:45</b>	<b>LUNCH</b> <i>Will be served at the hotel restaurant on the ground floor</i>
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## DAY 1: Thursday, October 2

<p><i>Session 2B</i></p> <p><b>DESIGN I</b></p> <p><i>Chair: J. Ačanski (Slovenia) &amp; B. Teplý (Czech Republic)</i></p>	<p><b>12:00 – 13:30</b></p> <p><b>Kamelija II Hall</b></p>
<p><i>S. Fehérvári &amp; S. G. Nehme</i></p> <p><b>RESIDUAL PROPERTIES OF HARDENED CEMENTS AFTER THERMAL SHOCK</b></p>	12:00-12:15
<p><i>O. Río &amp; C. Arciniegas</i></p> <p><b>A TAILOR MADE CONCRETE SOLUTION FOR TUNNELLING</b></p>	12:15-12:30
<p><i>Z. Šavor, I. Gukov, J. Bleiziffer, G. Hrelja, I. Kalafatić &amp; M. Franetović</i></p> <p><b>RJEČINA BRIDGE ON RIJEKA CITY ROUNDABOUT</b></p>	12:30-12:45
<p><i>Z. Sorić, J. Galić &amp; T. Kišiček</i></p> <p><b>QUAY AND SLIPWAY ON RIVER SAVA AND QUAY ON RIVER DRAVA IN CROATIA</b></p>	12:45-13:00
<p><i>B. Teplý</i></p> <p><b>NEW TREND IN DESIGN OF CONCRETE STRUCTURES: PERFORMANCE-BASED APPROACH</b></p>	13:00-13:15
<p><i>U. Jarc &amp; M. Završki</i></p> <p><b>EXTENSION AND RECONSTRUCTION OF THE EUROPARK SHOPPING CENTRE IN MARIBOR</b></p>	13:15-13:30
<p><b>LUNCH</b></p> <p><i>Will be served at the hotel restaurant on the ground floor</i></p>	<b>13:30 – 14:45</b>

## DAY 1: Thursday, October 2

<b>14:45 – 16:15</b> <b>Main hall</b>	<i>Session 3A</i>
	<b>TRANSPORT STRUCTURES II</b> <i>Chair: P. Sesar (Croatia) &amp; J. L. Vitek (Czech Republic)</i>
14:45-15:00	<i>Ž. Radovanović</i> <b>CONCEPTUAL AND MAIN DESIGNS OF THE THREE PEDESTRIAN BRIDGES IN PODGORICA</b>
15:00-15:15	<i>S. Kisbán</i> <b>THE M0 MOTORWAY CABLE STAYED BRIDGE IN BUDAPEST, HUNGARY – “A” SHAPED PYLONS</b>
15:15-15:30	<i>P. Sesar &amp; Z. Banic</i> <b>REQUIREMENTS ON FUTURE URBAN CONCRETE BRIDGES</b>
15:30-15:45	<i>A. Schweighofer, H. Kari &amp; J. Kollegger</i> <b>DESIGN OF A SHELL STRUCTURE FOR A GREEN BRIDGE</b>
15:45-16:00	<i>A. Bedics, G. Dubróvsky &amp; T. Kovács</i> <b>DEVELOPMENT OF A NEW BRIDGE GIRDER FAMILY IN HUNGARY – DESIGN, PRODUCTION AND APPLICATION</b>
16:00-16:15	<i>M. Pezer</i> <b>NEW JANKOMIR’S BRIDGE</b>

<b>16:15 – 16:45</b>	<b>POSTER SESSION &amp; EXHIBITION</b> <i>Coffee will be served at the exhibition area</i>
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## DAY 1: Thursday, October 2

<i>Session 3B</i>	<b>14:45 – 16:15</b>
<b>DESIGN II &amp; ARCHITECTURE</b>	<b>Kamelija II Hall</b>
<i>Chair: A. Mihanović (Croatia) &amp; A. Mandić (Croatia)</i>	
<i>Z. Šavor, G. Hrelja, M. Franetović, I. Kalafatić, M. Srbić &amp; J. Bleiziffer</i> <b>BUNDEK BEAM BRIDGE IN ZAGREB - A COMPETITION ENTRY</b>	14:45-15:00
<i>J. Navrátil, A. Sedlák &amp; P. Řezka</i> <b>MODELLING OF CONCRETE BRIDGE STRUCTURES CONSTRUCTED BY INCREMENTAL LAUNCHING</b>	15:00-15:15
<i>T. Szyszkowitz, G. Zenkner &amp; E. Handel</i> <b>MUMUTH – FREELY FORMED SPATIAL STRUCTURE</b>	15:15-15:30
<i>M. Kuželički &amp; D. Ružić</i> <b>THE PEČINE TUNNEL</b>	15:30-15:45
<i>D. Šarić, Ž. Banić &amp; G. Trogrlić Uzelac</i> <b>ROAD TUNNELS CONNECTING TOWN OF PLOČE WITH MOTORWAY</b>	15:45-16:00
<i>D. Kolić, M. Knights &amp; Z. Sever</i> <b>RAPID URBAN RAIL SYSTEM FOR ZAGREB AREA</b>	16:00-16:15
<b>POSTER SESSION &amp; EXHIBITION</b> <i>Coffee will be served at the exhibition area</i>	<b>16:15 – 16:45</b>

## DAY 1: Thursday, October 2

<b>16:45 – 18:15</b> <b>Main hall</b>	<i>Session 4A</i>
	<b>TRANSPORT STRUCTURES III</b> <i>Chair: S. Lakušić (Croatia) &amp; C. Haberland (Austria)</i>
16:45-17:00	<i>D. Krása, M. Kochánek &amp; J. Růžička</i> <b>PRAGUE METRO - LINE A EXTENSION TO INTERNATIONAL AIRPORT PRAHA RUŽYŇĚ CONCRETE STRUCTURES IN UNDERGROUND</b>
17:00-17:15	<i>S. Lakušić, M. Skazlić &amp; Mladenko Rak</i> <b>TRAM TRACK PAVING WITH MICRO FIBRE REINFORCED CONCRETE PLATE IN URBAN AREAS</b>
17:15-17:30	<i>O. Río, N. Rebolledo &amp; A. Rodríguez</i> <b>BACKFILLING FOR SEGMENTAL LININGS IN UNDERGROUND STRUCTURES</b>
17:30-17:45	<i>C. Haberland</i> <b>TUNNEL BORING MACHINES (TBM) – EXAMPLES OF POSSIBILITIES AND APPLICATIONS FOR URBAN INFRASTRUCTURE PROJECTS</b>
17:45-18:00	<i>M. Kochánek, J. Růžička &amp; D. Krása</i> <b>PRAGUE METRO - LINE C EXTENSION EXPERIENCE FROM DRIVING DUAL-RAIL TUNNELS AND NEW ARCHITECTURAL SOLUTION OF UNDERGROUND STATIONS</b>
18:00-18:15	<i>A. Ilmer &amp; F. Rupp</i> <b>RELIEF SEWER FOR THE VIENNA COLLECTING MAINS</b>
<b>20:00</b>	<b>CONGRESS BANQUET</b> <i>Will be served at the main congress hall</i>

## DAY 1: Thursday, October 2

<p>Session 4B</p> <p><b>BUILDINGS I</b></p> <p><i>Chair: D. Meštrović (Croatia) &amp; G. Tassi (Hungary)</i></p>	<p><b>16:45 – 18:15</b></p> <p><b>Kamelija II Hall</b></p>
<p><i>B. Trogrlić, D. Gabrić &amp; A. Mihanović</i></p> <p><b>'3F' - A BUILDING OF UNIVERSITY CAMPUS IN SPLIT</b></p>	<p>16:45-17:00</p>
<p><i>N. Borgudan, B. Medić, A. L. Pleština, T. Stantić Brčić, G. Janjuš, A. Marković &amp; H. Mihal</i></p> <p><b>ARENA ZAGREB</b></p>	<p>17:00-17:15</p>
<p><i>B. Hofer &amp; C. Mittermeir</i></p> <p><b>WESTSIDE LEISURE AND SHOPPING CENTRE – BERNE, SWITZERLAND</b></p>	<p>17:15-17:30</p>
<p><i>R. Dietze &amp; N. Dulikravić</i></p> <p><b>50.000 m<sup>2</sup> OF JOINTLESS FLOOR MADE FROM FIBRE COMPOSITE CONCRETE WITH INCREASED REQUIREMENTS ON FLATNESS AND DURABILITY</b></p>	<p>17:30-17:45</p>
<p><i>S. Mitrovic</i></p> <p><b>THE USE OF SELF COMPACTING CONCRETE FOR WATERPROOF BUILDING BASEMENTS</b></p>	<p>17:45-18:00</p>
<p><i>J. R. Desmyter &amp; B. B. Parmentier</i></p> <p><b>COMMENTS ON prEN13670 FOR THE EXECUTION OF CONCRETE STRUCTURES</b></p>	<p>18:00-18:15</p>
<p><b>CONGRESS BANQUET</b></p> <p><i>Will be served at the main congress hall</i></p>	<p><b>20:00</b></p>

## DAY 2: Friday, October 3

<b>09:00 – 10:30</b> <b>Main hall</b>	<i>Session 5A</i>
	<b>TRANSPORT STRUCTURES IV</b> <i>Chair: A. Kindij (Croatia) &amp; M. Kalný (Czech Republic)</i>
09:00-09:15	<i>M. Reiterer, U. Scholz, J. Fink, H. Axmann, R. Fila &amp; C. Trummer</i> <b>STRUCTURAL HEALTH MONITORING OF AN AUSTRIAN RAILWAY BRIDGE</b>
09:15-09:30	<i>D. Tkalčić &amp; K. Dujmović</i> <b>DOMOVINSKI BRIDGE OVER SAVA RIVER IN ZAGREB</b>
09:30-09:45	<i>W. Zimmermann</i> <b>FIRST APPLICATIONS WITH ULTRA HIGH PERFORMANCE CONCRETE (UHPC) IN AUSTRIA</b>
09:45-10:00	<i>V. Ukrainczyk, D. Kuzmanović, K. Ložnjak &amp; S. Štorga</i> <b>RENEWAL OF JANKOMIR BRIDGE ACCROSS RIVER SAVA (ZAGREB)</b>
10:00-10:15	<i>J. Glatzl, H. Kari, W. Platzer, S. Ebenbichler, O. Neuner, K. Margreiter &amp; C. Schaur</i> <b>RESTORATION OF AN EXISTING RAILWAY BRIDGE IN AN URBAN SURROUNDING</b>
10:15-10:30	<i>J. Radić, J. Bleiziffer &amp; M. Kušter</i> <b>LIBERTY BRIDGE - CENTRAL SAVA RIVER CROSSING IN ZAGREB</b>

<b>10:30 – 11:00</b>	<b>POSTER SESSION &amp; EXHIBITION</b> <i>Coffee will be served at the exhibition area</i>
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## DAY 2: Friday, October 3

<p>Session 5B</p> <p><b>MATERIALS I</b></p> <p><i>Chair: B. Medić (Croatia) &amp; K. Kopecskó (Hungary)</i></p>	<p><b>09:00 – 10:30</b></p> <p><b>Kamelija II Hall</b></p>
<p><i>D. Meštrović, D. Albartus &amp; J. Ožbolt</i></p> <p><b>NEW SOLUTIONS IN THE FIELD OF REINFORCEMENT TECHNOLOGY</b></p>	<p>09:00-09:15</p>
<p><i>R. Mihala, K. Bergmeister, A. Unterweger, P. Spyridis &amp; A. Rieder</i></p> <p><b>STRENGTHENING OF CONCRETE MEMBERS BY MEANS OF CARBON FIBRE REINFORCED POLYMERS (CFRP)</b></p>	<p>09:15-09:30</p>
<p><i>R. Čechmánek, J. Junek, H. Vilam &amp; J. Knězek</i></p> <p><b>UTILIZATION OF GLASS FIBRE REINFORCED CONCRETE IN URBAN ARCHITECTURE</b></p>	<p>09:30-09:45</p>
<p><i>Z. K. Szabó, O. Fenyvesi &amp; G. L. Balázs</i></p> <p><b>APPLICATION OF FRP STRENGTHENING USING CEMENT OR EPOXY BASED ADHESIVES</b></p>	<p>09:45-10:00</p>
<p><i>P. Kremnitzer &amp; C. Salesny</i></p> <p><b>SCC FOR HOLLOW BODIED CONCRETE SLABS</b></p>	<p>10:00-10:15</p>
<p><i>P. Arany, E. Tóth, G. Kolozsi &amp; G. L. Balázs</i></p> <p><b>A COMMON STRUCTURE - FROM UNCOMMON MIXTURES FOR THE LARGEST VIADUCT IN HUNGARY</b></p>	<p>10:15-10:30</p>
<p><b>POSTER SESSION &amp; EXHIBITION</b></p> <p><i>Coffee will be served at the exhibition area</i></p>	<p><b>10:30 – 11:00</b></p>

## DAY 2: Friday, October 3

<b>11:00 – 12:30</b> <b>Main hall</b>	<i>Session 6A</i>
	<b>BUILDINGS II</b> <i>Chair: Z. Sorić (Croatia) &amp; C. Schaur (Austria)</i>
11:00-11:15	<i>J. Kozák, B. Magyari &amp; G. Tassi</i> <b>FIBRE REINFORCED CONCRETE ELEMENTS FOR URBAN BUILDING FAÇADES</b>
11:15-11:30	<i>D. Meštrović, V. Kazić &amp; I. Hranilović</i> <b>DESIGN OF THE MUSEUM OF CONTEMPORARY ART</b>
11:30-11:45	<i>R. Sinđić-Grebović</i> <b>HIGH STRENGTH CONCRETE IN CONSTRUCTIVE ELEMENTS OF URBAN STRUCTURES</b>
11:45-12:00	<i>P. Presečki, M. Kovač &amp; D. Pavičić</i> <b>POST-TENSIONED SLABS FOR BIG SPANS IN URBAN DEVELOPMENT</b>
12:00-12:15	<i>M. Schulz</i> <b>STEEL FIBRE CONCRETE AND STEEL FIBRE REINFORCED CONCRETE (SFRC) ON THE WAY TO A DESIGNABLE BUILDING MATERIAL</b>
12:15-12:30	<i>M. Crnogorac &amp; I. Kalafatić</i> <b>STRUCTURAL DESIGN OF HOTEL LONE IN ROVINJ</b>

<b>12:30 – 13:45</b>	<b>LUNCH</b> <i>Will be served at the hotel restaurant on the ground floor</i>
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## DAY 2: Friday, October 3

<i>Session 6B</i>	<b>11:00 – 12:30</b>
<b>MATERIALS II</b>	<b>Kamelija II Hall</b>
<i>Chair: G. Hrelja (Croatia) &amp; P. Kremnitzer (Austria)</i>	
<i>D. Bjegović, D. Mikulić, M. Serdar, B. Milovanović &amp; I. Gabrijel</i> <b>SERVICE LIFE ESTIMATION OF CONCRETE STRUCTURE EXPOSED TO AGRESSIVE ENVIRONMENTAL LOADS</b>	11:00-11:15
<i>R. Hela &amp; J. Příklad</i> <b>STUDIES ON THE FACE CONCRETE</b>	11:15-11:30
<i>O. Fenyvesi, Z. K. Szabó &amp; Z. Józsa</i> <b>SWELLING-SHRINKING PROPERTIES OF CEMENT AND POLYMER BASED ADHESIVES</b>	11:30-11:45
<i>J. L. Vitek</i> <b>FIBRE REINFORCED CONCRETE IN PRESTRESSED STRUCTURES</b>	11:45-12:00
<i>K. Kopeckó</i> <b>ROLE OF MINERAL ADDITIVES IN CHLORIDE ION BINDING OF CEMENTS</b>	12:00-12:15
<i>T. Eisenhut &amp; G. Gruber</i> <b>PRESSURE OF FRESH CONCRETE IN SPECIAL FOUNDATION ENGINEERING</b>	12:15-12:30
<b>LUNCH</b> <i>Will be served at the hotel restaurant on the ground floor</i>	<b>12:30 – 13:45</b>

## DAY 2: Friday, October 3

<b>13:45 – 15:30</b> <b>Main hall</b>	<i>Session 7</i>
	<b>TRANSPORT STRUCTURES V</b> <i>Chair: D. Kolić (Croatia) &amp; M. Pauser (Austria)</i>
13:45-14:00	<i>A. Vlašić &amp; J. Radić</i> <b>ZAGREB CITY AND SAVA RIVER</b>
14:00-14:15	<i>T. Simandl, B. Schweighofer &amp; B. Hinterplattner</i> <b>SHIP IMPACT AT THE DANUBE BRIDGE IN KREMS</b>
14:15-14:30	<i>H. S. Huber</i> <b>EXPANSION OF THE WALTHERSTRASSE WITH CONSTRUCTION OF A NEW BRIDGE OVER THE RAILWAY LINES</b>
14:30-14:45	<i>H. Höfer</i> <b>USE OF CONCRETE IN MOTORWAY CONSTRUCTION, M0 BUDAPEST (KM 42+200 – 59+800)</b>
14:45-15:00	<i>V. Krstic &amp; N. Gucunski</i> <b>DETECTION OF UNDERGROUND OBSTACLES IN URBAN AREAS BY THE SASW TEST</b>
15:00-15:15	<i>J. Beslać, D. Tkalčić &amp; K. Štemberga</i> <b>DIFFICULTIES AND SUCCESSES IN THE MAINTENANCE OF KRK BRIDGE</b>
	<i>D. Kolić</i> <b>CONGRESS EVALUATION</b>

<b>15:30 – 18:30</b>	<b>TECHNICAL VISIT</b> <b>Krk Bridge</b>
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# TECHNICAL VISIT

**3 October**  
**Friday**  
**15:30-18:30**

## **KRK BRIDGES**

25 persons minimum

Krk Bridge consists of two large reinforced concrete arch spans providing a fixed road link to the Island of Krk. The bridge was constructed using an innovative method in which concrete spandrel columns, temporary steel tension tie top chords and diagonals were combined to form a truss. With a span of 390 m the Krk bridge is still the largest conventional reinforced concrete arch span in the world, 28 years upon its completion. The span of the smaller arch is 244 m.

The repair works on the Krk bridge started several years after its completion with installation of laminated bearings and strengthening adjacent structural elements. In the 1990s the works were broadened to include the repair of columns of the smaller arch. The smaller arch has been recently repaired by removal of the contaminated concrete, its subsequent replacement with shotcrete and adding protective coating. The repair of the larger arch presents major challenge to bridge engineers. The arch is supported on submerged inclined struts. After many years of research and testing various corrosion protection systems, cathodic protection method was selected for this part of the structure.

The technical visit to the Krk bridge will be guided by engineers involved in repair & rehabilitation project.



*Please confirm the attendance of the technical tour in the [registration form](#).*

# Poster Session

## TRANSPORT STRUCTURES

*G. Foller*

**MODIFICATION OF THE DONAUSTADT BRIDGE FOR METRO OPERATION**

*M. Petschacher*

**EVALUATION OF REMAINING LIFE OF A BRIDGE**

*G. Dohr & E. Eustacchio*

**WATERPROOFING OF CONCRETE BRIDGE DECKS, ACTUAL AUSTRIAN SYSTEMS AND EUROPEAN DEVELOPMENT**

*N. W. Than*

**SEISMIC RESPONSE ANALYSIS OF TRUSS BRIDGE WITH ELASTOMERIC BEARINGS**

*A. Rieder, R. Mihala, P. Spyridis, A. Unterweger & K. Bergmeister*

**EXPERIMENTAL AND PROBABILISTIC APPROACH FOR SINGLE ANCHORS CLOSE TO AN EDGE**

*D. Tkalčić, A. Balažić, G. Rabljenović, K. Mavar & A. Balagija*

**LUČKO INTERCHANGE - PERFORMANCE OF INVESTIGATION WORKS AND ASSESSMENT OF CONDITION FOR THE PURPOSES OF DEVELOPMENT OF A REHABILITATION DESIGN**

## DESIGN & ARCHITECTURE

*A. Barnaš & G. Rinnhofer*

**DEVELOPMENT OF THE ROTOP®-SPUN CONCRETE COLUMN**

*J. Bártová & P. Štemberk*

**ANCHORAGE ZONE DESIGN USING STRUT-AND-TIE MODEL**

*H. Brezinschek & H. Mötzl*

**DECISION GUIDANCE FOR ECO-EFFICIENCY IN CIVIL ENGINEERING**

*M. Frantová, J. Procházka & P. Štemberk*

**STRUT-AND-TIE MODEL FOR FRAME JOINTS**

*D. Meštrović & J. Ožbolt*

**STRUCTURAL DETAILS IN CONCRETE**

# Poster Session

## BUILDINGS

*C. König & W. Larch*  
**BIKE CITY**

*A. Molnár & I. Bódi*  
**ANALYSIS OF INTERFACIAL STRESSES IN A PRESTRESSED CFRP-PLATED  
WOODEN BEAM**

*A. Fódi & I. Bódi*  
**STATUS OF REINFORCED MASONRY IN HUNGARY**

## MATERIALS

*R. Zidek*  
**ANALYSIS OF RHEOLOGY OF COMPOSITE STRUCTURES**

*V. Vytlačilová, J. Vodička, H. Hanzlová & J. Výborný*  
**CHARACTERISTICS OF FIBRE CONCRETE WITH RECYCLED  
AGGREGATE – MASONRY AND CONCRETE**

## TOURS (optional)

**2 October**  
**Thursday**  
**09:30-18:00**

### KRK ISLAND TOUR

Price: 65 € - 25 persons minimum

Trails of the rich history can be found in the roman mosaics, small medieval churches or glagolitic monuments, enter with us in the rich past of the Krk island. Our first destination will be a place called Punat, well known for the manufacture of the olive oil. From Punat a small boat will take us to the island of Košljun (ride takes around 10 minutes).



Košljun Island has been inhabited since Roman times, and from 12<sup>th</sup> century the island has been inhabited by the priests. On the island there is a Franciscian monastery and a museum. In the museum there are different expositions: ethnographical, sacral, archeological, numismatic. It is one of the cultural centers in Croatia - island of peace and tranquility.



After visiting Košljun, we visit the town of Krk. Krk is the capital of the Krk island, strolling down the streets we will see the old city walls, the "Frankopan" castle from the 12<sup>th</sup> century, and a cathedral built on the remains of the roman spa from the 1<sup>st</sup> century. On the end of our trail we will visit Vrbnik – town situated on a 50 m high cliff, surrounded with the sea from one side and with fertile vineyards from the other side.

Lunch in a typical restaurant is included.

**To book a tour please contact Conference Secretariat at [4ccc@grad.hr](mailto:4ccc@grad.hr)**

## TOURS (optional)

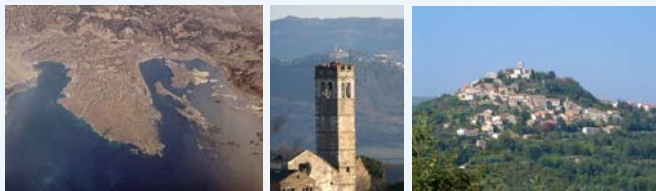
**3 October**  
**Friday**  
**09:30-18:00**

### TOUR OF ISTRIA – DELICIOUS OF ISTRIA

Price: 60 € - 25 persons minimum

Situated near the base of the Istrian peninsula Pula is the largest city in Istria. One of the most famous sights in the whole of Croatia is the Roman amphitheatre in Pula, which has been well preserved. Built during the 1st century AD, the three-story amphitheatre is the sixth largest in the world.

Green Istria is the right place for all those who have enough of city life, crowds, who wish to return to nature, to its peacefulness and tranquility. The inland Istria is showing a growing number of agro tourism points (today reaching the number of around 200). The accommodation units are constructed in typically Istrian tradition, usually called Istrian taverns, mostly isolated. Istria is a homeland the world known truffle.



The culinary chefs agree upon one thing only: the truffle should be placed at the very top of the gastronomic delicacies list. The truffle is a mysterious and unique tuber, completely concealed underground. A specialty added to foodstuff, known for its quality and used since the ancient Roman times is olive oil.

And what about wine...it is enough to say that the Istrian peninsula has a form of a grape ...Malmsey (Malvazija), Terran...Cheers! If you ate too much, a glass of biska, a traditional Istrian grape brandy with leaves of mistletoe or komovica will certainly help. Istrians have been historically devoted to the grapevine. A proverbial saying confirms it : *Bread is for the flesh and wine is for the soul*

Lunch is included.



**To book a tour please contact Conference Secretariat at [4ccc@grad.hr](mailto:4ccc@grad.hr)**

# REGISTRATION

REGISTRATION FEES		Before July 31	After July 31
	Author Participant	300 €	350 €
	Accompanying Person	150 €	150 €
	Student	50 €	50 €

**To register please fill out the Symposium Registration Form and send it by fax or by e-mail to the Symposium Secretariat:**

- fax: [+385 1 4828 052](tel:+38514828052)
- e-mail: [4ccc@grad.hr](mailto:4ccc@grad.hr)

**The participant registration fee includes:**

- Proceedings as a printed volume as well as on CD-ROM
- Conference bag
- Admission to all Technical Sessions
- Refreshments & lunches
- Welcome Cocktail on Wednesday 1 October 2008
- Banquet on Thursday 2 October 2008
- Technical visit on Friday 3 October 2008 (please confirm your attendance in the registration form)

**Accompanying Persons**

- Welcome Cocktail on Wednesday 1 October 2008
- Banquet on Thursday 2 October 2008
- Accompanying person bag

REGISTRATION DESK Working hours	The registration desk will be located at the Conference Venue of the Hotel Ambassador. We advise you to collect your registration documents as soon as possible after your arrival at the hotel. Our staff at the registration desk will be pleased to assist you with all your enquiries.	
	Wednesday, October 1	17:00-20:00
	Thursday, October 2	08:00-09:30

# VENUE & ACCOMMODATION

## VENUE

The conference will be held in the Congress Hall of the Hotel "Ambasador" in Opatija, Croatia.

## ACCOMMODATION



### **Ambasador Hotel \*\*\*\*\***

We recommend the accommodation at the Ambassador Hotel where the conference venue is located, and special discount rates will be available for conference participants. This is a top five-star hotel, the leading business-convention, incentive and resort hotel of the Kvarner region.

Rooms: 227 rooms and suites with balconies - air conditioning, mini bar, hair-dryer, IDD telephone with automatic message alert, ISDN line (on request), Sat./Pay TV.

Leisure: outdoor swimming pool, sun terrace, indoor pool with heated sea water, sauna, massage, solarium. Business center, offices and PC units for rent. Parking lot (100 vehicles) and underground garage (60 vehicles) with direct access to the hotel.

***To benefit from the special hotel rates, booking must be made using accommodation form available from symposium website [www.grad.hr/4ccc](http://www.grad.hr/4ccc), and not later than 19 September 2008.***

Felixa Peršića 5, 51410 Opatija, Croatia

Tel: +385/(0)51/74 33 33

Fax: +385/(0)51/74 34 44

e-mail: [ambasador@liburnia.hr](mailto:ambasador@liburnia.hr)

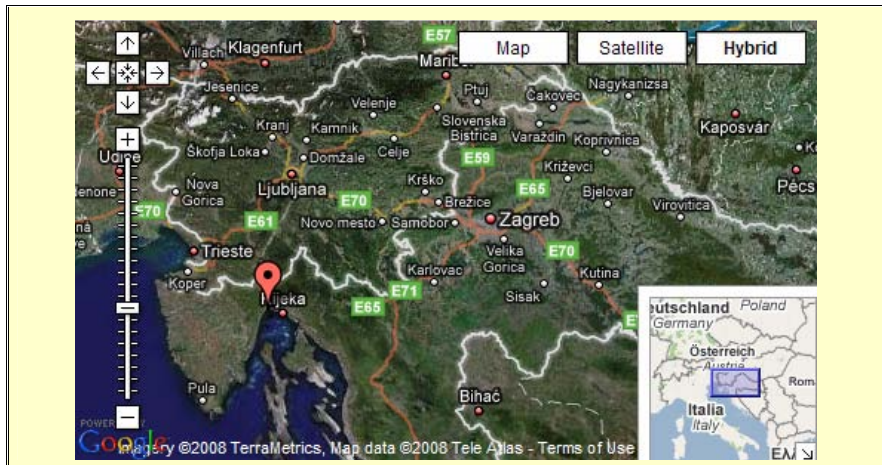
website: [www.liburnia.hr](http://www.liburnia.hr)

Single room bed&breakfast            89 € / day

Double room bed&breakfast        130 € / day

Taxes are not included (cca 1,50 € per person per day)

# VENUE & ACCOMMODATION



# VENUE & ACCOMMODATION

## ACCESS



## BY CAR

**Via Slovenia:** Ljubljana - Postojna (Pivka) - Rupa (Jelsane) border crossing - Opatija

**Via Italy:** Trieste - Kozina border crossing - Pasjak border crossing - Rupa (Jelšane) - Opatija

**Via Zagreb:** motorway A1&A6 Zagreb - Karlovac - Rijeka - Opatija

Route planner is available at

<http://www.visitopatija.net/kakodonasauto.do?lang=en>

## BY TRAIN

**The nearest train stations:**

**Matulji**, 5 km from Opatija, +385 51 274 102

**Rijeka**, 15 km from Opatija, 385 51 211 111

**Zagreb**, 200 km from Opatija, +385 060 333 444

**Information about travelling within Croatia:**

[www.hznet.hr](http://www.hznet.hr)

**Arriving from Italy, the nearest station is Trieste.**

More information: [www.fs-on-line.it](http://www.fs-on-line.it)

## BY PLANE

**The nearest airports:**

**Rijeka Airport, Krk Island (RJK)** [www.rijeka-airport.hr](http://www.rijeka-airport.hr),

45 km from Opatija, app. 1 hour by car (organized bus transportation to Rijeka, 30 mins drive)

**Zagreb Airport (ZAG)** [www.zagreb-airport.hr](http://www.zagreb-airport.hr)

190 km from Opatija, app. 2 hours by car

**Pula Airport (PUY)** [www.airport-pula.hr](http://www.airport-pula.hr)

100 km from Opatija, app. 1 hour by car

**Ronchi dei Legionari Airport, Trieste, Italy (TRS)**

[www.aeroporto.fvg.it](http://www.aeroporto.fvg.it)

110 km from Opatija, app. 1 hour by car

**Ljubljana Airport, Slovenia (LJU)** [www.lju-airport.si](http://www.lju-airport.si)

130 km from Opatija, app. 1.5 hours by car

**Marco Polo Airport, Venice, Italy (VCE)**

[www.veniceairport.it](http://www.veniceairport.it)

250 km from Opatija, app. 2.5 hours by car

# VENUE & ACCOMMODATION

## ACCESS

### BY COACH

#### Arrivals from Zagreb:

+385 (0) 60 313 333

+385 (0) 60 340 340

[www.akz.hr](http://www.akz.hr)

#### Arrivals from Rijeka:

+385 (0) 51 660 360

[www.autotrans.hr](http://www.autotrans.hr)

#### Arrivals from Trieste:

[www.croaziainfo.it](http://www.croaziainfo.it)

#### Arrivals from Ljubljana:

<http://www.ap-ljubljana.si/eng/>

### BY BOAT

If you plan to travel by sea please visit following sites:

#### Opatija Harbour

<http://www.opatija.net/nautika.asp?!=en>

#### Ferry lines in Croatia

[www.jadrolinija.hr](http://www.jadrolinija.hr)



# TRAVEL TIPS

**Travelling documents:** A passport or some other identification document recognised by international agreement. Visa requirements may be checked at [www.mfa.hr](http://www.mfa.hr). The Conference Secretariat in Zagreb will be pleased to send an official letter of invitation to obtain visa, upon request. It is understood that such an invitation is not a commitment on the part of the organizer to provide any financial support. Please contact [4ccc@grad.hr](mailto:4ccc@grad.hr)

**Croatian Currency:** Croatian kuna (HRK or Kn). Exchange rates are (May 2008): 100 € = 725 Kn, 100 Kn = 13,8 €. Credit cards are accepted in almost all hotels, marinas, restaurants and shops (American Express, Diners, Eurocard/Mastercard, Visa)

**Time zone:** GMT +1 in winter and GMT +2 in summer.

**Electricity:** 220V, 50 Hz. Connection for appliances is 2-pin plug.

**Water:** Tap water is potable throughout Croatia

**Allowed speed:** 50 km/h - within residential areas; 80 km/h - outside of residential areas; 100 km/h - on major roads; 130 km/h - on motorways

**Important telephone numbers:** International dialing code for Croatia: 385

Ambulance service: 94

Fire brigade: 93

Police: 92

Automobile breakdown service: 987

General information: 981

Information on local and long-distance telephone numbers: 988

Information on international telephone numbers: 902

[Croatian Automobile Club \(HAK\)](#): +385 - (0)1 - 4554 433 or 4640 800

**Customs regulations:** Customs regulations of the Republic of Croatia are harmonised with the standards of EU Member States. Foreign currency can be freely brought in and out of the country; domestic currency: up to 2,000 HRK. Professional and technical equipment of a high value should be reported at the border. Accompanied dogs and cats must have an International Certificate issued by an authorised veterinarian evidencing that at least 15 days, but not more than six months, passed since the vaccination against rabies. Tax refund to foreign citizens for purchased goods exceeding 500 kuna, providing that the form entitled "Porezni cek" ("Tax Cheque") is stamped by customs officers upon leaving the country. Information: [Customs Administration of the Republic of Croatia](#) (Tel: +385 - (0)1 - 6102 333)

**Medical service:** Foreign tourists do not pay for medical services if the Health Care Convention was signed between Croatia and the country they come from. Expenses of health services provided to persons coming from the countries with which the Health Care Convention was not signed are charged directly to users according to the price list. There are hospitals and clinics in all the major towns, and health centres, as well as pharmacies, in all smaller places. For patients whose lives are in danger, there is emergency transport by air (helicopter) or sea (speedboat).

# TRAVEL TIPS

**Working hours:** Shops and department stores are open between 8 a.m. and 8 p.m., and on Saturdays from 8 a.m. to 2 p.m., or to 3 p.m. A smaller number of stores close between noon and 4 p.m. Many stores are also open on Sundays, especially in the summer, and a smaller number in the larger cities are open 24 hours a day. Public services and companies usually work from 8.30 a.m. to 4.30 p.m. from Monday to Friday.

**Environment protection:** Protection of biodiversity is in accordance with the valid EU regulations. As regards bathing, the sea at the Croatian Adriatic is of high quality according to EU criteria. In case of an accident or pollution of the sea, please advise the National Centre for Search and Rescue at Sea to the telephone 9155(toll-free telephone), which is included in the network of international institutions of the same level. In case of an extraordinary pollution of the environment on the mainland, please inform the National Centre for Notification, the telephone number 985 or the Police the telephone number 92. Additional information about environment and health care: Tel: 0800 200 037

**Radio news in foreign languages during the tourist season:** On the second Channel of the Croatian Radio along with regular news, HAK will be giving reports on road conditions in the English, German and Italian language, and several times a day also information for boaters. Also on the Second Channel of the Croatian Radio, every hour on the hour, news and reports on the conditions of the roads are broadcast in alteration directly from the studios of: the Third Programme of the Bavarian Radio, the Third Programme of the Austrian Radio, RAI Uno and the British Virgin Radio.

**Climate:** Opatija has a mild Mediterranean climate. Thanks to its location below Učka mountain, the climate is gentle with enough moisture, and that is why Opatija is famous for rich vegetation and its parks. The bathing season lasts from June to the end of September, and winters are gentle. That makes the rest in Opatija pleasant through the whole year.

Climate in Opatija	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Max temperature (°C)	8	10	12	16	21	25	29	28	24	19	14	10
Min temperature (°C)	2	3	5	8	12	15	18	18	15	11	7	3
Hours of sunshine	4	4	6	7	6	10	11	10	8	6	4	3
Rainy days	7	6	7	7	6	5	4	4	5	7	9	9
Water temperature of the Adriatic	11	10	11	13	17	21	23	24	22	19	16	13

7-day weather forecast for the region is available from Meteorological and Hydrological Service website [www.dhmz.hr](http://www.dhmz.hr)

# Opatija



*Welcome!*



*Croatia*



Central European  
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