WELCOME TO ICSA2010

Although Architecture and Structural Engineering have both had their own historical development, their interaction has led to the many fascinating and delightful existing structures nowadays. However, there is still the need to stimulate the creative and original design of architectural structures and to persuade architects and structural engineers to further collaborate in this process and to take advantage of constructive principles and aesthetic and static values jointly. Therefore, it was considered appropriate to bring together all of the very best work that has been carried out in the field of structures and architecture during the First International Conference on Structures and Architecture (ICSA2010), held in Guimarães, Portugal, July 21-23, 2010.

ICSA2010 covered all major aspects of structures and architecture, including comprehension of complex forms, computer and experimental methods, concrete and masonry structures, emerging technologies, glass structures, innovative architectural and structural design, lightweight and membrane structures, special structures, steel and composite structures, the borderline between architecture and structural engineering, the history of the relationship between architects and structural engineers, the tectonic of new solutions, the use of new materials and timber structures, among others.

Structures and Architecture contains the lectures and papers presented at ICSA2010. It consists of a book of abstracts and a CD-ROM containing the full texts of the lectures and papers presented at ICSA2010, including the 8 keynote lectures and 249 selected contributions from more than 40 countries.

On behalf of ICSA2010, the chair of the Conference would like to take this opportunity to express his most sincere gratitude to the authors, organizers of mini-symposia and special-seminar to the participants for their contributions, to the members of the Conference Scientific Committee for their work and commitment and to the members of the Local Organizing Committee for the time and effort they have dedicated to make ICSA2010 a successful event.

Last, but not least, our sincere thanks to all the sponsors of ICSA2010, for their willingness to embrace this event from its very beginning.

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ICSA2010 Chair
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- AIJ - Architectural Institute of Japan
- ASCE - American Society of Civil Engineers
- CES - China Civil Engineering Society
- CM - Construção Magazine
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- SEI - Structural Engineering Institute / American Society of Civil Engineers
- TheStructuralEngineer.info Website

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GENERAL INFORMATION
The ICSA2010 will be held at the Convention Centre of the University of Minho - Campus of Azurém, Guimarães, Portugal.

The city of Guimarães is like no other city in Portugal. Its past is so intimately intertwined with the History of Portugal that it is commonly and proudly referred to as the Cradle of the Nation.

The Historic Centre of Guimarães has remained basically unchanged since the 15th century and was declared a World Heritage Site in 2001 by UNESCO, due to its Middle Age historical monuments. Guimarães was chosen by the Portuguese government to be the European Capital of Culture in 2012.

PROCEEDINGS
The book of abstracts and a CD-ROM will be distributed with registration’s materials at the Conference.

SCHEDULE
Onsite registration fees are:

600€ - Authors and participants
300€ - Students
250€ - Accompanying Persons

The registration fees includes: Conference attendance, the Book of Abstracts and the CD-ROM Proceedings, coffee-breaks, gala-diner (except for students) and welcome reception.

OPENING CEREMONY
Time: Wednesday, July 21, 9:00 - 9:30
Place: Main Auditorium

CLOSING CEREMONY
Time: Friday, July 23, 18:30 - 19:00
Place: Main Auditorium

KEYNOTE LECTURES
Ian Ritchie, Ian Ritchie Architects Ltd, London, England
“Ancient values, altruism and innovation in a changing world”
(Wednesday, July 21, Main Auditorium)

Julio Martínez Calzón, MC2, Madrid-Spain
“The treatment of the form in structural engineering”
(Wednesday, July 21, Main Auditorium)

Bjørn N. Sandaker, Oslo School of Architecture and Design, Oslo, Norway
“An ontology of structured space”
(Thursday, July 22, Main Auditorium)

António Reis, Technical University of Lisbon / GRID, Lisbon, Portugal
“The architecture of special structures”
(Thursday, July 22, Main Auditorium)

Yves Weinand, EPFL, Lausanne, Switzerland
Innovative timber constructions
(Thursday, July 22, Main Auditorium)

Angus MacDonald, School of Arts, Culture and Environment, Edinburgh, Scotland
“The changing relationship between architects and structural engineers”
(Friday, July 23, Main Auditorium)

André Tavares, University of Minho, Guimarães, Portugal
“Concrete immaterial structures”
(Friday, July 23, Main Auditorium)

Robert Off, Anhalt University of Applied Sciences / I.M.S .e.V, Bobingen, Germany
“New trends on membrane and shell structures - Examples of bat-sail and cushion-belt technologies”
(Friday, July 23, Main Auditorium)

ICS2A010 SPECIAL SEMINAR
ThM, ThA & ThE - 1
Megastructures - Architecture_Play_Structure
The seminar will focus on some megastructural proposals, designed in the 60s and 70s of the twentieth century, in order to discuss the social and cultural context that stimulated, then, a playful and expressive relationship between Architecture and Structure: from quotidian experience to radical utopia. In this sense, the symposium will not only count on the testimony of notorious authors of some of those proposals (Gian Piero Frassinelli, Dennis Crompton, Fumihiko Maki and Yona Friedman), but also on the vision of important researchers lately specialized on the matter (Mary Louise Lobsinger, Dominique Rouillard, Paul E. Kassabian and Simon Sadler).

Coordinated by:
Nuno Grande
Department of Architecture, University of Coimbra, Portugal; Pedro Bandeira
School of Architecture, University of Minho, Portugal.
Mini-Symposium on “Tectonics” in Architecture: Between Aesthetics and Ethics

The mini-symposium will provide a forum for the presentation of fundamental, theoretical, and practical aspects of the art of building, focusing the attention on the relations among mechanics, mathematics, structural and architectural design. The symposium is expected to bring together researchers (architects, engineers, mathematicians) for dealing with the influence of the scientific and technical knowledges on the architectonic culture, in order to underline the role played by the structural conception in designing processes during the centuries. The symposium will also discuss developments concerning the importance of the Vitruvian firmitas, pointing out the risks arising when the structural instances are neglected.

Although not limited to those topics the content of sessions will emphasise the following themes: theoretical issues; calculus and algorithms in architecture; various approaches to structural complexity.

Coordinated by:
Patrizia Trovalusci & Lucio Valerio Barbera
Sapienza University of Rome, Rome, Italy.

Mini-Symposium on Transparent Structural Materials - Glass and Plastic

The use of glass and transparent plastic material in modern architecture continues to gain in importance. To combine architectural and structural demands they can be used as structural elements. Therefore it is very important to know the detailed mechanical behaviour of the materials and to explore appropriate joining technologies. Based on this knowledge architectural planning and structural design can be merged. Composite elements and hybrid structures that consist of transparent and conventional building materials can also play an important role in the design of architectural structures.

The design parameters and methods for the successful use of transparent thermoplastics and glass can be presented in this Mini Symposium as well as their connections and detailing. The presentation scan also includes life cycle and safety considerations.

Coordinated by:
Johann-Dietrich Wörner
University of Darmstadt, German Aerospace Center, Germany
Konrad Bergmeister
University of Natural Resources and Applied Life Sciences, Vienna, Austria
Jens Schneider
University of Darmstadt, Germany

Mini-Symposium on Timber Construction

The mini-symposium will address contemporary and emerging issues related to using timber as a construction material that suits the needs of 21st century societies. Although not limited to those topics the content of sessions will emphasise the following themes: use of timber in tall buildings; cross-laminated-timber - a new design principle and modelling the performance of timber structures.

Coordinated by:
Ian Smith
University of New Brunswick, Canada
Gerhard Schickhofer & Thomas Bogensperger
Graz University of Technology, Institute for Timber Engineering and Wood Technology, Austria
Jochen Köhler
Swiss Federal Institute of Technology ETH, Switzerland.
SOCIAL PROGRAM
The social program includes:

Welcome Reception
Tuesday, July 20, 20:00 - Alberto Sampaio Museum

This museum was created in 1928 to house the collections of the Chapter House of N. S. da Oliveira and other churches and convents in the Guimarães region.

It is settled in a historical centre that is patrimony of the humanity, where, in the 10th C., the countess Mumadona ordered the building of a monastery. In the 11th C. that monastery was replaced by a college, under the invocation of St. Mary’s and later under the invocation of Our Lady of the Olive Tree.

The Alberto Sampaio Museum holds collections of great interest from which the sculpture collection, represented by limestone and wooden statues from the 13th C. up to the 18th C. are part of.

The goldsmithery collection composed of liturgical utensils - cups, patens, custodies, crosses and reliquaries - of varied typology and functions, which give the visitor the opportunity to keep track of evolution and likenings, from the beginnings of the 12th C. to the end of the 19th C.

Gala Dinner
Thursday, July 22, 20:00 - Municipal Stadium, Braga

The Braga Municipal Stadium is a football stadium built in 2003 as the new home for local club SC Braga, and as a 2004 UEFA European Football Championship venue. Designed by the Portuguese architect Eduardo Souto de Moura, it is often considered one of the most original and beautiful stadiums in the world. The Financial Times, states that: "There has been nothing in this country to match the architectural delight of Eduardo Souto de Moura’s stadium for Braga in Portugal, a breathtaking arena carved into the side of a rock face on the site of a former quarry.”

Featuring Banda Plástica de Barcelos - A Portuguese Folk Band created in 1976. We can find an obvious resemblance between the elements of the band and the handicraft abobe dolls from Barcelos - and Tuna Académica do Minho - A University Tuna is a musical group made up of university students.

This visit will provide the general idea of the most important religious and architectural monuments, such as the Sé, the most impressive church which has several styles, from Roman to Baroque. Panoramic visit passing through the City Hall, the Palace of “Raio”, the Convent of “Populo”, and visit to “Bom J esus” do Monte (by funicular).

Free time at Bom Jesus do Monte and Lunch on a Restaurant with a panoramic view over Braga.

After lunch the tour proceeds to Barcelos - one of the most emblematic cities of popular Minho art. On your stroll around Barcelos you will find the 18th-century churches of Bom J esus da Cruz and Nossa Senhora do Terço. Also opportunity for a visit to the Ceramics Museum. On the Handicraft Centre, you can get a good general view of Minho arts and crafts. The brightly-coloured Barcelos Cock is the most representative of all the pieces produced here, but one should not forget the brass bands and the figures depicting the region’s customs and habits. Return to Guimarães.

3) Ponte de Lima and Viana do Castelo
(full day) - July 23rd

Visit to Ponte de Lima a Portuguese village with its medieval architecture and surrounded by a beautiful green area.

Ponte de Lima has a beauty and very specific and natural environment. It is situated in the middle of the Ribeira of Lima valley. In the Middle Age it was a fortified village with walls 600 meters long, 10 towers, 2 turrets and 6 entrances. In 1995 Ponte de Lima won the European Grand Prize of Tourism and Environment.

We will then proceed to the town of Viana do Castelo, a XII century town (founded 1258), where the modern town has grown near the river Lima. We can visit the Cathedral and you can’t miss the neo-Byzantine Church of Santa Luzia, located on top of the Santa Luzia hill with a breathtaking view of Viana do Castelo, the river Lima estuary and the sea. The city is a living museum, but it is also the capital of the rich Minho folklore, with an important handicraft industry.

Free time for lunch on the city center. We can also visit the shipyards at Viana do Castelo in activity since 1944, being the major Portuguese Shipbuilder (to be confirmed). Return to Guimarães.
**Tuesday, July 20, 2010**

- **15:00 – 19:00**
  - Registration (Lobby of the Main Auditorium)

- **20:00**
  - Welcome Reception (Alberto Sampaio Museum - Guimarães)

**Wednesday Morning (WeM), July 21, 2010**

- **8:00 – 9:00**
  - Registration (Lobby of the Main Auditorium)

- **9:00 – 9:30**
  - Opening Ceremony (Main Auditorium)

- **9:30 – 10:30**
  - Keynote Lectures (Main Auditorium)
    - Ian Ritchie: Architectural values, altruism and innovation in a changing world
    - Julio Martínez Calzón: Treatment of the form in structural engineering

  **Chairman:** F. Branco

- **10:30 – 11:00**
  - Coffee Break (Lobby of the Main Auditorium)

**WeM 1 – Main Auditorium**

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<td>Form and structure, the teamwork between A. Jacobsen and M. Falster Andersen</td>
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<td>P. Trovalusci &amp; A. Tinelli</td>
<td>P. Trovalusci &amp; A. Tinelli</td>
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<td>Engineering free form: Spanish Pavilion for the Expo 2010 in Shanghai</td>
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<td>M. Wolken &amp; G. Crassé</td>
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<td>Two spectacular facades with corrugated glass in Porto and Antwerp and an all glass cube in Haarlem (NL)</td>
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### WeA 1 - Main Auditorium
- **Chairman:** G. Rega
- **Mini-symposium:** "Tectonics" in Architecture: Between Aesthetics and Ethics (2): The heritage of the past
  - **Chairman:** J. Schneider
  - **Session:** The tectonics of modern materials: alternatives from Le Corbusier’s work
    - V. Riso
  - **Session:** The methods and spatial sensitivity of Italian architects and engineers in the fifties and sixties
    - A. Muntoni
  - **Session:** The P.L. Nervi structural route from intuition to computation through geometry
    - F. Romeo
  - **Session:** Materials, forms and abstract methods in the work of Riccardo Morandi
    - L. Sampò
  - **Session:** The structural control of architecture in two works of Giuseppe Damiani Almeyda
    - C. Toci

### WeA 2 - Room B1.14
- **Chairman:** C. Bertolini Cestari
- **Mini-symposium:** Transparent Structural Materials - Glass and Plastic (2): Plastic
  - **Chairman:** F. Bos
  - **Session:** Transparent glass Vierendeel roof
    - B. Weller, S. Reich & J. Ebert
  - **Session:** Fly bubble, fly
    - B. Franken
  - **Session:** Plastic materials in façade applications
    - T. Ries
  - **Session:** Detailing of structural elements with thermoplastics
    - C. Eckhardt & J. Stahl
  - **Session:** Plexiglas spatial experiment - 90 years of the Bauhaus
    - T. Bröttger
  - **Session:** Innovations in PMMA design
    - J. StaHL & C. Eckhardt

### WeA 3 - Room B1.15
- **Chairman:** C. Bertolini Cestari
- **Mini-symposium:** Steel Structures (2)
  - **Chairman:** F. Bos
  - **Session:** Tubular structure for the "nearly ninety" dance scenography
    - J. Martínez-Calzón & B. M. Encinas Maldonado
  - **Session:** Masts and towers
    - U. Stottrop-Andersen & M.G. Nielsen
  - **Session:** Transformable architectural structures
    - N. Afshar & M. Hosseyni-Amir
  - **Session:** Behaviour of steel shear wall systems with cut-outs and stiffeners
    - A. Maleki, T. Donchev, H. Hadavinia & A. Cheah
  - **Session:** Improved design model for thin-walled cold-formed purlins continuously connected to sandwich panel roofing
    - M. Georgescu & V. Ungureanu

### WeA 4 - Room B1.16
- **Chairman:** R. Nijsse
- **Complex Forms and Formfinding (2): Plastic
  - **Chairman:** J. Stratil
  - **Session:** Evolutionary form-finding – conception of effective structures by means of interactive patterns
    - J. Stratil
  - **Session:** Optimization of structural form using a genetic algorithm to search associative parametric geometry
    - P. von Buelow, A. Falk & M. Turin
  - **Session:** From free-form structures to natural lighting – how engineering innovation pushes the limits of architecture
    - V. Schmid
  - **Session:** An interactive surface model for timber construction
    - G. Gouaty, I. Stotz, Y. Weinand & E. Tosan
  - **Session:** Following natural patterns to unite architecture and structure
    - P. Shirazpus, G. Yunesi & S. Yaghmaeian

### WeA 5 - Room B1.17
- **Chairman:** R. Nijsse
- **Innovative Architectural and Structural Design (2)
  - **Chairman:** N. Baldassini
  - **Session:** Eladio Dieste; ‘resistance through form’
    - R. Pedreschi & D. Theodossopoulos
  - **Session:** Architectural structural schemes
    - N. Baldassini
  - **Session:** Masts and towers
    - U. Stottrop-Andersen & M.G. Nielsen
  - **Session:** Improved design model for thin-walled cold-formed purlins continuously connected to sandwich panel roofing
    - M. Georgescu & V. Ungureanu
  - **Session:** Myron Goldsmith: the development of the diagonally braced tube
    - M. Neveu & E.R. Salkis
  - **Session:** Narrative structures
    - E. Castro e Costa
  - **Session:** Structural design process of the doubly curved Heysel canopy
    - K. Verbeeck & L. Ney

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First International Conference on STRUCTURES AND ARCHITECTURE
21-23 July 2010, Guimarães, PORTUGAL
**Wednesday Evening (WeE), July 21, 2010**

16:30 - 17:00  | **Coffee Break** (Lobby of the Main Auditorium)
17:00 - 19:00 | **Concurrent Technical Sessions: WeE 1 to WeE 5**

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<td>Mini-symposium</td>
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<td>Chairman: J. Schneider</td>
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<td>Teaching structures to architecture students: Examples from bridge design</td>
<td>Structural design procedures to support the development of innovative architectural structures</td>
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<td>G. Rega &amp; V. Settimi</td>
<td>Damages in Glass/Plastic- and Hybrid structures and respective Conclusions</td>
<td>Chairman: B. Sandaker</td>
<td>A. Berk &amp; A.I. Unay</td>
<td>S.G. Reid</td>
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<td>Towards an ethic of construction: the structural conception and the influence of mathematical language in architectural design</td>
<td>High-performance laminated glass for structural efficient glazing</td>
<td>Educating structural engineers and architects together at the University of Sheffield - 10 years on</td>
<td>Structural robustness as an innovative design concept</td>
<td>M. Sykora &amp; M. Holicky</td>
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<td>Structural design in the architectural design process: Toyo Ito.</td>
<td>Hybrid structural elements made of glass and polycarbonate</td>
<td>Tubular structures for the Seville April Fair: A complex geometry exercise</td>
<td>Let’s (re)start from the beginning: Structures and architecture - Back to school</td>
<td>Early Christian Cemetery Complex Sopianae/Pécs Hungary</td>
</tr>
<tr>
<td>Stone-masonry new constructions: science and history in the service of beauty and environment</td>
<td>Adhesively bonded hybrid steel-glass beams</td>
<td>Stabilility of single-layered grid shells with various connectors</td>
<td>Breaking stuff: A no frills approach to haptic learning in structures classes</td>
<td>Fibreglass constructions vs solid constructions. The relationship between structure and architecture in the contemporary age</td>
</tr>
<tr>
<td>An eco-design-oriented multidisciplinary approach in industrial design</td>
<td>Development of a super slim façade system for in Holland Polytechnic, Delft</td>
<td>Update of steel connection data bank</td>
<td>Inter-active “self-learning” cost estimation assistant for the design of “form-active” structures</td>
<td>Structural design of the Röder-conic shell canopy</td>
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**Thursday Morning (ThM), July 22, 2010**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>8:00-8:30</td>
<td>Registration (Lobby of the Main Auditorium)</td>
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<tr>
<td>8:30-10:00</td>
<td>Keynote Lectures (Main Auditorium)</td>
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<tr>
<td></td>
<td>Bjørn N. Sandaker: An ontology of structured space</td>
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<td></td>
<td>António Reis: The architecture of special structures</td>
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<td></td>
<td>Yves Weinand: Innovative timber constructions</td>
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<tr>
<td>10:00-10:30</td>
<td>Coffee Break (Lobby of the Main Auditorium)</td>
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<tr>
<td>10:30-12:30</td>
<td>Concurrent Technical Sessions: ThM 2 to ThM 5</td>
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<tr>
<td>10:30-13:30</td>
<td>Special Seminar: ThM 1</td>
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</tbody>
</table>

**ThM 1 – Main Auditorium**
- **Special Seminar:** Megastructures: Architecture_Play_Structure (1)
  - Chairmen: N. Grande & P. Bandeira
  - The seminar will debate some megastructural proposals, designed in the 60s and 70s, in order to discuss the social and cultural context and the playful relationship between Architecture and Structure

  **Tall Buildings**
  - Chairmen: A. Reis
  - Structures and architecture in tall buildings
    - K.S. Moon
  - Tone Reforma – an innovative tower design in Mexico City
    - D.N. Grant, R. Pittella, M. Tavolaro & I. Kourakis
  - Zerzero tower for the new Telefónica headquarters in Barcelona
    - J. Martínez-Calzón & L. Gariati

  **Perforative Tectonics**
  - Chairmen: V. Riso
  - Tectonic theory and practice
    - M. Frier, A.M. Fisker & P.H. Kirkegaard
  - Natural and structural design in architecture
    - A. Davico & P. Mendonça
  - The concept of confiuy and the tectonics of non standard architecture
    - C. Silvestri, S. Bullo & R. Di Marco

**ThM 2 – Room B1.14**
- **ThM 3 – Room B1.15**
- **ThM 4 – Room B1.16**
- **ThM 5 – Room B1.17**
- **ThM 6 – Room B1.13**

**ThM 2 – Room B1.14**
- **Tall Buildings**
  - Chairmen: P. Bandeira
  - Optimum design of steel diagrid structures for tall buildings
    - K.S. Moon
  - Residential and tertiary complex “La Pallaresa” in Barcelona
    - J. Martínez-Calzón & B. Ballesteros

**ThM 3 – Room B1.15**
- **Tectonics**
  - Chairmen: E. Karasabeyli
  - Tectonic structures: platforms and clouds
    - J.J. Ferrer-Forés
  - Structural timber fabric: Textile principles on building scale
    - M. Hudert & Y. Weinand

**ThM 4 – Room B1.16**
- **Timber Structures (1)**
  - Chairmen: A. Macdonald
  - Improving the system of floor slabs of Tiji beams with the incorporation of a decorative ceiling finish
    - M. Fernandez-Cabo
  - Case study of a large lattice truss timber structure of an industrial building
    - C. Molins

**ThM 5 – Room B1.17**
- **Interdisciplinary Work & Educating Architects and Structural Engineers (2)**
  - Chairmen: M. Crisinel
  - Collaborative teaching to create integrated building envelopes
    - K. Dong & J. Dermydy
  - An equilibrium approach on a structural scale to structural design
    - D. Zastavni

**ThM 6 – Room B1.13**
- **Steel Structures (4)**
  - Chairmen: M. Kishi & P.H. Kirkegaard
  - Reliability assessment of industrial heritage structures and application to a light-weight steel roof

**Debate**
- After the conference a short book on Megastructures will be published, as a testimony of this memorable meeting between architects and architectural researchers

- Analysis of some selected types of joints in lattice structures
  - V. Kvacik, P. Beke & N. Hocková

*“Inhabitable Houses: Architectural concepts of a modular steel residential house”*
- V. Murinho, A. CorREA, H. Ferreira, L. Simões da Silva, H. Gervásio, C. Rebelo, A. Santiago, P. Santos, D. Mataus & C. Rigueiro
### Thursday Afternoon (ThA), July 22, 2010

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tr>
<td>12:30 - 14:00</td>
<td>Lunch (Restaurant of the University)</td>
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<tr>
<td>14:00 - 16:00</td>
<td>Concurrent Technical Sessions: ThA 2 to ThA 5</td>
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<tr>
<td>15:00 - 16:00</td>
<td>Special Seminar: ThA 1</td>
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#### ThA 1 - Main Auditorium
- **Special Seminar**
  - **Megastructures: Architecture_Play-Structure (2)**
  - **Chairmen:** N. Grande & P. Bandeira
  - The seminar will debate some megalutural proposals, designed in the 60s and 70s, in order to discuss the social and cultural context and the playful relationship between Architecture and Structure.
  - **Designing bridges: structure, architectural concept and aesthetics**
    - A. Adão da Fonseca
  - **How to win at bridge**
    - C.M. Bednarski

#### ThA 2 - Room B1.14
- **Bridges**
  - **Chairman:** A. Nussbaumer
  - Designing bridges: structure, architectural concept and aesthetics
  - How to win at bridge

#### ThA 3 - Room B1.15
- **Membranes and Tensile Structures**
  - **Chairman:** R. Off
  - ‘Membranes’ in light weight and membrane structures
  - ‘Cables’ in light weight and membrane structures

#### ThA 4 - Room B1.16
- **Timber Structures (2)**
  - **Chairman:** M. Piazza
  - New joint design for the improvement of steel rods glued-in timber using an adhesive bulb
  - Numerical analysis of metal joints glued in timber pieces

#### ThA 5 - Room B1.17
- **Affordable Houses and Sustainable Buildings**
  - **Chairman:** K. Myhre
  - Design strategies for structure as in integrating framework
  - Barriers to the implementation of sustainable structural materials in green buildings

After the conference a short book on Megastructures will be published, as a testimony of this memorable meeting between architects and architectural researchers.
<table>
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<tr>
<th>Time</th>
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<tr>
<td>16:00 – 16:30</td>
<td>Coffee Break (Lobby of the Main Auditorium)</td>
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<tr>
<td>16:30 – 18:30</td>
<td>Concurrent Technical Sessions: ThE 1 to ThE 5</td>
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<td>16:30 – 18:30</td>
<td>Special Seminar ThE 1</td>
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<tr>
<td>16:30 – 18:30</td>
<td>Special Seminar ThE 2 to ThE 5</td>
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**Thursday Evening (ThE), July 22, 2010**

**The 1 - Main Auditorium**

- **Special Seminar**
  - **Megastructures: Architecture, Play, Structure (3)**
    - **Chairman:** N. Grande & P. Bandeira
    - **Details:** The seminar will debate some megastructural proposals, designed in the 60s and 70s, in order to discuss the social and cultural context and the playful relationship between Architecture and Structure.

  - **Paul E. Kassabian (Buckminster Fuller’s Geodesic Structures)**
  - **Simon Sadler (Constant’s New Babylon)**

**The 2 - Room B1.14**

- **Bridges (2)**
  - **Chairman:** A. Adão da Fonseca
  - **Details:** Design evolution of footbridges and access bridge on the jetties of LNG Terminal.
    - J.D. Gómez, A. Pastor & A. Arnedo
  - **The relation between architectural elements and structural system in the rehabilitation of the old bridges in Timișoara**
    - L. Rosiu & S. M. Bica

**The 3 - Room B1.15**

- **Hybrid and Composite Structures**
  - **Chairman:** I. Valente
  - **Details:** Tall hybrid RC framed buildings with massive timber floor plates.
    - A. Asiz & I. Smith
  - **Architecturally exposed hybrid wood-steel and wood-concrete structures**
    - P. Fast & J. Stahl

**The 4 - Room B1.16**

- **Timber and Masonry Structures**
  - **Chairman:** C. Molins
  - **Details:** Towards a new generation of software: a case study for timber building structures.
    - J.L. Fernández-Cabo, J. Ávila-Nieto & V. Kudla

**The 5 - Room B1.17**

- **Emerging Technologies**
  - **Chairman:** P. C. Louter
  - **Details:** Principles of conceptual design for new seismic protection systems.
    - M. Mezzi
  - **The emergence of kinetic intelligent architecture in 21st century**
    - H. Ghamari & M. Asefi
  - **Asymmetric dissipation devices and unconventional shapes in seismic areas**
    - M. Mezzi & A. Dusi

**Debate**

- **Asymmetric network arch bridges**
  - **Chairman:** B. Zwingmann, S. Marx & F. Schanack
  - **Details:** Convergent design methodology for bio-science labs: architectonic and performative structural considerations using the Gallinger composite column solution.
    - M. Echard & D. Tonis
  - **Structure and architectural project: two examples with masonry walls**
    - M. Freire, J.M. Rosales & G. Crecente

**After the conference a short book on Megastructures will be published, as a testimony of this memorable meeting between architects and architectural researchers.**

- **Proposals for determination of the effective moment of inertia of composite slabs**
  - R.S. Grista, F.C. Rodrigues & A.C.C. Lavall

- **Restoration of the refectory vault. Monasterio de Montelo. A Coruña, Spain**

**Events**

- **20:00 Gala Dinner** (Municipal Stadium - Braga)
### Friday Morning (FrM), July 23, 2010

<table>
<thead>
<tr>
<th>Time</th>
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<tr>
<td>8:00-8:30</td>
<td>Registration (Lobby of the Main Auditorium)</td>
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</table>
| 8:30-10:00    | Keynote Lectures (Main Auditorium) Angus MacDonald: The changing relationship between architects and structural engineers  
|               | André Tavares: Concrete immaterial structures                                                       |
|               | Robert Off: New trends on membrane and shell structures – Examples of bat-sail and cushion-belt technologies  |
|               | Chairman: K. Myhre                                                                                  |
|               | Coffee Break (Lobby of the Main Auditorium)                                                         |
| 10:00-10:30   | Coffee Break (Lobby of the Main Auditorium)                                                         |
| 10:30-13:00   | Concurrent Technical Sessions: FrM 1 to FrM 5                                                        |

#### FrM 1 - Main Auditorium
- **Mini-symposium**
  - **Timber Construction (1): Tall Timber Buildings**
    - Chairman: I. Smith
    - Better than steel? The use of timber for large and tall buildings from ancient times until the present  
      - R. Langenbach
    - The Cathedral Museum of Pécs
      - B. Bachmann
    - Pushing the limits of platform frame wood construction  
      - C. Ni & M. Poposki & E. Karacabeyli
    - Development of fireproof glued-laminated timber for use in medium-rise buildings in Japan  
      - T. Harada, D. Kamikawa, K. Mylamoto, T. Ouchi, M. Miyabayashi, K. Ando & N. Hattori
    - Design guidelines for an 8-storey hybrid wood-concrete multi-family building  
      - S. Gagnon, W. Munoz, M. Mohammad & K.D. Below
    - A case study of a 6-storey hybrid wood-concrete office building in Québec, Canada  
      - S. Gagnon & S. Rheest

#### FrM 2 - Room B1.14
- **Special Structures**
  - Investigation the optimum location of cable-supports for communication towers  
    - O. Salem
  - The Cathedral Museum of Pécs
    - B. Bachmann
  - Designing a bridge, airport and stadium
    - J. Pamplo, A. Krupa & B. Kim

#### FrM 3 - Room B1.15
- **Concrete Structures (1)**
  - Historical use of concrete and innovation in architecture  
    - M. Bostenaru-Dan
  - Spatial concrete plate structures - a fusion of architecture and structural engineering  
    - A. Gianoli & M. Kunze
  - Structural design of the International Iberian Nanotechnology Laboratory
    - H. Marques, P. Pimenta & A. Campos e Matos
  - Structure form of pretension string nail structure and application prospect  
    - F. Li, D.-J. Liu, J.-B. Han & J.-L. Wang
  - Preservation of historical concrete structures  
    - M. Bostenaru-Dan
  - Double-layer tensegrity grids for architectural applications: in search on new morphologies  
    - K. Isip & J. Kim
  - Possibility for strength improvement of concrete with delayed ettringite formation  
    - S. Lubej, A. Isevic & E. Radosavljevic

#### FrM 4 - Room B1.16
- **Computer and Digital Design Tools (1)**
  - Use of force density method by analytical procedures in funicular analysis  
    - C. Cercadillo-García & J.L. Fernandez-Cabo
  - Conservation requirements for concrete heritage. The case study of the buildings of the Fundação Calouste Gulbenkian in Lisbon  
    - J. Valença & E. Júlio
  - Artificial intelligence techniques applied to reinforced concrete  
    - J.L. Pérez, J. Eiras, F. Martínez-Abella & J.R. Rabuñal
  - Behavior of LNG concrete tank to cryogenic temperatures  
    - L. Dahmani
  - Damage evaluation for condition assessment of historic Masonry Structures by NDE and Monitoring  
    - Y.D. Aktas & A. Turun

#### FrM 5 - Room B1.17
- **Concrete Structures (1)**
  - Computational design tools for integrated design  
    - M.K. Holst & P.H. Kirkegaard
  - Historical use of concrete and innovation in architecture  
    - M. Bostenaru-Dan
  - Use of force density method by analytical procedures in funicular analysis  
    - C. Cercadillo-García & J.L. Fernandez-Cabo
  - Gathering the real time state of construction for simulation  
    - K. Ailland & H.-J. Bargstädt
  - The Cathedral Museum of Pécs
    - B. Bachmann
  - Reinforced concrete structures. Sustainable architecture?  
    - M. Molina-Huelva
  - Use of force density method by analytical procedures in funicular analysis  
    - C. Cercadillo-García & J.L. Fernandez-Cabo
  - The structural behavior and the state of stress in the elements of Cathedral of Sé in São Paulo  
    - K. Niccoli-Ramirez & H. Lindenberg-Neto
  - A dynamic analysis of the Ruins of St. Paul’s, Macau  
    - C.C. Lam, V.P. Hu & K.P. Kou
  - Advantages of using raw materials in structural solutions  
    - A.Murta, C. Teixeira, H. Varum, I. Bentes & J. Pinto
### Friday Afternoon (FrA), July 23, 2010

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>13:00 – 14:00</td>
<td>Lunch (Restaurant of the University)</td>
</tr>
<tr>
<td>14:00 – 16:00</td>
<td>Concurrent Technical Sessions: FrA 1 to FrA 5</td>
</tr>
</tbody>
</table>

### FrA 1 - Main Auditorium
- **Mini-symposium**
  - Chairman: T. Bogensperger
- **Session**
  - Architect and structural engineer communicating in multi-disciplinary creativity
  - L. Luyten
  - Architectural anatomy
  - J. Pérez-Herreras
  - Vertical relative displacements in a medium-rise CLT-building
  - E. Serrano, B. Enquist & J. Vessby
  - A study of cross-lamination of a multi-component liquid-retaining timber structure
  - N.J. Savage, A. Kermani & H. Zhang
  - Verification processes for cross laminated timber in the frame of EN 1995
  - R.A. Joebstl
  - On the architectural qualities of cross laminated timber
  - A.K. Bejder, P.H. Kirkegaard & A.M. Fisker
  - Vibration properties of cross laminated timber floors
  - N. Labonnote & K.A. Maib

### FrA 2 - Room B1.14
- **Session**
  - New solutions for constructing double-curved concrete shell structures
  - M. Johnson, P. Kassibian, C. Center, M. Love, T. Love & J. Lane
  - Technological evolution of concrete: from ancient times to ultra high performance concrete
  - A. Cannat & R.M. Ferreira
  - Lightweight fibro cement open web joists as low cost roofing element
  - S. F. Ahmad
  - On the architectural qualities of cross laminated timber
  - M. Dunn
  - Groundwork, structure, design: the integrated education of architects and engineers
  - M. Dunn
  - Load path method in the interpretation of dome behaviour
  - F. Palmiello & A. Totaro
  - Test of structures - interdisciplinary teamwork as a win-win situation
  - E. Amiet & I. González-Quelle

### FrA 3 - Room B1.15
- **Session**
  - Architect and structural engineer communicating in multi-disciplinary creativity
  - L. Luyten
  - Architectural anatomy
  - J. Pérez-Herreras
  - Vertical relative displacements in a medium-rise CLT-building
  - E. Serrano, B. Enquist & J. Vessby
  - A study of cross-lamination of a multi-component liquid-retaining timber structure
  - N.J. Savage, A. Kermani & H. Zhang

### FrA 4 - Room B1.16
- **Session**
  - New solutions for constructing double-curved concrete shell structures
  - M. Johnson, P. Kassibian, C. Center, M. Love, T. Love & J. Lane
  - Technological evolution of concrete: from ancient times to ultra high performance concrete
  - A. Cannat & R.M. Ferreira
  - Lightweight fibro cement open web joists as low cost roofing element
  - S. F. Ahmad
  - On the architectural qualities of cross laminated timber
  - M. Dunn
  - Groundwork, structure, design: the integrated education of architects and engineers
  - M. Dunn
  - Load path method in the interpretation of dome behaviour
  - F. Palmiello & A. Totaro

### FrA 5 - Room B1.17
- **Session**
  - Architect and structural engineer communicating in multi-disciplinary creativity
  - L. Luyten
  - Architectural anatomy
  - J. Pérez-Herreras
  - Vertical relative displacements in a medium-rise CLT-building
  - E. Serrano, B. Enquist & J. Vessby
  - A study of cross-lamination of a multi-component liquid-retaining timber structure
  - N.J. Savage, A. Kermani & H. Zhang
  - Verification processes for cross laminated timber in the frame of EN 1995
  - R.A. Joebstl
  - On the architectural qualities of cross laminated timber
  - A.K. Bejder, P.H. Kirkegaard & A.M. Fisker
  - Vibration properties of cross laminated timber floors
  - N. Labonnote & K.A. Maib
  - Groundwork, structure, design: the integrated education of architects and engineers
  - M. Dunn
  - Load path method in the interpretation of dome behaviour
  - F. Palmiello & A. Totaro
  - Test of structures - interdisciplinary teamwork as a win-win situation
  - E. Amiet & I. González-Quelle

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**First International Conference on STRUCTURES AND ARCHITECTURE**
21-23 July 2010, Guimarães, PORTUGAL
**Friday Evening (FrE), July 23, 2010**

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<tr>
<th>Time</th>
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<tbody>
<tr>
<td>16:00 – 16:30</td>
<td>Coffee Break (Lobby of the Main Auditorium)</td>
<td>FrE 5 – Room B1.17</td>
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<tr>
<td>16:30 – 18:30</td>
<td>Concurrent Technical Sessions: FrE 1 to FrE 5</td>
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<tr>
<td>16:30 – 18:30</td>
<td>FrE 1 – Main Auditorium: Mini-symposium</td>
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<td>Timber Construction (3) : Modelling of the load bearing performance of timber structures</td>
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<td>Chairman: K. Jochen</td>
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<td>Failure studies carried out in Europe and a proposal for a standardized failure template</td>
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<td>T. Toratti</td>
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<td>Moisture-induced stresses in timber-concrete composite structures</td>
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<td>M. Fragiomo &amp; J. Schärnlin</td>
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<td>Stress analysis of timber structures under variable humidity conditions by using a multi-Fickian moisture transfer model</td>
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<td>S. Fortino, T. Toratti &amp; A.L. Mendicino</td>
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<td>18:30 – 19:00</td>
<td>Closing Ceremony (Main Auditorium)</td>
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<td></td>
<td>FrE 2 – Room B1.14: The Borderline Between Architecture and Structural Engineering (2)</td>
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<td>Chairman: Y. Weinand</td>
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<td></td>
<td>The structure as an identity</td>
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<td>R. Barelkowski</td>
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<td>Project management: integrating architecture and structural engineering design processes</td>
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<td>N. Resende-Andrade, A.L. Aquare &amp; R.M. Lima</td>
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<td>The work of Eduardo Torroja: Research for improving the quality of construction technology</td>
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<td>J. Antuña</td>
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<td>Structural skins in contemporary architecture</td>
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<td>A. Bernabeu-Larena &amp; J. Bernabeu-Larena</td>
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<td>Qualitative structural model for pre-evaluation of structural behavior</td>
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<td>M. Oliveira &amp; A.M.S. Freitas</td>
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<td>Beware, she’s here!</td>
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<td>T. Andrade-Santos</td>
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<td>FrE 3 – Room B1.15: Concrete Structures (3)</td>
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<td>Chairman: M. Bostenaru Dan</td>
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<td>Accounting for the construction phase in the coordination between architectural and structural design</td>
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<td>M. Branco, M.R. Arruda &amp; L. Murteia</td>
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<td>Structural design of the concrete shell for “Facelift Unicoire”</td>
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<td>J. Vander-Beken, F. Ghysaert &amp; L. Ney</td>
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<td>Reducing the embedded energy and embodied carbon of reinforced concrete structures in Ireland</td>
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<td>J. Goggin</td>
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<td>Directionally oriented fibrous structures for lightweight concrete elements reinforcement</td>
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<td>P. Pina-Marques, R. Fangueiro &amp; C. Gonilho-Pereira</td>
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<td>Structural skins in contemporary architecture</td>
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<td>T. Andrade-Santos</td>
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<td>M.R. Taghavi</td>
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<td>Collaboration and rivalry at Expo 58: Authorship in the building industries’ landmarks</td>
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<td>R. Devos &amp; S. Van de Voorde</td>
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<td>Felix Candela (1910-1997): Architect and structural</td>
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<td>P. Cassinello</td>
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<td>The changing concept of truss design caused by the influence of science</td>
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<td>M. Rinke &amp; T. Kotnik</td>
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<td>Experimental investigation of panel zone in steel beam-to-column joint at elevated temperature</td>
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<td>M. Strecjak &amp; F. Wald</td>
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<td>FrE 5 – Room B1.17: Experimental and Numerical Analysis</td>
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<td>Chairman J. Pinto</td>
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<td>Prediction of debris hazardous zone for different architectural and structural forms</td>
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<td>S.C. Fari &amp; Q. J. Yu</td>
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<td>Experimental results on composite steel-concrete structural shear walls with steel encased profiles</td>
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<td>D. Dan, V. Stoian &amp; A. Fabian</td>
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<td>FrE 1 – Main Auditorium: Mini-symposium</td>
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<td>Timber Construction (3) : Modelling of the load bearing performance of timber structures</td>
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<td>FrE 2 – Room B1.14: The Borderline Between Architecture and Structural Engineering (2)</td>
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<td>Chairman: Y. Weinand</td>
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<td>R. Barelkowski</td>
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<td>Project management: integrating architecture and structural engineering design processes</td>
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<td>N. Resende-Andrade, A.L. Aquare &amp; R.M. Lima</td>
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<td>T. Andrade-Santos</td>
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Day is:  Wednesday, Thursday or Friday
Time is:  Morning, Afternoon or Evening
Room is:  1 (main Auditorium)  2 (B1.14)  3 (B.15)  4 (B1.16)  5 (B1.17)  6 (B1.13)
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21-23 July 2010, Guimarães, PORTUGAL

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<td><strong>Tuesday, July 20, 2010</strong></td>
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<tr>
<td>15:00 – 19:00</td>
<td>Registration (Lobby of the Main Auditorium)</td>
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<td>20:00</td>
<td>Welcome Reception (Arqueo Sampaio Museum - Guimarães)</td>
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<td><strong>Wednesday, July 21, 2010</strong></td>
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<tr>
<td>09:00 – 13:00</td>
<td>Opening Ceremony (Main Auditorium)</td>
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<td>09:00 – 10:30</td>
<td>Keynote Lectures (Main Auditorium)</td>
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<td>11:00 – 13:00</td>
<td><strong>WeA 1 Mini-symposium</strong></td>
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<td>14:30 – 16:30</td>
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<td><strong>WeE 2 Mini-symposium</strong></td>
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<td><strong>Thursday, July 22, 2010</strong></td>
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<td>09:30 – 10:00</td>
<td>Keynote Lectures (Main Auditorium)</td>
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<td>10:30 – 12:30</td>
<td><strong>ThM 1 Special Seminar</strong></td>
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<td>Megastuctures_Architectural_Structure [1]</td>
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<td>14:00 – 16:00</td>
<td><strong>ThA 1 Special Seminar</strong></td>
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<td>15:00 – 16:00</td>
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<td>16:30 – 18:30</td>
<td>Megastuctures_Architectural_Structure [2]</td>
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<td>20:00</td>
<td>Gala Dinner (Municipal Stadium - Braga)</td>
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<td><strong>Friday, July 23, 2010</strong></td>
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<td>10:30 – 13:00</td>
<td><strong>FrM 1 Mini-symposium</strong></td>
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<td>14:00 – 16:00</td>
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Conference Venue - Main auditorium, rooms for parallel sessions and exhibition hall

Welcome reception at Alberto Sampaio Museum