

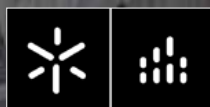
ICSA 2013

Second International Conference

Structures and Architecture

24-26 July 2013 Guimarães

PORTUGAL



University of Minho
School of Architecture

Cover

Photographer: Luís Ferreira Alves

Location: Braga, Portugal

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Description of the Braga Municipal Stadium

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.”

Eduardo Souto de Moura has been awarded with the 2011 Pritzker Architecture Prize. Extract of the Citation from the Jury:

“... the scope of his work has expanded: the Braga Municipal Stadium, Portugal, designed in 2000 is muscular, monumental and very much at home within its powerful landscape.”

WELCOME TO ICSA2013



Paulo J. S. Cruz
ICSA2013 Chair

Although Architecture and Structural Engineering have both had their own historical development, their interaction has led to many fascinating and delightful structures. However, there is still the need to stimulate the inventive and creative design of architectural structures and to persuade architects and structural engineers to further collaborate in this process.

Following the success of the First International Conference on Structures and Architecture (ICSA2010) it was considered convenient to promote a second edition of this event, to promote the synergy of both disciplines and to bring together all of the very best work that has been done in the field of structures and architecture.

ICSA2013 covered all major aspects of structures and architecture, including building envelopes, comprehension of complex forms, computer and experimental methods, concrete and masonry structures, educating architects and structural engineers, 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 architectural solutions, the use of new materials and timber structures, among others.

Structures and Architecture – Concepts, Applications and Challenges, contains the lectures and papers presented at the Second International Conference on Structures and Architecture (ICSA2013) that was organized by the School of Architecture of the University of Minho, Guimarães, Portugal, in July 2013. It consists of a book of abstracts and a CD-ROM containing the full texts of the lectures presented at the conference, including the 4 keynote lectures, and 277 selected contributions from 41 countries.

On behalf of ICSA2013, the chair of the Conference would like to take this opportunity to express his sincere thanks to the authors, organizers of mini-symposia and special sessions, and participants for their contributions, to the members of the International Scientific Committee for their dedicated work, and for the time and effort they have dedicated to make of ICSA2013 a successful event. Finally, we would like to register our sincere thanks to all the sponsors of ICSA2013.

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MAIN INSTITUTIONAL SPONSORS



ECCS – European Convention for Constructional Steelwork



IABMAS – International Association for Bridge Maintenance and Safety



IABSE
IABSE – International Association for Bridge and Structural Engineering



IASSS – International Association for Shell and Spatial Structures

INTERNATIONAL INSTITUTIONS



ACE – Architects' Council of Europe / Conseil des Architectes D'Europe



AIA – The American Institute of Architects



ASCE – American Society of Civil Engineers



BIBM – European Federation for Precast Concrete



BTES – Building Technology Educator's Society



EAAE – European Association for Architectural Education



EFCA – European Federation of Engineering Consultancy Associations



EU-GLASS-LABS – European Federation of Structural Glass Laboratories



ISCARSAH – International Scientific Committee on the Analysis and Restoration of Structures of Architectural Heritage

NATIONAL INSTITUTIONS



SEI – Structural Engineering Institute / American Society of Civil Engineers



TensiNet



The Institution of Structural Engineers



TheStructuralEngineer.info Website



ANIPB – Associação Nacional dos Industriais de Préfabricação em Betão



APPC – Associação Portuguesa de Projectistas e Consultores



ASCP – Associação Portuguesa para a Segurança e Conservação de Pontes



CMM – Associação Portuguesa de Construção Metálica e Mista



Ordem dos Arquitectos, Secção Regional do Norte



Ordem dos Engenheiros



Sociedad Española de Historia de la Construcción

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School of Architecture, University of Minho, Guimarães, Portugal

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GENERAL INFORMATION

The ICOSA2013 will be held at the Convention Centre of the Campus of Azurém of the University of Minho in 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 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

An overview of the schedule is provided on the page 22 of this program.

Onsite registration: Onsite registration fees are:

600.00€ - Authors and participants

300.00€ - Students

250.00€ - Accompanying Persons

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

OPENING CEREMONY

Time: Wednesday, July 24, 9:00 – 9:30

Place: Main Auditorium

CLOSING CEREMONY

Time: Friday, July 26, 18:40 – 19:00

Place: Main Auditorium

KEYNOTE LECTURES



Félix Escrig, University of Seville, Spain

“Emilio Perez Piñero. Inventor of deployability”
(Wednesday, July 24, Main Auditorium)



Andrea Deplazes, ETH, Zurich, Switzerland

“Archi-Tectonic”
(Thursday, July 25, Main Auditorium)



Ulrich Knaack, Technical University Delft, Delft, The Netherlands

“A façade roadmap”
(Thursday, July 25, Main Auditorium)



Mario Chiorino Politecnico di Torino, Torino, Italy

“Pier Luigi Nervi: Architecture as challenge”
(Friday, July 26, Main Auditorium)



Randolph Langenbach, Conservationtech Consulting, California, USA

“The great counterintuitive: Re-evaluating historic and contemporary building construction for earthquake collapse prevention”
(Friday, July 26, Main Auditorium)

ICSA2013 MINI-SYMPOSIA

WeM 1, WeA 1, WeE 1 & ThM 1:

Mini-Symposium on Modern Renaissance Timber Construction

Prior to the later stages of 19th century timber was unrivalled in many parts of the world as a preferred material for construction of tall, large and exotic buildings, but for a variety of reasons it was relegated to a secondary role during most of the 20th century even in countries where timber is a common commodity. The mini-symposium will address contemporary and emerging issues related what is literally becoming the Modern Renaissance of Timber Construction as a construction material. The sessions within the mini-symposium will illuminate transitions in what can be constructed using timber based on concurrent application of new timber-based construction materials and new connection methods; new design strategies and methods; and reframing of building codes and regulatory practices.

Coordinated by:

Ian Smith, University of New Brunswick, Fredericton, Canada
Jochen Köhler, Swiss Federal Institute of Technology ETH, Switzerland
Sylvain Gagnon, FPInnovations, Canada

ThA 1 & ThE 1:

Mini-Symposium On the “Tectonics” in Architecture: Between Aesthetics and Ethics

Following the successful experience of the mini-symposium already presented at the ICSA2010 in July 2010, the symposium expects to bring together architects, engineers and mathematicians from all over the world, to give an heterogeneous look on the aspects of the art of building, focusing the attention on the relations among mechanics, mathematics, structural and architectural design. Although not limited to these topics, the content of sessions will emphasise the following themes: theoretical issues, calculus and algorithms in architecture, various approaches to structural complexity. The symposium will also discuss developments concerning the importance of the Vitruvean firmity, pointing out the risks arising when the structural instances are neglected.

Coordinated by:

Patrizia Trovalusci, University of Rome “La Sapienza”, Rome, Italy
Mario Chiorino, Polytechnic of Turin, Turin, Italy

FrM 1 & FrA 1:

Structural Glass: Crossing borders

Even though Structural Glass currently is often not incorporated in standard structural engineering education programs, the field is developing at high speed and omnipresent in contemporary Architecture. The continuous innovations with Structural Glass are to a large extent driven by Architectural demands, and pushed forward by competent practicing engineers and a vivid research community.

Given their involvement in COST Action TU0905 – “Structural Glass - Novel Design Methods and Next Generation Products” and IABSE WG “Structural Glass”, respectively, the organizers want to bring together a good representation of nowadays projects and research activities which illustrate the growing international network in this domain.

Coordinated by:

Jan Belis, Ghent University LMO, Ghent, Belgium
Geralt Siebert, UniBwM Neubiberg, Germany

ICSA2013 SPECIAL SESSIONS

ThA2

From new tools and methods towards new tasks and ideals: The impact of technology and science in the post-war era

The development of new building tools and methods was an important motor in construction history, especially in the post-WWII era. Apart from their literal effects and immediate use, they also had profound influence on the division of roles and tasks in design and triggered new concepts on architecture and engineering, including a re-consideration of their ideals and societal positions. This session calls for papers exploring the manifold impact of new tools and methods in the world of building in the post-WWII era. It seeks to critically bridge between construction history, the history of technology, architecture history and building practice.

Coordinated by:

Rika Devos, Ghent University, Ghent, Belgium

WeM3

Innovation in timber

In an era of free-form architecture, issues of material properties, innovative solutions and realisation gain increased importance. Through development of technology and refined products, design of timber structures remains a worthy challenge for researchers and practitioners and frequently require new steps of innovation in relation to architectural and environmental performance, structural behaviour, construction methods and realisation during construction. The proposed session addresses factors driving innovation in timber design, innovative solutions and the interaction of architectural and structural aspects in timber research and practice.

Coordinated by:

Andreas Falk, Royal Institute of Technology KTH, Stockholm, Sweden

WeA2

Innovation in reciprocal structures

Reciprocal structures have been studied and used in the past for different needs and purposes, and their presence throughout history is scattered and discontinuous; in the last decades however they gained a constantly growing attention from researchers and practitioners because of the challenges and opportunities that their unique characteristics offer. This session assess the innovation in the design of a typology where the strong interaction between its architectural and engineering aspects stimulated researches concerning the morphology, the form finding methods, the structural and kinematic behavior, as well as the digital crafting and construction methods.

Coordinated by:

Dario Parigi, Aalborg University, Aalborg, Denmark

WeM2

From open structures to the cladding of control: A critical call for current tectonic theories and practices in architecture

Focusing on the cladding of architectural spaces (interior / exterior) this session addresses the current conditions of the built environment where large scale dwellings, hospitals, offices, schools and urban spaces are often experienced as formal structural frameworks rather than inviting spaces for residing. The fundamental potential of architecture is to provide shelter, embrace, surprise and captivate: How to position and release this potential within the contemporary construction industry furnishing a tectonic architectural theory and –practice? Which advantages of structural and material technological innovations are to be found in a future tectonic cladding of architectural spaces relating to the human scale?

Coordinated by:

Marie Frier Hvejsel, Aalborg Aalborg, Denmark
Anne Beim, Royal Danish Academy of Fine Arts, Denmark

ThM2

Principles in practice for the analysis, conservation and structural restoration of architectural heritage

Focusing The International Scientific Committee on the Analysis and Restoration of Structures of Architectural Heritage (ISCARSAH) was founded by ICOMOS as a forum for engineers architects, and conservators involved in the care of building heritage. The Committee has authored the ICOMOS Charter - Principles for the Analysis, Conservation and Structural Restoration of Architectural Heritage (ISCARSAH Principles). The symposium explores the Principles as they are put to use in different parts of the world.

Coordinated by:

Goran Arun, Yıldız Tech. Univ., Vice President ISCARSAH, Turkey
Stephen Kelley, Wiss, Janney, Elstner Assoc., Inc. Pres. ISCARSAH, Chicago, USA

PRESENTATION GUIDELINES

The presentations should take 15 minutes plus 5 minutes for audience questions. This schedule will be strictly enforced.

Each paper session will be attended by a chairman, responsible for monitoring the time and enlightening the author, through a signal, once there are 5 minutes left to the end of the presentation.

Personal Computer (MS Windows) with Power Point will be available at each Session room. No laptops will be allowed to connect to the LCD projector for making presentations.

Authors are requested to provide their presentation files at the Conference Desk. Please make sure no Asian fonts are used or, if those fonts are necessary, all fonts are embedded in the Power Point file.

SOCIAL PROGRAM

Welcome Reception

July 23, 20:00 – Ducal Palace of Bragança

The Paço dos Duques de Bragança, built in the 15th century by the then-future duke Dom Afonso, shows elements of architectural styles common in the Great manor houses and palaces of northern Europe. In the mid-20th century, after a period of disuse and abandonment, the palace was renovated and saw new life as a museum displaying items from the 17th and 18th centuries. Among its various collections, we can find pieces that document Portuguese contributions during the Age of Discoveries, while others narrate events in the Conquest of North Africa.

Paço dos Duques is placed at a walking distance from the conference venue. A map with information on how to get there is available on page 23.

Gala Dinner

July 25, 20:00 - mitPenha

mitPenha is a contemporary space, located at 607 meters high, on Penha's hill. It is embedded in the mountain, on a balanced integration with the surrounding ecosystem, enhancing the beauty of nature. MitPenha's presents a privileged scenery, as it provides a panoramic view of the region, especially of the urban site.

Registration as 'Student' does not include the gala dinner. Additional tickets for Gala Dinner for registrants with student fee are available through the registration desk (96.00 €)

Transfer to MitPenha will be available in the main entrance of the University.

ACCOMPANYING PERSON'S PROGRAM

1) Guimarães (half day) - July 24th

Visit to one of the most beautiful and historical cities of Portugal, Guimarães - the Nation's birthplace.

Surrounded by parks and a 15th century Palace, stands the Castle of Guimarães, which will be our first stop. Simple, but yet a remarkable site, a place full of story. It was here that D. Afonso Henriques was born in the 12th century from the Count Henrique and his wife D. Teresa. The future king was baptized in the Romanesque chapel of São Miguel outside the castle gates and close to the Ducal Palace.

Continuing with a visit to the 15th century Palace of the Dukes of Bragança, a massive and imposing building with distinctive turrets and brick chimneys. It was built in 1401 by the first Duke of Bragança and rehabilitated in the last century.

The Tour proceeds for a guided tour to the historic centre of Guimarães classified as World Heritage by UNESCO, with its medieval streets layout which is lined with historic buildings everywhere you look. Stop at Largo da Oliveira one of the central points. Free time for a calm stroll.

2) Douro Tour (full day) - July 25th

Meet with Abreu Staff and departure towards the Douro Valley region, worldwide known and famous for the wine production. The first stop will be at Vila Real, a beautiful and ancient city full of manor houses that it's one of the main characteristics of this city.

Panoramic walking tour through the city center. After this walking tour we will continue to "Solar de Mateus". The Palace, House or Solar de Mateus is one of the most significant works of the Portuguese civil architecture of the Baroque period, probably built by the Italian Architect Nicolau Nasoni. The building it's surrounded by beautiful gardens, lined with green boxwood and dotted with flower beds. Mateus it's also known for the production of the wine "Mateus Rose".

The tour will continue towards the centre of the Douro Valley region, passing through the city's of Sabrosa and Pinhão. Lunch. After lunch visit and wine taste at "Quinta do Seixo" a wine estate with over one hundred years. Quinta do Seixo also "offers" an outstanding view over the vineyards of this region that was declared by UNESCO as world heritage. Our journey continues with a visit to the city of Régua before the return to Guimarães.

3) Ponte de Lima and Viana do Castelo (full day) - July 26th

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 23, 2013					
Registration (Lobby of the Main Auditorium)					
15:00 – 19:00					
20:00					
Wednesday Morning (WeM), July 24, 2013					
Registration (Lobby of the Main Auditorium)					
8:00 – 19:00					
9:00 – 9:30					
9:30 – 10:15					
10:15 – 10:45					
10:45 – 12:45					
Concurrent Technical Sessions: WeM 1 to WeM 6					
WeM 1 – Main Auditorium	WeM 2 – Room B1.14	WeM 3 – Room B1.15	WeM 4 – Room B1.16	WeM 5 – Room B1.17	WeM 6 – Room B1.13
<p>Mini-Symposium Modern renaissance timber construction (1)</p> <p>Chair: Ian Smith</p> <p>CLT buildings as a new Italian architecture and their seismic design</p> <p><i>A. Ceccotti & A. Polastri</i></p>	<p>Special Session From open structures to the cladding of control. A critical call for current tectonic theories and practices in architecture</p> <p>Chair: Marie Frier Hvejsel</p> <p>Structural cladding /clad structures. Studies in tectonic building practice</p> <p><i>A. Beirm</i></p> <p>Tectonics of montage. Architectural positions for a tectonic sustainable building practice</p> <p><i>C. Bundgaard</i></p>	<p>Special Session Innovation in timber</p> <p>Chair: Andreas Falk</p> <p>Wood structures. Versatility and innovation</p> <p><i>F. Jensen</i></p> <p>Cross laminated timber. A key material for the future of structural design</p> <p><i>M. Nevado</i></p> <p>Gross-laminated timber: Driving forces and innovation</p> <p><i>A. Falk</i></p>	<p>General Session The borderline between architecture and structural engineering (1)</p> <p>Chair: Jose M.M. Sánchez</p> <p>Homeostatic patterns</p> <p><i>A. Erioli, C. Giacobazzi & G. Castellazzi</i></p> <p>The challenges of structure in today's architectural, economic and social context</p> <p><i>A. Bernabeu Larena & J. Bernabeu Larena</i></p> <p>Conceptual planning by the structural engineer</p> <p><i>A. Gianoli</i></p> <p>Alpepo building by Jean Prouvé in Grenoble. The specific issue of the suspended façade</p> <p><i>A. Coste & C. Blachot</i></p> <p>Great light spans. Geometry and simple structural behaviour. 2nd half of the 20th century</p> <p><i>V. Antiguédad García & J. Anaya Díaz</i></p> <p>Structure and architecture. The illogical results of considering them two separated entities, after the 2009 earthquake in L'Aquila</p> <p><i>C. Bartolomucci</i></p>	<p>General Session Computer and experimental methods (1)</p> <p>Chair: Climent Molins</p> <p>Modular construction systems for free form architecture</p> <p><i>S. Schafer J. Reising, S. Abedini, & A. Ljubas</i></p> <p>Seismic rehabilitation of RC structures. Case study: Educational building with GF+4 storey height regime</p> <p><i>M.C. Calin, D. Jordan & C.S. Dragomir</i></p> <p>Thicker funicular. Particle-spring systems for variable-depth form-responding compression-only structures</p> <p><i>B. Clifford</i></p> <p>Architectural feedback in the structural optimization process</p> <p><i>J. Felkner, E. Chatzi & T. Kotnik</i></p> <p>Multimodal structural optimization for conceptual design</p> <p><i>K. Martini</i></p> <p>Control of conservation works for architectural heritage buildings by micro seismic recordings and structural analysis</p> <p><i>C.S. Dragomir, A. Dutu & E.S. Georgescu</i></p>	<p>General Session Innovative architectural and structural design (1)</p> <p>Chair: Elsa Caetano</p> <p>Design of adaptive structures by kinematic synthesis of mechanisms</p> <p><i>Y. Akgün, F. Maden & K. Korkmaz</i></p> <p>Prestressed. Technique and innovation in the 1950-1975 architecture</p> <p><i>J. Anaya Díaz</i></p> <p>A new building system. Structural aspects of CO2aCERO system</p> <p><i>J. Pérez Valcárcel, V. Hermo & J. B. Rodríguez Cheda</i></p> <p>Diagrid structures. Innovation and detailing</p> <p><i>T. Boake</i></p> <p>Housing industrialization, success and failure, universal and local. Limits for housing globalization</p> <p><i>A. Correia, V. Murtinho & L. Simões da Silva</i></p> <p>Innovative architectural and structural design to preserve historical centres</p> <p><i>D. Félix, A. Feio & J.M. Branco</i></p>
<p>Merging seismic and fire design of timber buildings and potential and limitations on going high</p> <p><i>B. Kasal, D. Kruse, N. Ruther & T. Polocoser</i></p>	<p>Wallpaper & tectonics. A critical discussion of the state of the architectural discipline</p> <p><i>M.F. Hvejsel & P.H. Kirkegaard</i></p> <p>Architectural assemblages and materializations – changing notions of tectonics and materiality in contemporary architecture</p> <p><i>F. Nilsson</i></p>	<p>The wooden cooling tower</p> <p><i>E. Nozhova</i></p> <p>MonaLisa wood pavilion poplar pl(ay)wood</p> <p><i>G. Callegari, M. Sassone, A. Spinelli & R. Zanuttini</i></p> <p>A Spinelli & R. Zanuttini Robustness issues for design of innovative timber structures</p> <p><i>P.H. Kirkegaard, F. Hald & J.O. Sørensen</i></p>	<p>Structure and architecture. The illogical results of considering them two separated entities, after the 2009 earthquake in L'Aquila</p> <p><i>C. Bartolomucci</i></p>	<p>Control of conservation works for architectural heritage buildings by micro seismic recordings and structural analysis</p> <p><i>C.S. Dragomir, A. Dutu & E.S. Georgescu</i></p>	<p>Innovative architectural and structural design to preserve historical centres</p> <p><i>D. Félix, A. Feio & J.M. Branco</i></p>
<p>Status of cross-laminated timber construction in North America</p> <p><i>S. Gagnon & E. Karacabeyli</i></p>	<p>Architectural assemblages and materializations – changing notions of tectonics and materiality in contemporary architecture</p> <p><i>F. Nilsson</i></p>	<p>The wooden cooling tower</p> <p><i>E. Nozhova</i></p> <p>MonaLisa wood pavilion poplar pl(ay)wood</p> <p><i>G. Callegari, M. Sassone, A. Spinelli & R. Zanuttini</i></p> <p>A Spinelli & R. Zanuttini Robustness issues for design of innovative timber structures</p> <p><i>P.H. Kirkegaard, F. Hald & J.O. Sørensen</i></p>	<p>Structure and architecture. The illogical results of considering them two separated entities, after the 2009 earthquake in L'Aquila</p> <p><i>C. Bartolomucci</i></p>	<p>Control of conservation works for architectural heritage buildings by micro seismic recordings and structural analysis</p> <p><i>C.S. Dragomir, A. Dutu & E.S. Georgescu</i></p>	<p>Innovative architectural and structural design to preserve historical centres</p> <p><i>D. Félix, A. Feio & J.M. Branco</i></p>
<p>A review of seismic response of timber frames</p> <p><i>H. Stamatopoulos & K. Malo</i></p>	<p>Architectural assemblages and materializations – changing notions of tectonics and materiality in contemporary architecture</p> <p><i>F. Nilsson</i></p>	<p>The wooden cooling tower</p> <p><i>E. Nozhova</i></p> <p>MonaLisa wood pavilion poplar pl(ay)wood</p> <p><i>G. Callegari, M. Sassone, A. Spinelli & R. Zanuttini</i></p> <p>A Spinelli & R. Zanuttini Robustness issues for design of innovative timber structures</p> <p><i>P.H. Kirkegaard, F. Hald & J.O. Sørensen</i></p>	<p>Structure and architecture. The illogical results of considering them two separated entities, after the 2009 earthquake in L'Aquila</p> <p><i>C. Bartolomucci</i></p>	<p>Control of conservation works for architectural heritage buildings by micro seismic recordings and structural analysis</p> <p><i>C.S. Dragomir, A. Dutu & E.S. Georgescu</i></p>	<p>Innovative architectural and structural design to preserve historical centres</p> <p><i>D. Félix, A. Feio & J.M. Branco</i></p>

Wednesday Afternoon (WeA), July 24, 2013

13:30 – 14:30 Lunch (Restaurant of the University)

14:30 – 16:30 Concurrent Technical Sessions: WeA 1 to WeA 6

WeA 1 – Main Auditorium		WeA 2 – Room B1.14		WeA 3 – Room B1.15		WeA 4 – Room B1.16		WeA 5 – Room B1.17		WeA 6 – Room B1.13	
Mini-Symposium	Special Session	General Session	General Session	General Session	General Session	General Session	General Session	General Session	General Session	General Session	General Session
Modern renaissance timber construction (2)	Innovation in reciprocal structures	Timber structures(1)	The borderline between architecture and structural engineering (2)	Computer and experimental methods (2)	Computer and experimental methods (2)	Innovative architectural and structural design (2)	Innovative architectural and structural design (2)	Innovative architectural and structural design (2)	Innovative architectural and structural design (2)	Innovative architectural and structural design (2)	Innovative architectural and structural design (2)
Chair: Sylvain Gagnon	Chair: Dario Parigi	Chair: Paulo Mendonça	Chair: Juan Perez Herreras	Chair: Kirk Martini	Chair: Kirk Martini	Chair: Vitor Murtinho	Chair: Vitor Murtinho	Chair: Vitor Murtinho	Chair: Vitor Murtinho	Chair: Vitor Murtinho	Chair: Vitor Murtinho
Investigation of seismic performance of multi-storey timber buildings within the frame of the SERIES Project	Reciprocal systems based on planar elements	Connections loaded perpendicular to grain. Analysis of the failure behavior and design approach	A concrete prefabricated attic	Investigating a new material practice	Investigating a new material practice	Sustainable design of a multi-storey welded steel structure located in a seismic area	Sustainable design of a multi-storey welded steel structure located in a seismic area	Sustainable design of a multi-storey welded steel structure located in a seismic area	Sustainable design of a multi-storey welded steel structure located in a seismic area	Sustainable design of a multi-storey welded steel structure located in a seismic area	Sustainable design of a multi-storey welded steel structure located in a seismic area
<i>M. Piazza & R. Tomasi</i>	<i>A. Pugnale & O. Baverel</i>	<i>B. Franke & P. Quennville</i>	<i>C. Bocan</i>	<i>P. Nicholas, M. Tamke, P. Ayres & M. R. Thomisen</i>	<i>P. Nicholas, M. Tamke, P. Ayres & M. R. Thomisen</i>	<i>M. Georgescu, V. Ungureanu & M. Szitar</i>	<i>M. Georgescu, V. Ungureanu & M. Szitar</i>	<i>M. Georgescu, V. Ungureanu & M. Szitar</i>	<i>M. Georgescu, V. Ungureanu & M. Szitar</i>	<i>M. Georgescu, V. Ungureanu & M. Szitar</i>	<i>M. Georgescu, V. Ungureanu & M. Szitar</i>
Seismic design of CLT buildings: Definition of a suitable q-factor by numerical and experimental procedures	Reciprocal-frame structures. A digital design instrument	Convertible city. Light wood prefabricated systems in the extension of built environment	The importance of engineers in the development of modern spanish architecture. Alejandro de la Sota's industrial architecture	Study of the sensitivity of different building structures to tunnelling induced settlements	Study of the sensitivity of different building structures to tunnelling induced settlements	Concepts for a movable bridge	Concepts for a movable bridge	Concepts for a movable bridge	Concepts for a movable bridge	Concepts for a movable bridge	Concepts for a movable bridge
<i>L. Pozza, D. Trutalli, A. Polastri & A. Ceccotti</i>	<i>U. Thoennissen</i>	<i>A. Spinelli</i>	<i>M. Cabreza & A. Soler Estrela</i>	<i>C. Molins & C. Camós</i>	<i>C. Molins & C. Camós</i>	<i>J. Holowaty</i>	<i>J. Holowaty</i>	<i>J. Holowaty</i>	<i>J. Holowaty</i>	<i>J. Holowaty</i>	<i>J. Holowaty</i>
Seismic design of timber structures with displacement based method	The proposal of an ancient technique for modern construction. A stone reciprocal structure	Contribution to the fire resistance of timber construction using boards	Architecture and engineering in the new leaning towers	Multi-objective optimization of concrete shells	Multi-objective optimization of concrete shells	Partial dismantling of 1960's to 80's neighbourhoods. A sustainable holistic solution	Partial dismantling of 1960's to 80's neighbourhoods. A sustainable holistic solution	Partial dismantling of 1960's to 80's neighbourhoods. A sustainable holistic solution	Partial dismantling of 1960's to 80's neighbourhoods. A sustainable holistic solution	Partial dismantling of 1960's to 80's neighbourhoods. A sustainable holistic solution	Partial dismantling of 1960's to 80's neighbourhoods. A sustainable holistic solution
<i>C. Loss, M. Piazza & D. Zonta</i>	<i>M. Brocato & L. Mondardini</i>	<i>M. Dufková & P. Kuklík</i>	<i>M. Cámara, V. Compán & J. Sánchez</i>	<i>T. Mendez Echenagucia, A. Pugnale & M. Sassone</i>	<i>T. Mendez Echenagucia, A. Pugnale & M. Sassone</i>	<i>S. Huuhka</i>	<i>S. Huuhka</i>	<i>S. Huuhka</i>	<i>S. Huuhka</i>	<i>S. Huuhka</i>	<i>S. Huuhka</i>
Behaviour of moment connections in timber frameworks	Efficient design and fabrication of free-form reciprocal structures	Low cost construction. State of the art and prospects for using structure wood apartment buildings in Portugal	Structure as architectural system	Experimental tests on steel members with variable I welded section	Experimental tests on steel members with variable I welded section	Dynamic design of slender footbridges	Dynamic design of slender footbridges	Dynamic design of slender footbridges	Dynamic design of slender footbridges	Dynamic design of slender footbridges	Dynamic design of slender footbridges
<i>A. Polastri, R. Tomasi, M. Piazza & I. Smith</i>	<i>D. Parigi & P.H. Kirkegaard</i>	<i>M. Oliveira, J. P. Couto, P.Mendonça, J. Branco, M. Silva & A. P. Reis</i>	<i>B. Corotis & A. Daringa</i>	<i>I.M. Cristutiu, & D.L. Nunes</i>	<i>I.M. Cristutiu, & D.L. Nunes</i>	<i>E. Caetano & A. Cunha</i>	<i>E. Caetano & A. Cunha</i>	<i>E. Caetano & A. Cunha</i>	<i>E. Caetano & A. Cunha</i>	<i>E. Caetano & A. Cunha</i>	<i>E. Caetano & A. Cunha</i>
Seismic performance assessment of a timber-log house	Static and kinematic formulation of planar reciprocal assemblies	Embodied information in structural timber	Closing the gap while celebrating the divide. Tools for A/E collaborative learning	Performance assessment of mixed CFRP retrofitting solution for RC slabs	Performance assessment of mixed CFRP retrofitting solution for RC slabs	Natural structures and innovative design	Natural structures and innovative design	Natural structures and innovative design	Natural structures and innovative design	Natural structures and innovative design	Natural structures and innovative design
<i>J.M. Branco & P.B. Lourenço</i>	<i>D. Parigi & P.H. Kirkegaard</i>	<i>E. Jannasch</i>	<i>M. Donofrio</i>	<i>S.C. Florut, V. Stoian, T. Nagy-György, D. Dan & D. Diaconu</i>	<i>S.C. Florut, V. Stoian, T. Nagy-György, D. Dan & D. Diaconu</i>	<i>N. Nawari & A. M. Gutierrez</i>	<i>N. Nawari & A. M. Gutierrez</i>	<i>N. Nawari & A. M. Gutierrez</i>	<i>N. Nawari & A. M. Gutierrez</i>	<i>N. Nawari & A. M. Gutierrez</i>	<i>N. Nawari & A. M. Gutierrez</i>
			A multi-performance comparison of long-span structural systems	The use of unconventional reinforcements in structures. Design aspects	The use of unconventional reinforcements in structures. Design aspects	Design of Reconfigurable Doubly-Curved Structure	Design of Reconfigurable Doubly-Curved Structure	Design of Reconfigurable Doubly-Curved Structure	Design of Reconfigurable Doubly-Curved Structure	Design of Reconfigurable Doubly-Curved Structure	Design of Reconfigurable Doubly-Curved Structure
			<i>E. Douville, C.T. Griffin, B. Thompson & M. Hoffman</i>	<i>K. Jaafar</i>	<i>K. Jaafar</i>	<i>F.Maden, K. Korkmaz & Y. Akgun</i>	<i>F.Maden, K. Korkmaz & Y. Akgun</i>	<i>F.Maden, K. Korkmaz & Y. Akgun</i>	<i>F.Maden, K. Korkmaz & Y. Akgun</i>	<i>F.Maden, K. Korkmaz & Y. Akgun</i>	<i>F.Maden, K. Korkmaz & Y. Akgun</i>

Wednesday Evening (WeE), July 24, 2013

16:30 – 17:00 Coffee Break (Lobby of the Main Auditorium)

17:00 – 19:00 Concurrent Technical Sessions: WeE 1 to WeE 6

WeE 1 – Main Auditorium		WeE 2 – Room B1.14		WeE 3 – Room B1.15		WeE 4 – Room B1.16		WeE 5 – Room B1.17		WeE 6 – Room B1.13	
Mini-Symposium	General Session	General Session	General Session	General Session	General Session	General Session	General Session	General Session	General Session	General Session	General Session
Modern renaissance timber construction (3)	Emerging technologies	Timber structures (2)	The borderline between architecture and structural engineering (3)	Building envelopes	Innovative architectural and structural design (3)	Innovative architectural and structural design (3)	Innovative architectural and structural design (3)	Innovative architectural and structural design (3)	Innovative architectural and structural design (3)	Innovative architectural and structural design (3)	Innovative architectural and structural design (3)
Chair: Jochen Kohler	Chair: Michel Crisinel	Chair: Artur Feio	Chair: Romuald Tarczewski	Chair: Christian Louter	Chair: Juan Pérez Valcárcel	Chair: Juan Pérez Valcárcel	Chair: Juan Pérez Valcárcel	Chair: Christian Louter	Chair: Christian Louter	Chair: Juan Pérez Valcárcel	Chair: Juan Pérez Valcárcel
Better than steel? (Part 2). Tall wooden factories and the invention of "slow burning" heavy timber construction	Monitoring the recovery of architectural heritage	Analysis of the elasto-plastic failure behavior of wood under compression	Design of the Brasília TV tower	Life cycle assessment of irish residential buildings and typical building envelope analysis	Hybrid structures. A case of a pedestrian bridge	Hybrid structures. A case of a pedestrian bridge	Hybrid structures. A case of a pedestrian bridge	Life cycle assessment of irish residential buildings and typical building envelope analysis	Life cycle assessment of irish residential buildings and typical building envelope analysis	Hybrid structures. A case of a pedestrian bridge	Hybrid structures. A case of a pedestrian bridge
<i>R. Langenbach</i>	<i>P. Diaz Simal, E. López Rodríguez, E. López Burló & J. Lacasa Diaz</i>	<i>S. Franke</i>	<i>J.M. Morales Sánchez & E. B. C. Azambuja</i>	<i>A. Armstrong & J. Goggins</i>	<i>M.C. Phocas, T. Sophocleous & A. Michael</i>	<i>M.C. Phocas, T. Sophocleous & A. Michael</i>	<i>M.C. Phocas, T. Sophocleous & A. Michael</i>	<i>A. Armstrong & J. Goggins</i>	<i>A. Armstrong & J. Goggins</i>	<i>M.C. Phocas, T. Sophocleous & A. Michael</i>	<i>M.C. Phocas, T. Sophocleous & A. Michael</i>
	The role of spontaneous construction of post-disaster housing	Fire-resistance analysis of a novel wood-concrete composite deck	Energy efficiency upgrading, architectural restyling and structural retrofit of modern buildings by means of "engineered" double skin façade	Proposals for intervention in obsolete building envelopes in Andalusia	Reciprocal structures in architectural shaping of floors and roofs	Reciprocal structures in architectural shaping of floors and roofs	Reciprocal structures in architectural shaping of floors and roofs	Proposals for intervention in obsolete building envelopes in Andalusia	Proposals for intervention in obsolete building envelopes in Andalusia	Reciprocal structures in architectural shaping of floors and roofs	Reciprocal structures in architectural shaping of floors and roofs
	<i>D. Félix, A. Feio, J.S. Machado & J.M. Branco</i>	<i>R. Meena, M. Schollmayer & S. Hehl</i>	<i>F. Feroldi, A. Marini, B. Badiani, G.A. Pizzari, E. Giuriani, P. Riva & A. Belleri</i>	<i>M. Molina Huelva, J. M. Rincón-Calderón & P. Fernández-Ans</i>	<i>M. Piekarski</i>	<i>M. Piekarski</i>	<i>M. Piekarski</i>	<i>M. Molina Huelva, J. M. Rincón-Calderón & P. Fernández-Ans</i>	<i>M. Molina Huelva, J. M. Rincón-Calderón & P. Fernández-Ans</i>	<i>M. Piekarski</i>	<i>M. Piekarski</i>
Performance-based design for mid-rise wood constructions in Canada	Comparing the embodied energy of structural systems in parking garages	Optimized generation of non-standard wood structures based on native irregular components	The architecture of the fall. Metamorphosis of structure in the work of Enric Miralles (1988-1997)	Integrated design applied in thermal retrofitting solutions for residential buildings	Origami based, deployable disaster relief shelter	Origami based, deployable disaster relief shelter	Origami based, deployable disaster relief shelter	Integrated design applied in thermal retrofitting solutions for residential buildings	Integrated design applied in thermal retrofitting solutions for residential buildings	Origami based, deployable disaster relief shelter	Origami based, deployable disaster relief shelter
<i>C. Dagenais, S. Gagnon & R. Desjardin</i>	<i>C. Griffin, L. Bynum, A. Green, S. Marandyuk, J. Nangung, A. Burkhardt & M. Hoffman</i>	<i>V. Monier, G. Duchanois & J-C. Bignon</i>	<i>C. García Estévez & J.M. Rovira</i>	<i>A. Ciutina, V. Ungureanu, D. Dubina & D. Grecea</i>	<i>S. Rihał</i>	<i>S. Rihał</i>	<i>S. Rihał</i>	<i>A. Ciutina, V. Ungureanu, D. Dubina & D. Grecea</i>	<i>A. Ciutina, V. Ungureanu, D. Dubina & D. Grecea</i>	<i>S. Rihał</i>	<i>S. Rihał</i>
Predicting force flows in timber light-frame building superstructures	Bridge design 2.0. Developments in the field of integrated, sustainable and durable bridge design	Development of prefabricated timber-concrete composite floors	The role of architectural theory in exploiting the potential of iron load-bearing structures	Modified plastic materials for a new generation of architecture	Three-hinged structures in a historical perspective	Three-hinged structures in a historical perspective	Three-hinged structures in a historical perspective	Modified plastic materials for a new generation of architecture	Modified plastic materials for a new generation of architecture	Three-hinged structures in a historical perspective	Three-hinged structures in a historical perspective
<i>G. Doudak & I. Smith</i>	<i>J. Smits</i>	<i>P. Nechanický & P. Kukik</i>	<i>M. Hárta</i>	<i>T. Ries</i>	<i>L. Sivnik</i>	<i>L. Sivnik</i>	<i>L. Sivnik</i>	<i>P. Nechanický & P. Kukik</i>	<i>P. Nechanický & P. Kukik</i>	<i>L. Sivnik</i>	<i>L. Sivnik</i>
Is cross-laminated timber suitable for building structures to thirty levels?	Earth architecture. Ancient and new methods to improve the durability	Timber framed masonry buildings, an earthquake resistance influenced architecture	Can collaboration within multidisciplinary teamwork be explained using Belbin? A case study	Isostatic lines' study to optimize steel space grid envelope structures for tall buildings according to their solicitations	"Floating roofs". The Dorton arena and the development of modern tension roofs	"Floating roofs". The Dorton arena and the development of modern tension roofs	"Floating roofs". The Dorton arena and the development of modern tension roofs	Isostatic lines' study to optimize steel space grid envelope structures for tall buildings according to their solicitations	Isostatic lines' study to optimize steel space grid envelope structures for tall buildings according to their solicitations	"Floating roofs". The Dorton arena and the development of modern tension roofs	"Floating roofs". The Dorton arena and the development of modern tension roofs
<i>J. Chapman</i>	<i>R. Eires, A. Camões & S. Jalali</i>	<i>A. Dutu, J. Gomes Ferreira & C.S. Dragomir</i>	<i>A.S. Dederichs & J. Karlshoj</i>	<i>R. Señis</i>	<i>T. Sprague</i>	<i>T. Sprague</i>	<i>T. Sprague</i>	<i>A. Dutu, J. Gomes Ferreira & C.S. Dragomir</i>	<i>A. Dutu, J. Gomes Ferreira & C.S. Dragomir</i>	<i>T. Sprague</i>	<i>T. Sprague</i>
Wind design of timber buildings	Daylight in interiors	Daylight in interiors	The interdisciplinary design studio. Identifying collaboration	Expanded cork as building envelope. Architectonic and technological aspects	Mass-customized architectural design approach. Evaluation and a proposal based on fractal geometry principles	Mass-customized architectural design approach. Evaluation and a proposal based on fractal geometry principles	Mass-customized architectural design approach. Evaluation and a proposal based on fractal geometry principles	The interdisciplinary design studio. Identifying collaboration	The interdisciplinary design studio. Identifying collaboration	Expanded cork as building envelope. Architectonic and technological aspects	Mass-customized architectural design approach. Evaluation and a proposal based on fractal geometry principles
<i>I. Zisis & T. Stathopoulos</i>	<i>L. Janeckova & D. Bošová</i>	<i>L. Janeckova & D. Bošová</i>	<i>K. Dong, J. Doerfler & T. Fowler</i>	<i>P. Sousa & P.J.S. Cruz</i>	<i>M. Asefi & F. Fakourian</i>	<i>M. Asefi & F. Fakourian</i>	<i>M. Asefi & F. Fakourian</i>	<i>K. Dong, J. Doerfler & T. Fowler</i>	<i>K. Dong, J. Doerfler & T. Fowler</i>	<i>P. Sousa & P.J.S. Cruz</i>	<i>M. Asefi & F. Fakourian</i>

Thursday Morning (ThM), July 25, 2013

8:30 – 19:00	Registration (Lobby of the Main Auditorium)	
9:00 – 10:30	Keynote Lectures (Main Auditorium) Chair: Luís Simões da Silva Andrea Deplazes "Archi-Tectonic" Ulrich Knaack "A façade roadmap"	
10:30 – 11:00	Coffee Break (Lobby of the Main Auditorium)	
11:00 – 13:00	Concurrent Technical Sessions: ThM 1 to ThM 6	

ThM 1 – Main Auditorium	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
Mini-Symposium Modern renaissance timber construction (4)	Special Session Principles in practice for the analysis, conservation and structural restoration of architectural heritage	General Session Timber structures (3)	General Session The borderline between architecture and structural engineering (4)	General Session Steel and composite (1)	General Session Innovative architectural and structural design (4)
Chair: Maurizio Piazza	Chair: Gorun Arun & Stephen Kelley	Chair: Christian Eckhardt	Chair: Miguel C.Fernandez-Cabo	Chair: Martina Eliasova	Chair: Terri Boake
Design concepts and principles for taller multi-storey superstructures incorporating timber frameworks <i>I. Smith</i>	The ISCARSAH principles in practice <i>S. Kelley</i>	On seismic response of retrofitted wooden house by collapsing process analysis <i>T. Takatani & H. Nishikawa</i>	The interaction of architects & str. engineers for the Hellenic World complex in Athens <i>E.S. Kyriazis</i>	Specificity of shaping light gauge steel shells <i>J. Abramczyk</i>	Deployable stage. Proposal of an application with mobile structures <i>M.P. Torres Londoño</i>
Timber beams with end restraints <i>K. Malo & J. Kohler</i>	The building and its structural history (or how the history is the source of endless technical knowledge) <i>M. Segarra Lagunes</i>	Barriers to the design and use of cross-laminated timber structures in high-rise multi-family housing in the United States <i>C. Griffin & J. Schmidt</i>	A structural language for a conceptual design collaboration <i>L. Luyten</i>	Numerical analysis of sliding rigid beam-column joints made from encased tubes for high-rise structures <i>A. Albarada Valls, A. Alentorn Puigcerver & J. M. Carreras</i>	Naturalwall®. Timber multifunctional systems in refurbishment sustainable process <i>A. Spinelli & G. Callegari</i>
Behaviour of dowel-type timber connections under cyclic loading <i>S. Zhang, W. Wang, C. Huang & W. Wu</i>	Master builders' design skills in diagnosing the failures <i>G. Arun</i>	A modular timber construction system made with ribbed-box or rather hollow-box elements <i>S. Franke & R. Hausammann</i>	Engineers and the role of structures in architecture <i>B. Manum & D. Nielsen</i>	Experimental and theoretical analysis of bridges with encased filler beams <i>P. Beke, V.Kvocák & R. Vargová</i>	Multi-objective search in the early phase of architectural design <i>T. Mendez Echenagucia, M. Sassone, A. Astolff & P.A. Croset</i>
Design and production of an heavy timber reaction frame for a laboratory test setup <i>M. Andreatoli, P. Grossi, T. Sartori & R. Tomasi</i>	Physical evaluation of the endless column <i>R. Sofronie</i>	The roman timber framework, a neglected construction method <i>X. Laumain</i>	On the extension of graphical statics into the 3rd dimension <i>M. Schrems & T. Kotnik</i>	Shear connection of composite steel and concrete bridge trusses <i>M. Chárvat & J. Macháček</i>	Using the laser scanning technology in the rehabilitation of existing buildings <i>S. Pescari, D. Dan & V. Stoian</i>
Glulam structures: some Portuguese case studies <i>A. Feio, P. Cruz & A. Pinto</i>	Structural evaluation of Kilitbahir Castle in Canakkale, Turkey <i>A. Turer</i>	The behavior of toothed-plate connectors under reversed cyclic loading <i>E. Tuhtanen & K. Öiger</i>	Configuration design for collective housing building structure -IFD systems configuration <i>J. Nikolic</i>	Experimental study on steel-concrete shear walls with steel encased profiles retrofitted with FRP composites <i>D. Dan, A. Fabian, V. Stoian & T. Nagy-György</i>	Computational morphogenesis in architecture. Structure and light as a multi-objective design/optimization problem <i>A. Liuti, A. Pugnale & A. Erioli</i>
Panel discussion: What are the boundaries on what can be constructed from timber? <i>Panelists: A. Ceccotti, B. Kasal, R. Langanbach, I. Smith & J. Kohler</i>	Dismantling of foundation system for conservation of masonry structures in Angkor, Cambodia <i>Y. Iwasaki, Y. Akazawa, M. Fukuda, J. Nakazawa, K. Nakagawa, I. Shimoda & T. Nakagawa</i>	The architectural taming of infrastructure: interaction architect. Structural engineers <i>R. Tarczewski & P. Ogieski</i>	The re-use of disassembled steel structures between architectural design and environmental sustainability <i>C. Calderini, M. Pongiglione & A. Giachetta</i>	Form structure inte(g)ration <i>E. Mele & M. Toreno</i>	

Thursday Afternoon (ThA), July 25, 2013					
Lunch (Restaurant of the University)					
Concurrent Technical Sessions: ThA 1 to ThA 6					
ThA 1 – Main Auditorium	ThA 2 – Room B1.14	ThA 3 – Room B1.15	ThA 4 – Room B1.16	ThA 5 – Room B1.17	ThA 6 – Room B1.13
<p>Mini-Symposium</p> <p>On the “tectonics” in architecture. Between aesthetics and ethics (1)</p> <p>Chair: Patrícia Trovalusci</p> <p>Shells. Innovation system design by Ildefonso Sánchez (1898-1980)</p> <p><i>P. Cassinello</i></p> <p>The DNA of the avant-gardes</p> <p><i>L. Enguita</i></p> <p>Conceptual design of a pedestrian bridge by means of topology optimization</p> <p><i>L. Frattari, J. P. Dagg & G. Leoni</i></p> <p>The nature of tectonic architecture and structural design</p> <p><i>A. Carter, P.H. Kirkegaard & R. Jyrrell</i></p> <p>Construction and form-finding of a post-formed timber grid-shell</p> <p><i>F. Portioli, S. Pone, B. D’Amico, R. Landolfo, S. Colabella, B. Parenti, D. Lancia, A. Fiore, M. D’Aniello & C. Ceraldi</i></p>	<p>Special Session</p> <p>From new tools and methods towards new tasks and ideals. The impact of technology and science in the post-war era</p> <p>Chair: Rika Devos</p> <p>The architecture of absence. Building, landscape and the changing character of technology in the post-war era</p> <p><i>C. Cabral</i></p> <p>New french architectural treatises for a new kind of public architecture</p> <p><i>E. Monin</i></p> <p>The development of architectural concrete in Belgium during the 1960s and 1970s</p> <p><i>S. Van de Voorde</i></p> <p>Working relationships between architects and structural engineers. World War II to the 1970s</p> <p><i>D. Yeomans</i></p> <p>Finnish architect-engineer cooperation on concrete and shell structures in the 1950s and 1960s</p> <p><i>A. Miskanen</i></p>	<p>Parallel Event</p> <p>Sustainability assessment in early phases of building projects</p> <p>Chair: Luís Bragança</p> <p>Opening and presentation of the new SB_Steel methodology</p> <p><i>H. Koukkari</i></p> <p>Criteria for sustainable steel-intensive building</p> <p><i>L. Bragança & J. Andrade</i></p> <p>LCA approach in steel-framed buildings design</p> <p><i>B. Rossi</i></p> <p>Thermal performance of steel-framed buildings</p> <p><i>P.Santos</i></p> <p>Sustainable design of steel structures</p> <p><i>R. Landolfo</i></p>	<p>General Session</p> <p>The borderline between architecture and structural engineering (5)</p> <p>Chair: Russel Gentry</p> <p>Infrastructures and environmental impact. The synergy of architectural and structural design</p> <p><i>M. Pasca</i></p> <p>New species of structures</p> <p><i>J. Pérez-Herreras</i></p> <p>The disappearance of the structural analysis barrier. The Sydney Opera House from a contemporary perspective</p> <p><i>J. Rey Rey</i></p> <p>The role of structures in daylighting retrofits for existing buildings</p> <p><i>M. Sedor, C.T. Griffin & K. Konis</i></p> <p>Built environment sustainability. Breaking the borderlines between architects and civil engineers</p> <p><i>M.A. Szitar, T.O. Gheorghiu & D.M. Grecea</i></p> <p>Structuring geometry and abstraction of structures in architectural synthesis</p> <p><i>B. Dzenana, R. Čahtarević & S. Haillović</i></p>	<p>General Session</p> <p>Steel and composite (2)</p> <p>Chair: Alain Nussbaumer</p> <p>Theoretical and experimental studies on composite steel-concrete structural shear walls with steel encased profiles</p> <p><i>D. Dan, A. Fabian & V. Stoian</i></p> <p>Great steel structures. The Italian post-war trial</p> <p><i>M. Zordan & F. Fragnoli</i></p> <p>Required performance level of an existing building for over roofing</p> <p><i>N. Zsolt & M. Cristutiu</i></p> <p>Innovative conception and design of structural systems for flexible floor spaces</p> <p><i>C. Odenbreit, O. Hechler & M. Braun</i></p> <p>Double curved aluminum façade</p> <p><i>K.Najjar</i></p> <p>Tree like structures and fractal</p> <p><i>F. Escrig, J. Sánchez Sanchez & T. Rodríguez Leon</i></p>	<p>General Session</p> <p>Innovative technologies and design</p> <p>Chair: Mircea Georgescu</p> <p>The legacy of the modern movement and its adversities in the face of the current development of changeable housing construction solutions</p> <p><i>H. Ferreira, V. Murtinho & L. Simões da Silva</i></p> <p>Nature-inspired structural optimization of freeform shells</p> <p><i>F. Wäimer, R. La Magna & J. Knippers</i></p> <p>An innovative proposal for a deployable shading system</p> <p><i>M. Asefi, E. Ebrahimi Salari, Sh. Valadi & Gh. Kouchenani</i></p> <p>“Reticolatus”. An innovative reinforcement for irregular masonry. A numeric model</p> <p><i>S. Galassi, M. Paradiso, A. Borri & D. Sinicropi</i></p> <p>Fabric formed concrete structures and architectural elements’</p> <p><i>R. Pedreschi</i></p> <p>Balconies, analysis of constructive technology current state and foresight of new industrial development</p> <p><i>L. Sierra & J.L. Zamora</i></p>

13:00 – 14:30

14:30 – 16:30

Thursday Evening (ThE), July 25, 2013

Coffee Break (Lobby of the Main Auditorium)

16:30 – 17:00
17:00 – 19:00

Concurrent Technical Sessions: ThE 1 to ThE 6

The 1 – Main Auditorium

The 2 – Room B1.14

The 3 – Room B1.15

The 4 – Room B1.16

The 5 – Room B1.17

The 6 – Room B1.13

Mini-Symposium	General Session	Parallel Event	General Session	General Session	General Session
On the “tectonics” in architecture. Between aesthetics and ethics (2) Chair: Mario Chiorino	Special structures Chair: Isabel Valente	Web-based support tool for decision-making and examples of application Chair: Heli Koukkari	The borderline between architecture and structural engineering (6) Chair: Mario Rinke	Steel and composite (3) Chair: Christoph Odenbreit	The tectonic of architectural solutions (1) Chair: Vincenzo Riso
<i>M. Savorra & G. Fabbrocino</i>	Shapes and behavior of triangular grid structures. Current trends in architecture of the 21th Century <i>E. Gonzalez & J. Anaya Diaz</i>	Environmental analysis of an office building in France – comparison between structural systems <i>O. Vassart</i>	Examining the architectural engineer <i>M. Uhllein</i>	Comparing the seismic performance of concentrically braced frames with and without self-centering behavior <i>G. O'Reilly & J. Giggins</i>	Alternative affordable housing through simulated 3d architectural tectonic: V3 Residence, Putrajaya <i>R. Ab. Rahman & A. A. Dzaharudin</i>
The recovery of the ethic of constructions. P. L. Nervi vs. S. Musmeci, two structural conceptions compared <i>P. Trovalusci & A. Tinelli</i>	Elevated pedestrian ways in Japan. A historical view <i>H. Isohata</i>	Role of the LCA in the renovation processes based on two case studies <i>J.A. Chica</i>	Traditional and scientific knowledge for a sustainable vulnerability reduction of rural housing in Haiti <i>F. Vieux-Champagne, A. Caimi; P. Garnier, H. Guillaud, O. Moles, S. Grange, Y. Siefert & L. Daudeville</i>	Efficient solution for large motorways composite bridges <i>E. Petzek, L. Toma & E. Meteş</i>	SPACEPLATES building system <i>A. Romme, I.Servin & A.Bagger</i>
Tensegrity tectonics. Structural concept and architectural expression <i>K. Liapi</i>	Building on planet Mars student project <i>A. Nussbaumer, P. Zurbrueegg, S. Erkman & T. Besson</i>	Web-based support tool for the sustainability assessment of steel-framed buildings <i>H. Gervásio</i>	Structures for quality and quantity of natural light in architecture <i>S. Bica, I.M. Cristutiu & O. Micsa</i>	Technical solutions for rehabilitation of old arch bridges <i>L. Toma, E. Petzek & R. Bănciță</i>	Combining shape grammars and BIM in the rehabilitation design process of the bourgeois house of Oporto: the research progress <i>E. Coimbra & V. Riso</i>
The Nervi system. Between complexity and ethic <i>T. Iori & S. Poretti</i>	Adaptable hybrid steel structures. Kinetic modeling and simulation study <i>M.C. Phocas, M. Matheou & E.G. Christoforou</i>	Examples of application of the web-based support tool <i>V. Ungureanu</i>	The evolutionary process of built heritage influenced by the architecture/engineering borderline decisions <i>A. Tavares, A. Costa & H. Varum</i>	Reconversion process of an old building into a modern commercial centre <i>N. Zsolt & M. Cristutiu</i>	AgwA architecture office : Addressing structure in architecture competitions <i>H. Fallon & B. Vandenbulcke</i>
The school of bridges in Venice: teaching bridge design in an University of Architecture <i>A. Zanchettin, E. Reccia & E. Siviero</i>	Analysis of Portadas de Feria subjected to wind loads incorporating nonlinearity of the guys <i>M.T. Rodríguez León, J.S. Sánchez & F. Escrig</i>	Discussion and conclusions <i>Fondation Loius Vuitton. Exploring new structural typologies</i> <i>A.M. Bordas Geli & M. Peiro Sandra</i>	Confrontation between building and ground: gravity in the work of João Vilanova Artigas <i>L. Borgonovi e Silva & T. Kotnik</i>	Adapting a historic truss viaduct to modern requirements <i>J. Holowaty</i>	Towards an improved architectural quality in contemporary architecture <i>C. Cristensen & P.H. Kirkegaard</i>
			Structural solutions for emergency architecture <i>O. Veronescu & G.D. Mihai</i>	Design engineer construct. Building large scale structures <i>K. Dong & J. Feldman</i>	

Friday Morning (FrM), July 26, 2013

8:30 – 19:00	Registration (Lobby of the Main Auditorium)
9:00 – 10:30	Keynote Lectures (Main Auditorium) Chair: Paulo J. S. Cruz Mario Chiorino "Pier Luigi Nervi: Architecture as Challenge" Randolph Langenbach "The Great Counterintuitive: Re-evaluating Historic and Contemporary Building Construction for Earthquake Collapse Prevention"
10:30 – 11:00	Coffee Break (Lobby of the Main Auditorium)
11:00 – 13:00	Concurrent Technical Sessions: FrM 1 to FrM 6

FrM 1 – Main Auditorium	FrM 2 – Room B1.14	FrM 3 – Room B1.15	FrM 4 – Room B1.16	FrM 5 – Room B1.17	FrM 6 – Room B1.13
<u>Mini-Symposium</u> Structural glass. Crossing borders (1)	General Session Concrete and masonry structures (1)	General Session The history of the relationship between architects and structural engineers (1)	General Session Comprehension of complex forms(1)	General Session Educating architects and structural Engineers (1)	General Session The tectonic of architectural solutions (2)
Chair: Jan Belis	Chair: Climent Molins	Chair: Humberto R. Camilloni	Chair: Harry Giles	Chair: Juan M. Songel	Chair: Katherine Liapi
Double skin façades made of glass. Aspects of structural design and static analysis	A critical assessment of concrete and masonry structures for reconstruction after seismic events in developing countries. <i>H. McWilliams & C.T. Griffin</i>	Pier Luigi Nervi in the United States. The height and decline of a master builder <i>A. Bologna & G. Neri</i>	The dynamic phraseology of structures. Enabling the design of complex systems <i>T. Boake</i>	Hybrid architecture. Coupling structural understanding and architectural education <i>R. Balbo, T. Kocaturk & A. Veliz</i>	AgwA architecture office. Study cases on structure and architecture <i>H. Fallon & B. Vandenbulcke</i>
<i>B. Siebert</i>	Technology of thin shells in the german baroque <i>V. Compán, M. Cámara & J. Sánchez</i>	Doménico Parma and Guillermo González Zuleta. A story of challenges, innovation and development of concrete architecture in Colombia <i>E.C. Cortes Paez & A. Primmer</i>	Railway stations between infrastructural complexity and architectural form <i>E. Conticelli & S. Tondelli</i>	Cultivating the next generation of architects. Through pattern of structural systems <i>M. P. Callahan & I. K. Chang</i>	Vijjo Revell. Tectonic structures <i>J.J. Ferrer Forés</i>
Boosting European education on structural glass. COST action TU0905 training school <i>J. Belis, C. Louter, J. Neugebauer & J. Schneider</i>	An approach to patents of prestressed concrete in the 20 th Century's architecture <i>M.P. Llorente, J. Anaya Díaz & M.M. Sánchez</i>	Supporting modern architecture. Sources for the Matosinhos Market structural design <i>J. P. Delgado & P.T. Pinto</i>	Structural analysis of the Curators' Lab Arena. An impressive ephemeral timber structure <i>A. Feio & P.J.S. Cruz</i>	Teaching seismic and wind subjects to architecture students <i>I.K. Chang, M.P. Callahan, P. Lu, H.Y. Chan & S. Luong</i>	The Tectonic meaning in Le Corbusier's architecture – the case of Le Cabanon <i>F. Hakonsen</i>
Glass structures, from theory to practice <i>N. Emami</i>	Study to evaluate the characteristics of masonry for "Stirbey family chapel" to retrofit the structure <i>C.L. Matei & R.C. Matei</i>	Structure impact on architectural form of multi-storey factory buildings of industrial revolution <i>J. Horicka & T. Šenberger</i>	Structural form as ornament <i>R. Oprita</i>	Embracing the past. Using historical structures to teach engineering fundamentals <i>R. Dermody</i>	Mies' early american work and the tectonic bond between architecture and structure <i>R. Serrano</i>
Evaluation of the SLG method for applications with adhesive point-fixings <i>J. Dispersyn, K. Calleyl & J. Belis</i>	Influence of various factors to mechanical properties of glued joint in glass <i>K. Machalická & M. Eliášová</i>	Memories of Mario. The best structures Professor I never knew <i>D. Oakley</i>	Diagrids for design and construction of freeform tall buildings <i>K.S. Moon</i>	Constructing by creative re-use of unexpected materials <i>P.L. Carvalho & P.J.S. Cruz</i>	Structure and architecture in the design studio <i>P. Endres & C. Wetzel</i>

Friday Afternoon (FrA), July 26, 2013

Lunch (Restaurant of the University)

14:30 – 16:30
Concurrent Technical Sessions: FrA 1 to FrA 6

FrA 1 – Main Auditorium

FrA 2 – Room B1.14

FrA 3 – Room B1.15

FrA 4 – Room B1.16

FrA 5 – Room B1.17

FrA 6 – Room B1.13

Mini-Symposium	General Session	General Session	General Session	General Session	General Session
Structural glass. Crossing borders (2)	Concrete and masonry structures (2)	The history of the relationship between architects and structural engineers (2)	Comprehension of complex forms (2)	Educating architects and structural Engineers (2)	Lightweight and membrane structures (1)
Chair: Geralt Siebert	Chair: Aires Camões	Chair: Deborah Oakley	Chair: Marios Phocas	Chair: Paulo Mendonça	Chair: Mario Sassone
Analytic models of adhesively bonded steel-glass beams	Application of the operational modal analysis method for the control of the intervention in the Roman Theatre (Cádiz, Spain)	Prefabrication and standardization. Anne Jacobse's contribution	Outtrigger structures for twisted, tilted and tapered tall buildings	Interaction of shape and structural performance. Design of structures methods of structural optimization	Innovative technological solutions for ultra-lightweight shelters covering archaeological sites
<i>M. Netusil, T.Fremr & M. Eliasova</i>	<i>E. Rodriguez-Mayorga, P. Pachon, J. F. Jimenez, V. Compan, A. Saez & E. Yanes</i>	<i>Y. Ortega Sanz</i>	<i>K.S. Moon</i>	<i>I. Lochner</i>	<i>P. Beccarelli, A.Zanelli, R. Maffei, G. Carra & E. Rosina</i>
Building integrated photovoltaic. New developments	Funicular Forms and Earthquake Performance of Low-Strength Masonry Buildings	Architect and engineer. The collaboration of Louis I. Kahn and August E. Komendant	Discretization solutions for the construction of free form complex surface structures	Numerical models of a beam belonging to a tall building: errors and approximations within ordinary design	Deployable membrane structures design proposal for the scissors-type system
<i>G. Siebert & B. Siebert</i>	<i>S.Rihal & J. Edmisten</i>	<i>H. Rodriguez-Camilloni</i>	<i>A. Berk & H. Giles</i>	<i>L. Sgambi, N. Basso, R. Pavani, E. Civelli, C. D. Meroni & M. Pagin</i>	<i>O.F. Avellaneda Lopez & R. Sastre</i>
Stress corrosion parameters for glass with different edge finishing	Determination of residual load-bearing capacity of existing masonry structures	What is a Steel construction?	Architectural topology parametrically defined by digital manufacturing	How to build the future with limited and finite resources?	Minimal-surface-T-connections in architecture
<i>M. Vandebroek, C. Louter, J. Dispersyn, D. Sonck & J. Belis</i>	<i>J. Witzany, T. Cejka & R. Zigler</i>	<i>F. Rosenberg</i>	<i>M. Garcia del Valle & J. Anaya Diaz</i>	<i>Y. Sieffert, J.-M. Huygen & D. Daudon</i>	<i>G.H. Filz</i>
Exploratory experimental investigations on post-tensioned structural glass beams	Structural behaviour of masonry buildings subjected to landslide. Load path method approach	Between Le Duc and Mérimée. Talking about Vézelay	Virtual reality as a multi disciplinary communication tool	Understanding the interplay between structure and architecture using building information modeling (BIM)	Lightweight architecture. Characteristics for an effective application in case of emergency
<i>C. Louter, J.H. Nielsen & J. Belis</i>	<i>F. Palmisano & A. Elia</i>	<i>A. Rueda, J. Anaya Diaz & P. Cruz Franco</i>	<i>L.D. Houck, R. Hassan, T.K. Thiis & K. Solheim</i>	<i>N. Nawari</i>	<i>R. Maffei, A. Zanelli & P. Beccarelli</i>
Experimental investigations and numerical modelling of point fitted glass panes		Systems of rationalization. New methods and changes of organization in Swedish building construction around 1970	Parametric Design and Non-Linear Analysis of a Large-Scale Deployable Roof Structure based on Action Origami	Force material form. Transferring historical construction concepts into contemporary architectural design	
<i>O. Hechler, M. Tibolt & C. Odenbreit</i>		<i>E. Sigge</i>	<i>R. Gentry, D. Baerflecken, M. Swarts & N. Wonoto</i>	<i>M. Rinke & J. Shwartz</i>	
Reinforced glass connection. Concept, test and detail	The architect / structural engineer relationship. A symmetrical symbiosis	The architect / structural engineer relationship. A symmetrical symbiosis	Tessellation of Islamic star patterns on complex forms		
<i>P. Carvalho, P.J.S. Cruz & F.A. Veer</i>	<i>R. Oprita</i>	<i>M.C. Fernandez-Cabo & A. Casas-Pérez</i>			

Friday Evening (FrE), July 26, 2013

Coffee Break (Lobby of the Main Auditorium)

Concurrent Technical Sessions: FrE 1 to FrE 5

FrE 1 – Main Auditorium	FrE 2 – Room B1.14	FrE 3 – Room B1.15	FrE 4 – Room B1.16	FrE 5 – Room B1.17
<p>Short Session Reinforced glass</p> <p>Chair: Paulo Cruz</p> <p>An insight into the new reinforced glass connection technic</p> <p><i>P. Carvalho & P. Cruz</i></p> <p>Benefits of sentryglass® in glass façades</p> <p><i>M. Gallizia</i></p>	<p>General Session The use of new materials</p> <p>Chair: Aires Camões</p> <p>Agricultural residues applications in contemporary building industry</p> <p><i>H. Dahn & J. Knippers</i></p> <p>The finishing touch for better energy efficiency of episodically used masonry wall single family houses</p> <p><i>S. Djambova & O. Simov</i></p> <p>Light, colour, form and surface</p> <p><i>C. Eckhardt</i></p> <p>Cement-bonded particle boards of modified composition with alternative raw sources utilization</p> <p><i>T. Melichar & Bydžovský</i></p> <p>Thermal and energy refurbishment of university buildings using phase change materials</p> <p><i>R. Vicente, L.N. Gomes, M.S. Rodrigues & T.R. Silva</i></p>	<p>General Session: The history of the relationship between architects and structural engineers (3)</p> <p>Chair: Pedro Bandeira</p> <p>Structural engineering for timber and steel-timber trusses in Italy (1800-1950)</p> <p><i>E. Zamperini</i></p> <p>“Arup calling”, Engineering gets to Paris. Centre Pompidou (1971-77)</p> <p><i>M. Comba</i></p> <p>Anatomy of structures</p> <p><i>F. Selmani</i></p> <p>The structural engineer. Finding the philosophy of the profession</p> <p><i>M. Ujhlein</i></p> <p>Steel skeleton and terra cotta skin. Engineering and architecture of the Chicago stock exchange by Adler and Sullivan</p> <p><i>M. Chiurini</i></p>	<p>General Session Educating architects and structural Engineers (3)</p> <p>Chair: Ana Luísa Rodrigues</p> <p>Conceptual structural design. An important topic in architectural education</p> <p><i>L. Sgambi, N. Basso & M.E. Codazzi</i></p> <p>The advantage of including full-size construction as an educational tool in the architecture education</p> <p><i>J. Siem, B.O. Braaten, B. Manum, P. Aalto & A. Gilberg</i></p> <p>Found in translation. Physical models as a structural design tool for architects</p> <p><i>T. Vilquin</i></p> <p>Reframing structures. Frame experimentation in artistic studies</p> <p><i>I. Vrouwe & B. Pak</i></p> <p>Aesthetics in the education of civil and structural engineers</p> <p><i>J.M. Songel</i></p>	<p>General Session Lightweight and membrane structures (2)</p> <p>Chair: Isabel Valente</p> <p>Qualitative investigation: efficiency of a membrane roof project</p> <p><i>E. F. Nunes, J. B. M. de Sousa Jr., B. Baier & A. M. S. de Freitas</i></p> <p>“Corogami hut” case study</p> <p><i>C. Wiebe</i></p> <p>Surface- and mesh-based approaches towards a materialization of architectural catenoids</p> <p><i>G.H. Filz, S. Schiefer & Th. Stecher</i></p> <p>Temporary reticulated membrane at PS1</p> <p><i>P. Endres</i></p>

18:30 – 19:00 Closing Ceremony (Main Auditorium)

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)

A

Aalto, P. FrE 4
Ab. Rahman, R. ThE 6
Abedini, S. WeM 5
Abramczyk, J. ThM 5
Akazawa, Y. ThM 2
Akgün, Y. WeM 6, WeA 6
Albareda Valls, A. ThM 5
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Bundgaard, C. WeM 2
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Bydžovský, J. FrE 2
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 Zisis, I. WeE 1
 Zonta, D. WeA 1
 Zordan, M. ThA 5
 Zsolt, N. ThA 5, ThE 5
 Zurbruegg, P. ThE 2

Tuesday, July 23, 2013

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

20:00 **Welcome Reception** (Palace of the Dukes of Bragança - Guimarães)

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

9:30 – 11:00 **Keynote Lectures** (Main Auditorium)

11:30 – 13:30	WeM 1 Mini-symposium "Modern Renaissance timber construction " (1)	WeM 2 Special Session From open structures to the cladding of control. A critical call for current tectonic theories and practices in architecture	WeM 3 Special Session Innovation in timber	WeM 4 General Session The borderline between architecture and structural engineering (1)	WeM 5 General Session Computer and experimental methods (1)	WeM 6 General Session Innovative Architectural and Structural Design (1)
14:30 – 16:30	WeA 1 Mini-symposium "Modern Renaissance timber construction " (2)	WeA 2 Special Session Innovation in reciprocal structures	WeA 3 General Session Timber Structures (1)	WeA 4 General Session The borderline between architecture and structural engineering (2)	WeA 5 General Session Computer and experimental methods (2)	WeA 6 General Session Innovative Architectural and Structural Design (2)
17:00 – 19:00	WeE 1 Mini-symposium "Modern Renaissance timber construction " (3)	WeE 2 General Session Emerging Technologies	WeE 3 General Session Timber Structures (2)	WeE 4 General Session The borderline between architecture and structural engineering(3)	WeE 5 General Session Building Envelopes	WeE 6 General Session Innovative Architectural and Structural Design (3)

Thursday, July 25, 2013

9:00 – 10:30 **Keynote Lectures** (Main Auditorium)

11:00 – 13:00	ThM 1 Mini-symposium "Modern Renaissance timber construction " (4)	ThM 2 Special Session Principles in practice for the analysis, conservation and structural restoration of architectural heritage	ThM 3 General Session Timber Structures (3)	ThM 4 General Session The borderline between architecture and structural engineering (4)	ThM 5 General Session Steel and Composite (1)	ThM 6 General Session Innovative Architectural and Structural Design (4)
14:30 – 16:30	ThA 1 Mini-symposium "Tectonics" in Architecture: Between Aesthetics and Ethics (1)	ThA 2 Special Session From new tools and methods towards new tasks and ideals. The impact of technology and science in post-war era	ThA 3 Parallel Event Sustainability assessment in early phases of building projects	ThA 4 General Session The borderline between architecture and structural engineering (5)	ThA 5 General Session Steel and Composite (2)	ThA 6 General Session Innovative technologies and design
17:00 – 19:00	ThE 1 Mini-symposium "Tectonics" in Architecture: Between Aesthetics and Ethics (2)	ThE 2 General Session Special structures	ThE 3 Parallel Event Web-based support tool for decision-making and examples of application	ThE 4 General Session The borderline between architecture and structural engineering (6)	ThE 5 General Session Steel and Composite (3)	ThE 6 General Session The tectonic of architectural solutions (1)

20:00 **Gala Dinner** (Municipal Stadium - Braga)

Friday, July 26, 2013

9:00 – 10:30 **Keynote Lectures** (Main Auditorium)

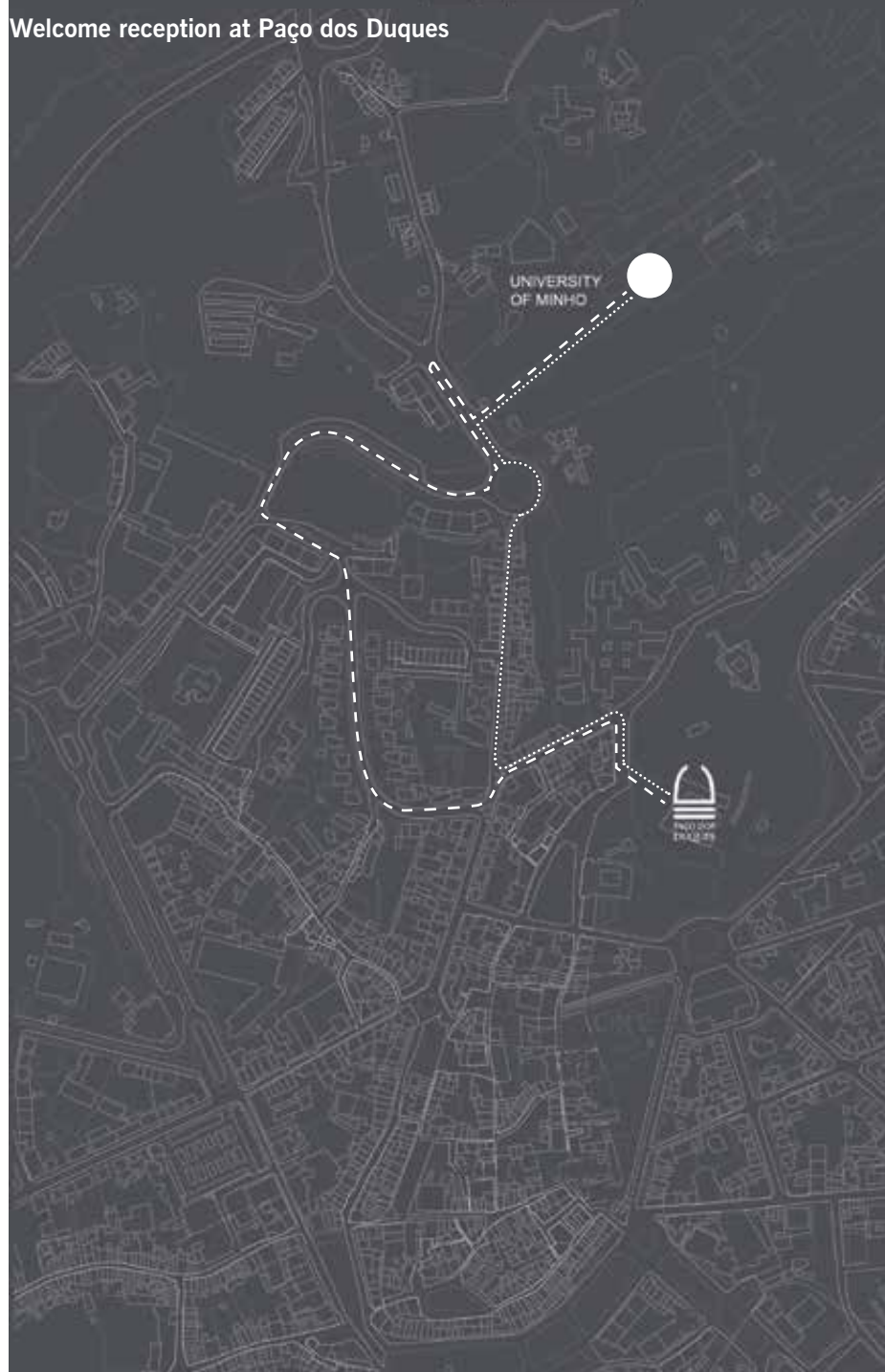
11:00 – 13:00	FrM 1 Mini-symposium Structural glass: Crossing borders (1)	FrM 2 General Session Concrete and Masonry structures (1)	FrM 3 General Session The history of the relationship between architects and structural engineers (1)	FrM 4 General Session Comprehension of complex forms (1)	FrM 5 General Session Educating architects and structural engineers (1)	FrM 5 General Session The tectonic of architectural solutions (2)
14:30 – 16:30	FrA 1 Mini-symposium Structural glass: Crossing borders (2)	FrA 2 Concrete and Masonry structures (2)	FrA 3 The history of the relationship between architects and structural engineers (2)	FrA 4 Comprehension of complex forms (2)	FrA 5 Educating architects and structural engineers (2)	FrA 6 General Session Lightweight and membrane structures (1)
17:00 – 18:40	FrE 1 Short Session: Reinforced Glass	FrE 2 The use of new materials	FrE 3 The history of the relationship between architects and structural engineers (3)		FrE 5 Educating architects and structural engineers (3)	FrE 6 General Session Lightweight and membrane structures (2)

18:40 – 19:00 **Closing Ceremony** (Main Auditorium)

Wednesday, July 24, 2013



Welcome reception at Paço dos Duques



..... On foot - - - - - By car

0 100 500 m