9th IMC

Programme

International Masonry Conference

Universidade do Minho
Escola de Engenharia

Editors
Paulo B. Lourenço
Barry A. Haseltine
Graça Vasconcelos

July 7, 8, 9 2014
Guimarães, Portugal

Welcome to

Guimarães, Portugal, July 07-09, 2014

The 9th International Masonry Conference will take place in University of Minho, Guimarães, Portugal, between 7 and 9 July 2014, jointly and co-organized by University of Minho and the International Masonry Society. This Conference series has become one of the most important international events in the masonry world and it takes place every four years.

The topics addressed, among others, include Innovation for Masonry, Masonry Materials and Testing, Earthquake Resistance, Repair and Strengthening, Conservation and Historic Buildings, Masonry and Building Physics, Architecture with masonry and Case Studies. Special sessions have been organized in Energy Efficiency, Sustainability and Eco-materials, Earthen Architecture, and Masonry Infills and Earthquakes.

9thIMC 2014

Beyond a very good number of interesting papers on these topics, presented by researchers, technical specialists and students, the Conference comprehends five Keynote Lectures, a session devoted to Industrial Challenges and four special sessions dedicated to challenging and up to date topics in the area of masonry, namely Sustainability and Eco-materials, Energy Efficiency, Earthen Construction and Masonry Infill and Earthquakes.

A student challenge was also prepared so that students and young researchers could enthusiastically involve into the conference.

We warmly thank all the contributors, the authors, the speakers and the exhibitors and sponsors of the event and wish this conference will offer you fruitful discussions and a pleasant time in Guimarães.

Paulo B. Lourenço and **Barry Haseltine** | Guimarães, July 2014

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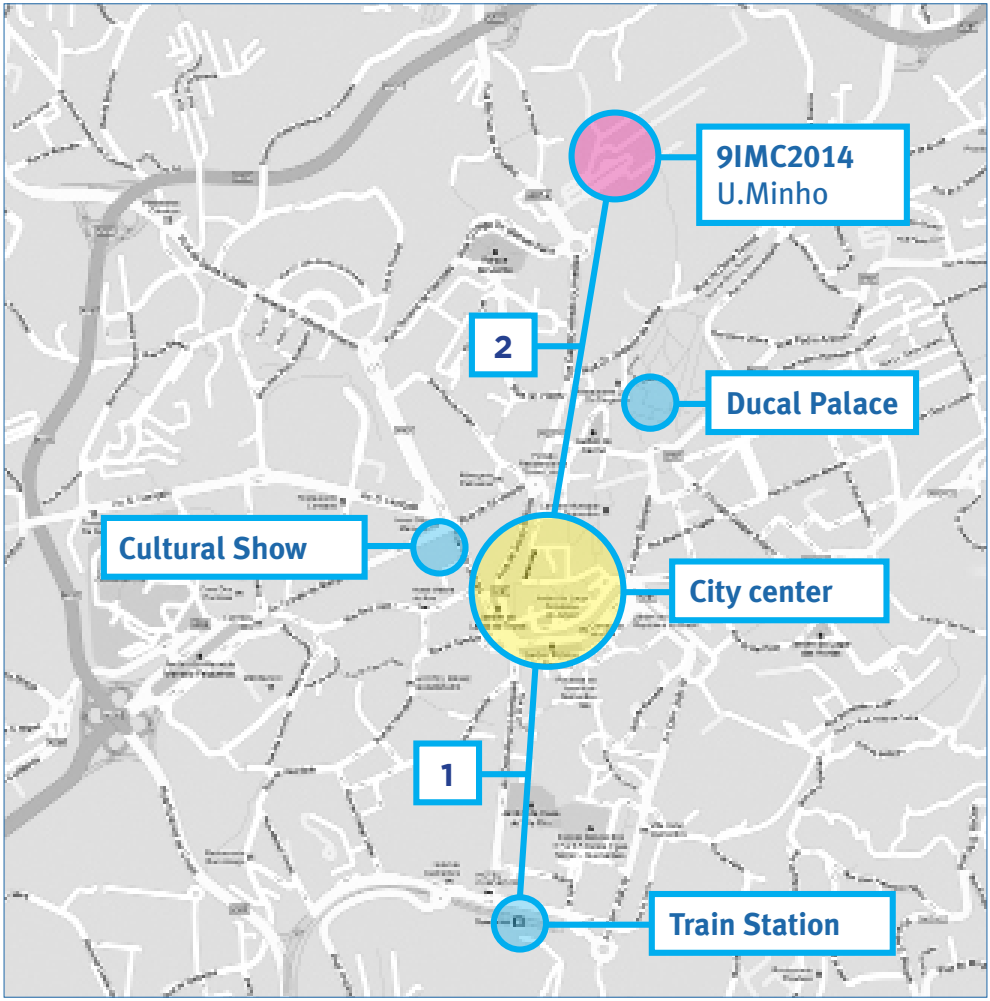
IMPORTANT INFORMATION

Guimarães City Map with the Conference Location



1 — Train Station ⇢ City Center = 10 min. walk | **2 — City Center** ⇢ 9IMC 2014 = 15 min. walk

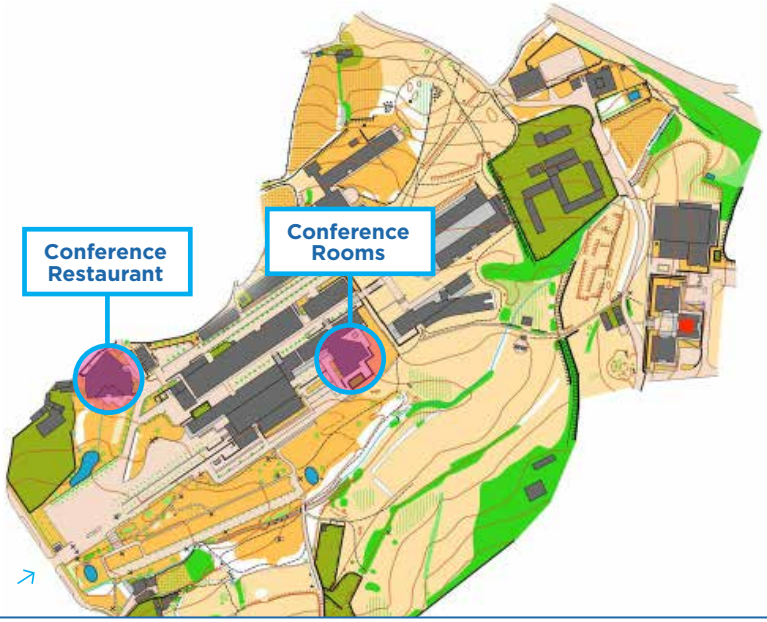
CONFERENCE SECRETARIAT

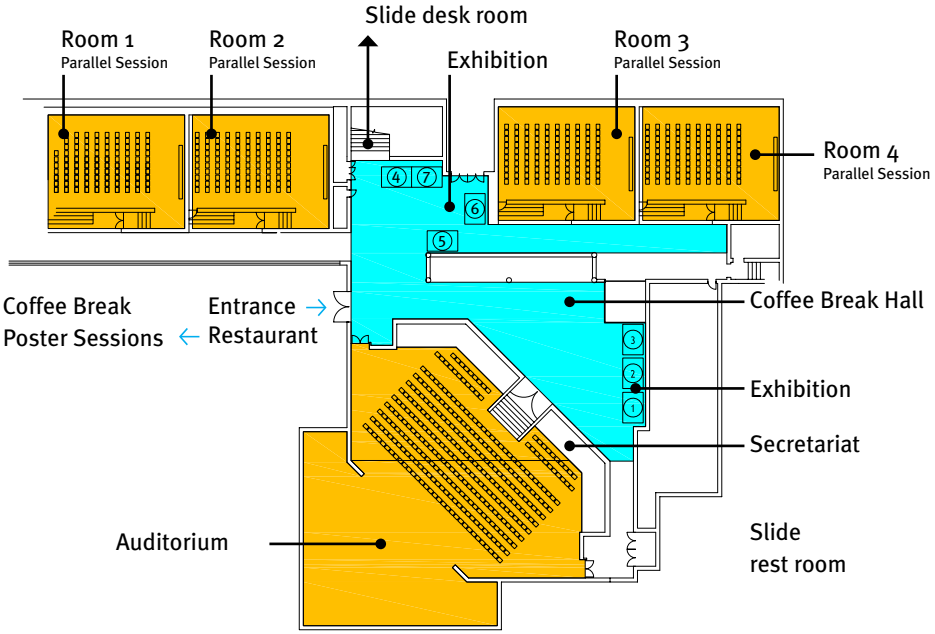
Paula Teixeira
University of Minho, Department of Civil Engineering
P-4800-058, Azurém, Guimarães, PORTUGAL
Tel +351 253 510 218 / Fax +351 253 510 217

CONFERENCE MAP

University of Minho map

with the Conference Venue





LONG-TERM WEATHER FORECAST

For Guimarães between 7th and 9th July 2014.
Temperature between 20ºC and 28ºC (68ºF to 82ºF).
Mostly sunny and no wind.

HOW TO GET TO 9IMC 2014

› **by car**
University of Minho
Campus de Azurém
Alameda da Universidade
4800-058 Guimarães
Portugal
latitude: 41º 27 6.85 N
longitude: 8º 17 33.19 W

› **by air**
The closest airport to the city of Guimarães is the Sá Carneiro Airport in Porto, about 50 km away.
The following airlines operate in Porto airport: Aigle, Air Berlin, Brussels Airlines, easyjet, Iberia, Lufthansa, Luxair, Ryanair, Sata Internaticonal, TAP Portugal, Transavia.com, Royal Air Maroc.
Furthermore, TAP Portugal has its hub in Lisbon airport, where the following additional airlines operate: Aer Lingus, Aero Vip, Air Europa, Air France, Air Moldova, Air Nostrum, Air Transat, Blue Air, bmibaby, British Airways, Cimber Sterling, Continental, Egyptair, NIKI/Air Berlin, KLM, STP Airways, TAAG, TACV, Tunisair, Ukraine, US Airways, Vueling.
From the airport the most convenient way to arrive to Guimarães is to take a direct bus. Go to http://getbus.eu and you can plan your trip. There are 6 departures per day on working days and 7 at weekends.

› **by bus**
As mentioned before, from Porto airport the most convenient way to arrive in Guimarães is to take a direct bus. Go to http://getbus.eu and you can plan your trip. There are 6 departures per day on working days and 7 at weekends.
From the centre of Porto you may take a bus to Guimarães at Parque da Magauanha (close to Trindade Metro Station), where the Bus Station to Guimarães is located.
From Braga, you may take the transfer busses at the schedule defined by the Conference in the morning and in the evening. You can also take the daily bus from the University. For this, you can buy the tickets at University.

› **by train**
From the city of Porto you can catch a train to Guimarães at Campanhã Station.

› **by taxi**
Should you wish to take a taxi from the airport to Guimarães, the journey takes approximately 45 min. The fare is around 60/80 Euro.

NOTES FOR SPEAKERS

- The 9IMC conference will be running on a tight schedule and your cooperation in making sure the sessions follow to the designated time limit is much appreciated.
- Each Speaker is allowed a total of 12 minutes. The Chairperson of your session might manage the time for questions and answers and reserve a combined Q&A session for all speakers towards the end of the session.
- Speakers will be alerted as they approach their presentation time limit (i.e. with a 2-minutes warning).
- We suggest all Speakers to prepare a presentation with about one slide per minute (maximum of about 12 slides).
- A computer with projector equipment will be available at each conference room. For presentations we advise to use powerpoint or pdf slides.
- For the sake of good order, please bring your presentation in an USB memory device.
- Files should be delivered in the Slide Desk Room of the Conference (see conference map).
- Please deliver your presentation 3 hours before your oral presentation.
- 15 min before the beginning of each session, each Speaker should introduce himself to the Chair of the Session.
- Once again, we kindly ask your cooperation for the success of 9IMC Conference.

Programme July 6—9

Hour	July 06	July 07	July 08	July 09
08:00 08:30		Registration Secretariat next to the Conference Rooms		
08:30 09:00		Opening Session Auditorium		
09:00 09:40		Keynote: Guilherme Parsekian Auditorium	Keynote: Wael El-Dahkakni Auditorium	Keynote: Daniel V. Oliveira Auditorium
09:40		Parallel Sessions	Parallel Sessions	Parallel Sessions
10:30		**AUDITORIUM** Analysis of Masonry Structures **ROOM 1** Innovation and Sustainability in Masonry **ROOM 2** Conservation of Historic Buildings **ROOM 3** New Construction Techniques / Technologies **ROOM 4** Masonry Materials and Testing	**AUDITORIUM** Case Studies **ROOM 1** Analysis of Masonry Structures **ROOM 2** Masonry and Buildings Physics **ROOM 3** Earthquake Resistance and Retrofitting **ROOM 4** Masonry Materials and Testing	**AUDITORIUM** Energy Efficiency (Special Session) **ROOM 1** Analysis of Masonry Structures **ROOM 2** Earthen Construction **ROOM 3** Codes and Standards/ Training and Education in Masonry
10:30 11:00		Coffee Break Coffee Break Hall	Coffee Break / Poster Session 1 Coffee Break Hall	Coffee Break / Poster Session 3 Coffee Break Hall
11:00		Parallel Sessions	Parallel Sessions	Parallel Sessions
12:30		**AUDITORIUM** Masonry Materiajyls and Testing **ROOM 1** Analysis of Masonry Structures **ROOM 2** Conservation of Historic Buildings **ROOM 3** Earthquake Resistance and Retrofitting **ROOM 4** Repair and Strengthening	**AUDITORIUM** Sustainability and Eco-materials (Special Session) **ROOM 1** Analysis of Masonry Structures **ROOM 2** Case Studies **ROOM 3** Earthquake Resistance and Retrofitting **ROOM 4** Masonry Materials and Testing	**AUDITORIUM** Energy Efficiency (Special Session) **ROOM 1** Analysis of Masonry Structures **ROOM 2** Repair and Strengthening **ROOM 3** Reliability and Performance / Fire Resistance
12:30 14:00		Lunch University Campus Restaurant	Lunch University Campus Restaurant	Lunch University Campus Restaurant
14:00 14:40		Keynote: Pedro Arias Auditorium	**AUDITORIUM** Industrial Challenges Session Parallel Sessions	Keynote: Victor Mestre / Sofia Aleixo Auditorium
14:40		Parallel Sessions	**ROOM 1** Analysis of Masonry Structures **ROOM 2** Conservation of Historic Buildings **ROOM 3** Earthquake Resistance and Retrofitting **ROOM 4** Masonry Materials and Testing	Parallel Sessions
16:00		Students Challenge Lab Tests Live Streaming at Coffee Break Hall **AUDITORIUM** Repair and Strengthening **ROOM 1** Analysis of Masonry Structures **ROOM 2** Conservation of Historic Buildings **ROOM 3** Earthquake Resistance and Retrofitting **ROOM 4** Masonry Materials and Testing		**AUDITORIUM** Architecture with Masonry **ROOM 1** Analysis of Masonry Structures **ROOM 2** Earthquake Resistance and Retrofitting **ROOM 3** New Developments in Design / Verification
16:00 16:30	Registration	Coffee Break / Students Challenge Poster Session Coffee Break Hall	Coffee Break / Poster Session 2 Coffee Break Hall	Coffee Break Coffee Break Hall
16:30		Parallel Sessions	Parallel Sessions	Parallel Sessions
18:00		**AUDITORIUM** Masonry Infills and Earthquakes (Special Session) **ROOM 1** Analysis of Masonry Structures **ROOM 2** Masonry and Buildings Physics **ROOM 3** Innovation and Sustainability in Masonry **ROOM 4** Masonry Materials and Testing	**AUDITORIUM** Earthen Architecture (Special Session) **ROOM 1** Analysis of Masonry Structures **ROOM 2** Conservation of Historic Buildings **ROOM 3** Earthquake Resistance and Retrofitting **ROOM 4** Masonry Materials and Testing	**AUDITORIUM** Codes and Standards **ROOM 1** Analysis of Masonry Structures **ROOM 2** Architecture with Masonry **ROOM 3** Masonry Materials and Testing
18:00 19:00				Farewell Coffee Break Hall
19:00 20:00	Cocktail Reception Ducal Palace			
20:00			Conference Dinner — mitPenha, Penha Hill Shuttle service will be provided from the city. Additional information will be given at the Secretariat.	
21:30		Downtown Cultural Show Praça da Plataforma das Artes		
23:00				

JULY 06	
16:00-18:30	PAÇO DOS DUQUES (DUCAL PALACE), GUIMARÃES
	Registration

JULY 06	
19:00-23:00	PAÇO DOS DUQUES (DUCAL PALACE), GUIMARÃES
	Cocktail Reception – Free visit to the Ducal Palace from 19:00 to 20:00

JULY 07		
8:30-9:00	OPENING SESSION	AUDITORIUM
	José Bastos, Municipality of Guimarães António G. Correia, Engineering School, University of Minho Barry Haseltine, International Masonry Society Steve Garrity, International Masonry Conference Paulo B. Lourenço, University of Minho	

JULY 07	› Chairman: Adrian Page	
9:00-9:40	KEYNOTE	AUDITORIUM
	The success of masonry structures in Brazil: Practice, research and challenges › **Guilherme Parsekian**	

PARALLEL SESSIONS

JULY 07	› Chairman: Adrian Page	
9:40-10:30	ANALYSIS OF MASONRY STRUCTURES	AUDITORIUM
ID 1204	A concrete damage plasticity model for ancient Roman pozzolanic concrete › S. Ivancic, P. Brune, **R. Perucchio**	
ID 1528	Characterization of structural characteristics of Portuguese buildings with masonry infill walls stock › **A. Furtado**, C. Costa, H. Rodrigues, A. Arêde	
ID 1192	Structural analysis of the church dome “Saints Justo y Pastor” in Granada (Spain) › **J. Suárez**, R. Bravo T. Ramirez	

JULY 07	› Chairman: Alain Gasser	
9:40-10:30	INNOVATION AND SUSTAINABILITY OF MASONRY	ROOM 1
ID 1643	No admixture, sustainable, self-consolidating grout › **C. Baltimore**, J. Mwangi, E. Bateman	
ID 1080	Holistic approach of a new masonry arch bridge on a Cevennes road › **A-S. Colas**, R. Briere, A. Feraille, G. Habert, Y. Tardivel	
ID 1389	Masonry stone structures in XVI century Khalji Mandu › **C. Rubini**	

JULY 07	› Chairman: Görün Arun	
9:40-10:30	CONSERVATION AND HISTORIC BUILDINGS	ROOM 2
ID 1552	Effective assessment methodology for trulli in Apulia, Italy › G. Sanitate, **L. Todisco**, G. Monti	
ID 1289	Seismic analysis and retrofitting design of masonry tower in L'Aquila › **L. Fanale**, D. Galeota, S. Avola	
ID 1264	The state of conservation of S. Francisco Church in Évora (Portugal): the physico-chemical characterization of the plasters › **M.R. Veiga**, A.S. Silva, A.R. Santos	
ID 1457	Stone architecture in the Belus limestone massif (Syria): knowledge and conservation problems › **M. Coppola**, L. Marino	

JULY 07	› Chairman: Geoffrey Edgell	
9:40-10:30	NEW CONSTRUCTION TECHNIQUES/TECHNOLOGIES	ROOM 3
ID 1548	Contributions and innovations to improve the performance and behaviour of masonry interior partition walls › **J.-L. Zamora-Mestre**	
ID 1385	Experimental and numerical analysis of the seismic performance of concrete block masonry buildings › L. Avila, **G. Vasconcelos**, P.B. Lourenço	
ID 1291	Physical and mechanical properties of an anhydrous calcium sulfate based mineral composite with hydrophobic granular silica aerogel modified by a polymer based surfactant agent › **D. Sanz-Pont**, D. Sanz-Arauz, C. Bedoya-Frutos	
ID 1398	Masonry product models for building information modelling › T. Witthuhn, S. Sharif, **R. Gentry**, J. Elder	

JULY 07	› Chairman: Nebojsa Mojsilovic	
9:40-10:30	MASONRY MATERIALS AND TESTING	ROOM 4
ID 1345	Simulation results of cracking in point loaded masonry compared with experimental results › **A.T. Vermeltfoort**	
ID 1327	Microstructural characterization of phases and interfaces of Portland cement mortar using high resolution microscopy › **M.F.O. Barreto**, P.R.G. Brandão	
ID 1383	Proposed field implementation of mitigative details for non-contact lap splices in concrete block construction › A. Kisin, **L.R. Feldman**	
ID 1321	Natural hydraulic lime mortars with ceramic wastes for masonry › **P. Faria**, V. Silva, T. Madeira	

10:30-11:00	COFFEE BREAK

PARALLEL SESSIONS

JULY 07	› Chairman: A.T. Vermeltfoort	
11:00-12:30	MASONRY MATERIALS AND TESTING	AUDITORIUM
ID 1299	Evaluation of elastic modulus of concrete blocks using acoustic tests › E.A.F. Santos, L.M.F. Oliveira, **V.G. Haach**, M.R.S. Corrêa	
ID 901	The influence of moisture on the mechanical behaviour of sandstone assessed by means of micro-computed tomography › **E. Verstrynge**, G. Pyka, M. Wevers, K. Van Balen	
ID 937	An in situ diagonal compression test with displacement control of the two wall sides › P. Crespi, A. Franchi, **A. Gregori**, P. Ronca	
ID 1473	Literature study on the rate and mechanism of carbonation of lime in mortars › E. Despotou, T. Schlegel, A. Shtiza, **F. Verhelst**	
ID 1346	The influence of hardening conditions on the properties of masonry cement mortar prisms made in brick moulds › **G. Bertram**	
ID 1612	Seismic behavior comparison of traditional and confined masonry Haitian walls › **D. Quiun**, G. Villa García, M. Blondet	

JULY 07	› Chairman: Dirk R.W. Martens
11:00-12:30	ANALYSIS OF MASONRY STRUCTURES — ROOM 1
ID 1432	Discrete element method to assess the 2D failure of dry stone retaining walls › J.J. Oetomo, **E. Vincens**, F. Dedecker, J.-C. Morel
ID 1364	Numerical modelling of masonry gravity dams considering the internal structure of the material › E.M. Bretas, **J.V. Lemos**, P.B. Lourenço
ID 1343	Towers and bell towers in Tuscany between the Middle Ages and the Renaissance. Building techniques › **L. Giorgi**
ID 1318	Membrane effects in non-load-bearing masonry walls › **M. Schmitt**, C.-A. Graubner
ID 1458	Analytical, numerical and experimental investigations on the load-bearing behaviour of partially supported slabs connected to single-leaf walls › **W. Jäger**, S. Reichel
ID 1512	Construction and materials of Visby medieval city wall – risk of damage › **K. Balksten**, C. Thelin

JULY 07	› Chairman: Sergio Lagomarsino
11:00-12:30	CONSERVATION AND HISTORIC BUILDINGS — ROOM 2
ID 1072	The value and future of masonry in architecture: Not necessarily carved in stone › R.L. Castro, **G. Diodati**
ID 1580	Case hardening and the weather resistance of rhyolitic tuff: Preservation of the cavates and petroglyphs of Bandelier national monument › D. Broxton, P. Porter, A. Bass, **R. Domingue**
ID 1127	Watermills: a project of restoration and enhancement of hydraulic machines of Sant'Angelo le Fratte (Basilicata - Italy) › A. Pellettieri, **M. Corrado**
ID 1408	Finite element analysis of grout injection on multi-wythe stone masonry walls › **A. Isfeld**, N. Shrive
ID 1469	Reconstruction plans of the municipalities of the barony of Carapelle in the province of L'Aquila (Italy) › G. Cialone, G. Cifani, **A. Mannella**, A. Petracca, C. Modena, G. Bettiol, M. Munari, F. da Porto
ID 1394	Critical aspects and stress redistribution in historical multi-leaf masonry walls › **S. Cominelli**, E. Giuriani

JULY 07	› Chairman: Daniel P. Abrams
11:00-12:30	EARTHQUAKE RESISTANCE AND RETROFITTING — ROOM 3
ID 1001	Effectiveness of composite grids embedded in mortar layers for strengthening of masonry walls › **A. Garofano**, F. Ceroni, M. Pecce
ID 1262	Behaviour under elevated temperatures of the bond between near surface mounted fibre reinforced polymer reinforcement and clay brick masonry › **M.J. Masia**, J. Shen, G. Simundic
ID 1575	Injected anchors for the seismic retrofit of historical stone masonry buildings: In situ experimental tests › **F. Silveri**, P. Riva, G. Profeta, E. Poverello, C. Algeri
ID 1340	Seismic performance of bed-joint reinforced solid brick masonry walls › G. Rushabh, **A. Menon**
ID 1317	Unreinforced stone masonry buildings in New Zealand: Inventory and material characterisation › **M. Giaretton**, D. Dizhur, F. Da Porto, J.M. Ingham
ID 1339	Seismic characterisation of unreinforced masonry buildings in Auckland, New Zealand › **K. Walsh**, P. Cummuskey, D. Dizhur, J. Ingham
ID 1429	Vibrations of multi-storey RC frame with SIM panels: Numerical simulation › **Y. Totoev**, D. Williamson, Z. Wang

JULY 07	› Chairman: Robert Drysdale
11:00-12:30	REPAIR AND STRENGTHENING — ROOM 4
ID 1494	Performance of supplementary injection anchors inside masonry › **B. Gigla**
ID 1098	Dynamic validation of post-earthquake safety intervention Mirandola, 2012 Emilia earthquake › G. Boscato, **R. Ceravolo**, S. Ientile, M.L. Pecorelli, A. Quattrone, S. Russo, F.L. Zanotti
ID 1596	Performance assessment of overlay strengthened masonry under cyclic loading using the diagonal tensile test › **J. Almeida**, E. Pereira, J. Barros
ID 1374	An overview of seismic strengthening techniques traditionally applied in vernacular architecture › **J. Ortega**, G. Vasconcelos, M. Correia

ID 1582	Characterization of fibre reinforced geopolymers as structural strengthening material for brick masonry › **E. Garbin**, M. Panizza, M.R. Valluzzi, F. Nardon, S. Tamburini, M. Favaro, A. Magro
ID 1636	Investigating the durability of FRP-masonry elements immersed in water › **S.H. Maljaee**, B. Ghiassi, P.B. Lourenço, D.V. Oliveira
ID 1243	Strengthening of unreinforced brick masonry at the central stores building by grouting › **C. Chaudhry**

12:30-14:00	LUNCH	UNIVERSITY CAMPUS RESTAURANT

JULY 07	› Chairman: Antonello De Luca	
14:00-14:40	KEYNOTE	AUDITORIUM
	Geomatic technology applied in the masonry structures: A review › **Pedro Arias**, B. Riveiro, B. Conde-Carnero, M. Solla	

PARALLEL SESSIONS

JULY 07	› Chairman: Antonello De Luca	
14:40-16:00	REPAIR AND STRENGTHENING	AUDITORIUM
ID 1513	A new method for strengthening tiled vaults: “Reinforced Catalan vaulting” › M. Corradi, **G. Castori,** A. Borri	
ID 1217	Preserving history - It starts with temporary stabilization › **D.T. Biggs**, B.M. Lione	
ID 1572	Evaluation of cover deviation and resistance of steel anchorages in masonry walls › **F. Pinho**, V. Lúcio, L. Moura, N. Travassos, I. Almeida	
ID 1285	Numerical study of the performance of TRM strengthened brickwork walls against second order bending effects › **E. Bernat-Maso**, L. Gil	
ID 1287	Laboratory tests on unreinforced and reinforced historical masonry wall specimens in L’Aquila (Italy) › P. Crespi, A. Franchi, D. Galeota, **A. Gregori**, P. Ronca	
ID 1300	Numerical investigation on the performance of wall-to-wall connections in traditional masonry buildings › **A.S. Araújo**, D.V. Oliveira, P.B. Lourenço	

ID 1108	Experimental and analytical studies of a tapered anchor system for masonry retrofit applications › C. Citto, **M. Schuller**, W. Ruth, M. Ruth, I. Murray

JULY 07	› Chairman: Guilherme A. Parsekian	
14:40-16:00	ANALYSIS OF MASONRY STRUCTURES	ROOM 1
ID 882	The influence of temperature and cracks on the structural behaviour of church vaults as exemplified by selected sacral object of lower-Silesia/ Poland › **K. Ałykow**, M. Napiórkowska-Ałykow	
ID 1430	Analysis of bed joint influence on masonry modulus of elasticity › **R. Zavalis**, B. Jonaitis, P.B. Lourenço	
ID 1392	Micromodel fracture simulations for validating a masonry macromodel › **S. Lange**, N. Bretschneider, V. Slowik	
ID 1338	The effect of vertical seismic actions on the behaviour of stone masonry structures – Numerical study › **D. Campos**, J. Guedes, V. Lopes	
ID 1595	Numerical analysis of the influence of the geometry of ceramic blocks on structural walls › C. Félix, **G. Mohamad**, E. Rizzatti, R. Portella, E. Rizzatti JR.	
ID 1515	Optimal FRP strengthening for transversally loaded masonry walls by means of a combined homogenization › B. Matteo, **G. Milani**	

JULY 07	› Chairman: Steve Garrity	
14:40-16:00	CONSERVATION AND HISTORIC BUILDINGS	ROOM 2
ID 1459	Recovery of stone architectural heritage › **M. Zerbinatti**, I. Bianco, S. Fasana, R. Nelva	
ID 1633	A troubled relationship: steel and masonry in American structures between 19th and 20th centuries › **M. Faliva**	
ID 1352	Preservation and restoration of buildings with load-bearing masonry. The structures of the Mattatoio (Slaughterhouse) in Rome and of the Murate (Walled-in nuns) in Florence › **A. Baratta**, L. Farroni, C. Piferi	
ID 1573	Defining architectural fragments/ruins in context of masonry study of Kiradu group of temples, Rajasthan, India › **S. Vardia**	

ID 1535	Characterisation of historical mortars from the Moorish Castle in Sintra, Portugal › **A.P.F. Pinto**, B. Silva, D.V. Silva, A. Lamas
ID 1565	Shelburne farms: Restoration and conservation of a Gilded-age estate garden › **D. Porter**, A. Bass

JULY 07	› Chairman: Rita Bento	
14:40-16:00	EARTHQUAKE RESISTANCE AND RETROFITTING	ROOM 3
ID 1308	Shaking table tests on unreinforced load-bearing masonry structures › **C. Mordant**, C. Taylor, M. Dietz, L. Vasseur, H. Degée	
ID 897	Flexural deformations of URM piers: Comparison of analytical models with experiments › **S. Petry**, K. Beyer	
ID 1472	Seismic risk evaluation aided by IR thermography › P. Bison, G. Cadelano, A. Mannella, L. Milano, **A. Petracca**	
ID 1630	Seismic response of a 4 storey building with reinforced concrete and unreinforced masonry walls › **K. Beyer**, M. Tondelli, S. Petry, S. Peloso	
ID 1342	Earthquake induced permanent displacements of ancient retaining walls › **D. Egglezos**	

JULY 07	› Chairman: Marcio Ramalho	
14:40-16:00	MASONRY MATERIALS AND TESTING	ROOM 4
ID 1559	The use of crushed brick as an aggregate replacement in concrete › **D. Alterman**, A.W. Page, L. Dean	
ID 1305	Control method to determine the joint mortar strength of concrete block masonry with scratch › **T. Hasegawa**, O. Senbu	
ID 1279	Quantifying the benefits of lime additions in cement based mortars › **A. Smith**, F. Verhelst, C. Denayer, R. Givens	
ID 1017	Conserving Scotland's built heritage: a petrographic investigation on the effects of de-icing salts on Scottish sandstones › **C. Graham**, M. Lee, V. Phoenix, M. Young	
ID 1620	An experimental comparison of hydrated lime and an admixture for masonry mortars › **P. Walker**, S. Kioy, A. Jowsey	

ID 1417	Experimental study on masonry infill walls under blast loading › **J. Pereira**, J. Campos, P.B. Lourenço

JULY 07	
16:00-16:30	COFFEE BREAK
	Students Challenge Poster Session

PARALLEL SESSIONS

JULY 07	› Chairman: Francesca Da Porto	
16:30-18:00	SPECIAL SESSION: MASONRY INFILLS AND EARTHQUAKES	AUDITORIUM
MIE 1	Innovative systems for earthquake resistant masonry enclosures in RC buildings › A.B. Dias, **F. Da Porto**, E. Fehling, P.B. Lourenço, P. Morandi, E. Vintzileou, A.Yakut	
MIE 6	Seismic risk of buildings with RC frames and masonry infills from Timisoara, Banat region, Romania › M. Mosoarca, C. Petrus, V Stoian, A. Anastasiadis	
MIE 2	INSYSME: First activities of the German partners › C. Butenweg, **U. Meyer**, E. Fehling	
MIE 3	In-plane experimental response of strong masonry infills › **P. Morandi**, S. Hak, G. Magenes	
MIE 4	Experimental testing and numerical modelling of infill masonry walls subjected to in-plane damage › **N. Verlato**, G. Guidi, F. Da Porto	
MIE 5	Numerical modelling of masonry-infilled reinforced concrete frames: Model calibration and parametric study › **F. Akhoundi**, P.B. Lourenço, G. Vasconcelos	

JULY 07	› Chairman: Alberto Taliercio	
16:30-18:00	ANALYSIS OF MASONRY STRUCTURES	ROOM 1
ID 1277	Geometric comparison of two periods' masonry design and assembly: early Ottoman domes and recent parametric walls › **B. Kurtuluş**, D. Üçer, Ö. Bakirer, S.T. Elias-Ozkan	
ID 1606	Discussion about three-dimensional modeling of masonry arches in ABAQUS and its comparison with mechanisms theory › **R. Goñi**, I. De Arteaga, P. Morer	

ID 1449	Numerical modelling of masonry shear walls failure mechanisms › A. Drougkas, **L. Pelà**, P. Roca
ID 1370	Discrete element modelling of the archaeological colonnade in Pompeii › V. Giamundo, **V. Sarhosis**, G.P. Lignola, E. Cosenza
ID 1275	Numerical micro-modeling simulation of masonry in compression › **A. Drougkas**, P. Roca, C. Molins
ID 1599	Interaction of in plane-out plane masonry walls › **A. Bakhshi**, A. Soleimanzadeh, M. Yekranhnia

JULY 07	› Chairman: Hipólito Sousa
16:30-18:00	MASONRY AND BUILDING PHYSICS — ROOM 2
ID 1545	A numerical study of the hygric performance of a masonry wall › **E. Vereecken**, S. Roels
ID 1216	Determination of water content in solid brick masonry walls using a dielectric probe › **P.K. Larsen**
ID 1306	Sensitivity analysis of the thermal resistance of masonry through numerical simulations of laboratory tests › **H. Sousa**, R. Sousa
ID 1522	Long-term monitoring of salt movement in masonry materials › **J. Frick**, E. Gabrielli, C. Colla, F. Grüner
ID 1107	Thermal effectiveness of low emissivity coatings in hollow bricks: a numerical analysis for different cavity concentration › S. Fantucci, **V. Serra**, A. Martinelly
ID 1267	Recognition of a historical library by an approach toward construction technology › **A. Yousefnezhad**

JULY 07	› Chairman: Carl-Alexander Graubner
16:30-18:00	INNOVATION AND SUSTAINABILITY OF MASONRY — ROOM 3
ID 1366	Innovation in construction of stone vaults: The cathedral of šibenik (15th – 16th C.) › **M. Šimunić Buršić**
ID 1551	Lateral load behaviour of clay masonry façade with advanced wood framing › M. Mcginnis, M. Gangone, **B. Weldon**, E. Wosick
ID 1250	Performance of monolithic external masonry walls made with thermal-insulating clay blocks › **T. Kranzler**

ID 1460	Durability to marine environment of innovative products for consolidation and chromatic reintegration of historical renders › M. Matos, G. Borsoi, **R. Veiga**, P. Faria, A.S. Silva
ID 1361	Comparison between cementitious and geopolymeric mortars with the same mechanical strength class › **A. Mobili**, M. Bitetti, F. Tittarelli
ID 1558	A measure for the dynamic thermal performance of walling systems incorporating the combined effect of thermal mass and thermal resistance › **D. Alterman**, A.W. Page, T. Moffiet, B. Moghtaderi

JULY 07	› Chairman: Mark Masia	
16:30-18:00	MASONRY MATERIALS AND TESTING	ROOM 4
ID 1443	The modelling of water grout transfer into masonry walls units › **L.A. Pereira-de-Oliveira**	
ID 1524	Evaluation of mechanical and hydric performances of masonry walls composed of earth bricks, geopolymer binder and wood. › **F. Fouchal**, F. Gouny, P. Maillard, L. Ulmet, S. Rossignol	
ID 1396	Experimental study of rubble stone masonry specimens › **J. Milosevic**, M. Lopes, R. Bento, A.S. Gago	
ID 1276	EN 1015-11 and EN 1015-12: proposal updating for lime products › C. Airaghi, D. Botteon, G. Canziani, M. Dalpiaz, S. Grimaldi, M. Ludovisi, **F. Milani**, R. Ricci	
ID 967	Comparison of the results from various evaluation methods of frost resistance of burnt bricks › **O. Senbu**, T. Hasegawa	
ID 1314	Compressive capacity and behaviour of concrete and ceramic masonry prisms › **F.S. Fonseca**, H.R. Roman, M. Mohamad, R.J.K. Mendes, R.H. Romagna	
ID 1621	Cyclic in-plane experimental tests for evaluation of shear capacity of brick masonry walls › **E. Partene**, V. Stoian, M. Mosoarca, L. Fekete-Nagy	

JULY 08	› Chairman: Pere Roca
9:00-9:40	KEYNOTE — AUDITORIUM
	Resilient reinforced concrete block shear wall systems for the next-generation of seismic codes › **Wael El-Dahkakni**

PARALLEL SESSIONS

JULY 08	› Chairman: Pere Roca
9:40-10:30	CASE STUDIES — AUDITORIUM
ID 1422	The use of bricks in the Italian architecture of late 1930s: references and evocations to ancient Rome › A. Maahsen-Milan, **E. Pietrogrande**
ID 1380	Evaluation of pathological manifestations in buildings of the program of rental residential executed in structural masonry › **M.C.S. Alvarenga**, R.C.S.R. Alvarenga, J.L.R. Paes, R.S.C. Silva, M. Roberto
ID 1401	The behaviour of historical buildings in seismic zones: Three cases of masonry constructive typologies in Valparaiso › **M. Hurtado**, T. Jimenez
ID 1478	Characterization of masonry materials of Pavia's barracks to diagnose the alterations originated after the rehabilitation works › E. Menéndez, **A.M. Álvaro**

JULY 08	› Chairman: Nigel G. Shrive
9:40-10:30	ANALYSIS OF MASONRY STRUCTURES — ROOM 1
ID 1052	A transient-gradient enhanced non-local model for the failure of brick masonry › A. Jelvehpour, **M. Dhanasekar**
ID 1379	Low unit strength masonry: Computational modelling approaches › V. Giamundo, V. Sarhosis, **G.P. Lignola**, Y. Sheng, S. Garrity, G. Manfredi
ID 1414	Quantification of parameters for the evaluation of the geometric irregularity of stone masonry walls › **C. Almeida**, J.P. Guedes, A. Arêde, A. Costa
ID 1568	Application of non-destructive electrochemical techniques for the corrosion evaluation in metal reinforced masonry structures › **S. Ramos**, I. Martínez

JULY 08	› Chairman: David Biggs
9:40-10:30	MASONRY AND BUILDING PHYSICS — ROOM 2
ID 867	Transport of pore fluid in plastered brick masonry regarding long-term rising damp › **K. Kaminski**
ID 1444	Analysis and grouting of severely fragmented brickwork of the Aula Magna, the prestigious banqueting hall of the former palace of Coudenberg, Brussels, Belgium › **R. Hayen**, S. Godts, H. De Clercq
ID 1525	Retrofitting vapour permeable insulation to traditional brick and stone masonry › **M. Jenkins**

JULY 08	› Chairman: Katrin Beyer
9:40-10:30	EARTHQUAKE RESISTANCE AND RETROFITTING — ROOM 3
ID 1591	Study on the seismic behaviour of St. Peter the apostle church of Andahuaylillas in Cusco, Peru › **R. Marques**, S. Ivancic, C. Briceño, R. Aguilar, R. Perucchio, J. Vargas
ID 1624	Strengthening of masonry infill walls under out-of-plane loading with textile reinforced mortar (TRM) › **A. Martins**, G. Vasconcelos, R. Fangueiro, F. Cunha
ID 1375	Full-scale seismic testing of modern unreinforced thermal insulation clay block masonry houses › L. Mendes, P. Candeias, A. Correia, A.C. Costa, E. Coelho, **A. Jäger**, S. Lu, H. Degée, C. Mordant
ID 1332	In-situ testing of wall-to-diaphragm shear transferring connections in an existing clay brick URM building › **I. Giongo**, D. Dizhur, R. Tomasi, J. Ingham

JULY 08	› Chairman: Sriman K. Bhattacharyya
9:40-10:30	MASONRY MATERIALS AND TESTING — ROOM 4
ID 1484	Static behaviour of earth block masonry: experimental testing and finite element modelling › **L. Miccoli**, A. Garofano, P. Fontana, U. Müller
ID 894	Innovative materials and technologies used for modern masonry in Romania › **C.L. Matei**
ID 1419	Effect of mortar water content in the properties of masonry › A. Costigan, **S. Pavia**
ID 1496	Calibration of brick-masonry material parameters through inverse analysis and proper orthogonal decomposition › C. Corrado, **L. Macorini**, A. Lorenzo, C. Amadio, B.A. Izzuddin

11:00-11:30	COFFEE BREAK
	Poster Session 1

PARALLEL SESSIONS

JULY 08	› Chairman: G. Vasconcelos and Luis Bragança
11:00-12:30	SPECIAL SESSION: SUSTAINABILITY AND ECO-MATERIALS — AUDITORIUM
SEM 1	Masonry - a sustainable building material › **C.-A. Graubner**, S. Pohl
SEM 2	Influence of non-compliant fly ashes in air-lime mortars › **A.B. Mana**, F. Pinho
SEM 3	Assessing the materiality of stone › **D. Ioannidou**, S. Zerbi, G. Habert
SEM 4	Environmental footprint study of mortars, renders and plasters formulations with no, low or high hydrated lime content › T. Schlegel, **A. Shtiza**
SEM 5	Eco-wall modular solutions for buildings › M. Amado, F. Pinho, P. Faria, **I. Ramalhete**

JULY 08	› Chairman: Wael El-Dakhakhni
11:00-12:30	ANALYSIS OF MASONRY STRUCTURES — ROOM 1
ID 1506	A Finite element modelling method for thin layer mortared masonry systems › **S. Nazir**, M. Dhanasekar
ID 1303	Shear load bearing capacity of straight reinforced lintels considering the composite effect of reinforced concrete ceilings above › **E. Gunkler**, J.J. Marx, D. Beyer
ID 1632	A numerical model to assess the dynamic response of out-of-plane loaded one-way spanning URM walls connected to flexible diaphragms › **H. Derakhshan**, M. Griffith, J. Ingham
ID 1336	Modelling and buckling failure of load bearing walls › C. Sandoval, **P. Roca**, J.M. Adam, J. Garzón-Roca
ID 1390	Behaviour of unreinforced masonry columns subjected to eccentric compression in one and in two directions › **J.K. Klouda**
ID 1258	Thermal break with cellular glass units in load-bearing masonry walls › **D.R.W. Martens**

ID 1570	Structural behaviour of Persian brick masonry minarets due to change of temperature and fire › **M. Hejazi**, M. Daei, S.M. Moayedian, S. Mohammad, B. Hejazi

JULY 08	› Chairman: Wolfram Jäger	
11:00-12:30	CASE STUDIES	ROOM 2
ID 1053	Evaluation of decay on historic masonry building facades, case study: Deira and Bur Dubai › **S. Gunay**	
ID 1499	Waste and productivity of gypsum block partition masonry wall on construction of multi-storey building › E. Araújo, **A. Lordsleem Jr.**	
ID 1628	Workflows in masonry construction: analysis of labor requirements › **L. Florez**, D. Castro-Lacouture, R. Gentry	
ID 1331	Shear strength of an early XX century masonry building: Comparison among different testing techniques › **C. Mazzotti**, E. Sassoni, V. Rinaldini	
ID 1428	Rehabilitation of the old alcohol factory of Ribeira Grande for use of the contemporary arts centre of Azores › H. Sousa, **J. Botelho**	

JULY 08	› Chairman: Humberto Varum	
11:00-12:30	EARTHQUAKE RESISTANCE AND RETROFITTING	ROOM 3
ID 1363	Seismic vulnerability analysis of a complex building aggregate in villa Santa Lucia degli Abruzzi, Italy › **L.M. Roth**	
ID 1592	Analysing masonry research data in matrix form › **P. Dillon**, F. Fonseca	
ID 1501	Mitigating out-of-plane failure of unreinforced masonry walls by restraining geometrical axial elongation › **Y. Sanada**, H. Yulia, T. Tomonaga, T. Kanada	
ID 1280	Experimental tests on typical masonry of Messina area (Italy) retrofitted with CAM: A full scale arch › C. Cilia, P. Colajanni, R. Marnetto, A. Recupero, **N. Spinella**	
ID 1654	Response of a reinforced concrete block shear wall structure to simulated earthquake loading › P. Heerema, M. Shedid, **W. El-Dakhakhni**	

ID 1598	Development of fragility curves of confined masonry buildings › A. Bakhshi, **M.H. Ahmadi**, M. Yekrangnia
ID 1442	Evaluation of seismic code regulations on typical veneer walls › **K.V. Høiseth**, A.M.Y. Hamed, T. Kvande

JULY 08	› Chairman: Jan Kubica
11:00-12:30	MASONRY MATERIALS AND TESTING — ROOM 4
ID 931	Numerical and experimental analysis of cracks and rupture mode for concrete block small walls › **M. Ramalho**
ID 1614	Reassessment of some code parameters of structural masonry › L.M.F. Oliveira, **M.R.S. Corrêa**
ID 1320	Possible weathering of the brick matrix when exposed to water with different ph › **I. Rörig-Dalgaard**
ID 1293	Effective utilization of demolished brick masonry in building products › A.S. Manjunath, B.M. Somanath, **M.V. Renukadevi**, K.S. Jagadis
ID 1252	Crack safety of non-load-bearing partition walls made of autoclaved aerated concrete › **M. Graubohm**, W. Brameshuber
ID 1382	Characterization of binding lime mortar used in the ruins of Anba Bishoi monastery near Sohag (Egypt) › **A. Osman**, W. Bartz, J. Kosciuk
ID 1261	Effect of ceramic block geometry on efficiency of masonry structures › **M. Gihad**, F.S. Fonseca, E. Rizzatti, H.R. Roman, R. Portella

12:30-14:00	LUNCH	UNIVERSITY CAMPUS RESTAURANT

PARALLEL SESSIONS

JULY 08		
14:00-16:00	INDUSTRIAL CHALLENGES SESSION	AUDITORIUM
	Panel: › Fabio Campora, Brazilian Association of Industrialized Mortars › Cliff Fudge, European Autoclaved Aerated Concrete Association › Antonio Caballero González, European Calcium Silicate Unit Producers Association & European Mortar Industry Organisation › Frederik Verhelst, European Lime Association › Alfonsina Di Fusco, Italian National Association of the Brick Industry › John Chrysler, Masonry Institute of America › Victor Coias e Silva, Portuguese Heritage Guild (GECORPA)	
IC1	Industrial challenges for the European AAC association › C. Fudge	
IC2	Product information – the regulatory and societal challenge not only for the calcium silicate masonry industry › A.C. González	
IC3	The case of lime by EuLA › E. Despotou, F. Verhelst	
IC4	The Italian industry of clay bricks provides earthquake-resistant masonry validated by research › A.A. Di Fusco, G. D'Anna	
IC5	Industrial challenges – United States › J. Chrysler	
IC6	GECORPA: Promoting change in the construction sector › V. Cóias	
IC7	An outlook on the typical residential buildings in Brazil › F.L. Campora	

JULY 08	› Chairman: Jason Ingham	
14:00-16:00	ANALYSIS OF MASONRY STRUCTURES	ROOM 1
ID 1290	Engineering model for the load bearing capacity of unbonded pre-stressed calcium silicate masonry walls › **O. Dashkhuu**, E. Gunkler	
ID 1461	The effect of stereotomy on the shape of the thrust-line and the minimum thickness of masonry arches › N. Makris, **H. Alexakis**	

ID 1377	Masonry columns behavior analyses due to a different mode of confinement with GFRP straps › **J. Galić**, H. Vukić, I. Kalafatić
ID 2002	Validation of limit analysis of masonry structures through comparison with experimental tests results in real scale › **G. Brandonisio**, E. Mele, A. De Luca
ID 1397	Masonry response to tunnelling: A sensitivity study on the effect of cracking and building weight › **G. Giardina**, M. DeJong, R. Mair
ID 1566	Modeling reinforced concrete building frames with infilled masonry › M.O. Soriani, **G.A. Parsekian**
ID 1456	A fibre beam element for equivalent frame modelling of masonry buildings › E. Raka, V. Sepe, **E. Spacone**
ID 1583	Contribution of 3D documentation on structural evaluation: The cistern of Hagia Thecla basilica › **U. Almac**, I.P. Pekmezci, M. Ahunbay
ID 1077	Quality control of masonry execution according to different building codes › **E.S. Fortes**, R.L. Canato, G.A. Parsekian
ID 1629	Thermal stress generated in masonries by stiff and flexible bonding materials › **B. Zając**, A. Kwiecień

JULY 08	› Chairman: Barry Haseltine	
14:00-16:00	CONSERVATION AND HISTORIC BUILDINGS	ROOM 2
ID 1109	Application of operational modal analysis method in the monastery of San Jerónimo (Seville, Spain) › P. Pachon, **A. Sáez**, M. Cámara, M.E. Rodriguez-Mayorga, V. Compán	
ID 1657	The elastic connection systems between domes and vertical supporting elements in 16th century Ottoman masonry structures and their problems of conservation › C. Binan, **E.T. Sipahioglu**	
ID 1322	Seismic assessment of Christchurch catholic basilica, New Zealand › **L.C. Silva**, P.B. Lourenço, N. Mendes	
ID 1601	Stratified masonry building and cracks analysis: A case study › P. Corradini, L. Balboni, **C. Di Biase**	
ID 1581	Moisture distribution, structural monitoring, and decorative plaster conservation: The adobe church at mission Tumacacori, USA › **A. Bass**, D. Porter	

ID 946	Restoration and conservation of the heritage: The Cross of Lavras Novas (MG) rebuilt by stonework extension program › F.L Pereira, **F.C. Nogueira**, L.M. Pereira, B.A. Machado, C.A. Pereira
ID 942	Conservation of the Sandstone Façade of the Minster of Salem – Long Term Observation › **A. Kieferle**
ID 1266	Masonry architecture in Baroque Naples: the church of San Giuseppe delle Scalze between degradation and prospects for restoration › **R. Picone**, A. Spinosa, L. Veronese
ID 1103	Criteria for the selection and processing of a stone for replacements and repairs of ashlar masonry › **J. Bláha**, M. Panáček, S. Chamra, K. Kovářová, T. Rafl
ID 1218	Relations between measurable properties of reparation mortars and the practical application methods used by the masons › **A. Velosa**, A. Haugen

JULY 08	› Chairman: Guido Magenes	
14:00-16:00	EARTHQUAKE RESISTANCE AND RETROFITTING	ROOM 3
ID 1523	Seismic retrofitting of three-leaf stone masonry walls by means of grouting and NSM glass cords › M. Kržan, M. Masia, V. Bokan-Bosiljkov, **V. Bosiljkov**	
ID 1295	Seismic behaviour of vernacular masonry buildings during 2010 and 2011 earthquakes in Turkey › A.O. Kuruscu, D.Güney, **G. Arun**	
ID 1234	Historical palaces, combined actions for safety evaluation and recently developed solutions for seismic retrofitting › **A. Viskovic**, P. Carusi, L. Antonelli	
ID 1584	Stress-strain relationship for concrete block masonry boundary element columns › A. Abo El Ezz, H.S. Eldin, **K. Galal**	
ID 1491	Improvement of unreinforced masonry wall panels shear strength using NSM CFRP strips › **D. Dizhur**, M.C. Griffith, J.M. Ingham	
ID 1309	Stability and stiffness contribution of the masonry in the Borbone anti-seismic system › S. Galassi, **N. Ruggieri**, G. Tempesta, R. Zinno	
ID 1334	Seismic performance of full-scale brick masonry buildings › **A. Chourasia**, S.K. Bhattacharyya, N.M. Bhandari, P. Bhargava	

ID 1356	Cyclic in-plane shear behaviour of unreinforced masonry walls with openings: Design of experimental testing programme › **C. Allen**, M.J. Masia, A.W. Page
ID 1585	Seismic reinforcement techniques for old buildings walls › **A.I. Marques**, P.X. Candeias, M.R. Veiga, J. Ferreira
ID 1640	Seismic Strengthening of historical masonry houses in seismic prone areas using EN 1998-3 › **F. Karantoni**, F. Lyrantzaki

JULY 08	› Chairman: Humberto R. Roman	
14:00-16:00	MASONRY MATERIALS AND TESTING	ROOM 4
ID 1517	Quick assessment of indoor radioactivity levels of granite historical buildings of Braga (NW Portugal) › M. Lima, J. Sanjurjo-Sánchez, **C. Alves**	
ID 1045	Analysis of the process of production of ceramic blocks for structural and non-structural masonry – Case study › **F.C.Z. Júnior**, C. Fuad, R.A. Oliveira	
ID 1359	The drilling resistance test in the characterization of lime mortar renders in multilayer system › **R. Nogueira**, A.P.F. Pinto, A. Gomes	
ID 1440	Experimental and numerical study on the determination of masonry compressive strength by means of cores › E. Sassoni, **C. Mazzotti**	
ID 1421	Direct sonic and ultrasonic wave velocity in masonry under compressive stress › **E. Manning**, L.F. Ramos, F.M. Fernandes	
ID 1368	The fortress of Sagres: A two-phase rehabilitation process › **J.N. Bastos**	
ID 1555	Mechanical characterization of the constituent materials of stone arch bridges › **C. Costa**, A. Arêde, A. Costa	
ID 1530	Manufacture of soil cement bricks through addition of pet (polyethylene terephthalate) wastes › J.A.P. Filho, **A.J.G. Dia**, J.H. Storopoli	
ID 1556	Physical, pozzolanic and chemical properties of bricks of Karacahisar Castle Gate, Turkey › **I. Güldoğan**, Y. Güney, M.E. Altınsapan	

ID 1350	Evaluation of the effect of compliant contact layers on the measurement of thermal conductivity of cement and concrete specimens › **N. Patterson**, S. Nyoon, M.S. Imbabi, D.E. Macphee

16:00-16:30	COFFEE BREAK
	Poster Session 2

PARALLEL SESSIONS

JULY 08	› Chairman: Mariana Correia and Daniel V. Oliveira
16:30-18:00	SPECIAL SESSION: EARTHEN ARCHITECTURE — AUDITORIUM
ID 682	The new German standards for earth blocks and earth masonry mortar › **H. Schroeder**, C. Ziegert, P. Fontana
ID 972	Numerical analysis of Brazilian traditional rammed earth masonry › **M.H.Y. Sato**, R.M.L.R.F. Brasil
ID 1631	Choosing a mason (Lyela Country, Burkina Faso) › **L. Pecquet**
ID 2009	Numerical analyses of the in-plane response of unreinforced and reinforced adobe walls › **N. Tarque**, G. Camata, M. Blondet, E. Spacone, H. Varum
ID 981	Experimental characterization of Italian adobe bricks reinforced with straw fibres › **F. Parisi**, D. Asprone, L. Fenu, A. Prota
ID 2010	Shear behaviour of rammed earth walls repaired by means of grouting › **R.A. Silva**, D.V. Oliveira, L. Schueremans, T. Miranda, J. Machado

JULY 08	› Chairman: Paulo B. Lourenço
16:30-18:00	ANALYSIS OF MASONRY STRUCTURES — ROOM 1
ID 1412	Vulnerability of masonry arches under increasing embrace displacements › S. Coccia, **F. Di Carlo**, U. Ianniruberto, Z. Rinaldi
ID 1504	Warning signs of impending failure of historical masonry structures › J.J. Kim, T. Fan, M.M.R. Taha, N.G. Shrive
ID 1452	Seismic response of masonry vaulted structures: Experimental and numerical modelling › **M. Rossi**, C. Calderini, S. Lagomarsino, G. Milani
ID 1325	Arch stability assessment for maintenance and inspection purpose › **A. Zanaz**, F. Fouchal, S. Yotte, A. Chateauneuf

ID 852	Assessment of damage induced in masonry structures by soil subsidence using physical modelling › H.-L. Nghiem, F. Emeriault, **M. Al Heib**
ID 1416	Analysis of masonry arch bridges using DEM with two distinct mesh generations › **G.A.F. Rouxinol**, M.J.C. Morais
ID 857	A method of cells-type approach to estimate the macroscopic elastic and creep coefficients of brick masonry › **A. Taliercio**

JULY 08	› Chairman: António Arêde
16:30-18:00	CONSERVATION AND HISTORIC BUILDINGS — ROOM 2
ID 1508	Physical and mechanical characterisation of lime mortars used in the rehabilitation of historic buildings by means of non-destructive testing › **Y. Boffill**, H. Blanco, I. Lombillo, L. Villegas, C. Thomas
ID 1323	Energy efficiency and conservation of cultural values at “Portici” houses of Bolzano › **E. Lucchi**, D. Exner
ID 993	Jointly measuring moisture and salts in old masonry by means of permanent sampling points › **E. Franzoni**, S. Bandini, G. Graziani, A. Fregni
ID 1618	Historic masonry of middle ages in Sardinia: Materials and building techniques as motivating reasons for iconographic choices › **A. Cazzani**, S. Columbu, A. Ruggieri
ID 1547	The structures of historic bridges in mixed masonry. The reconstruction of Ponte Navi and Ponte Pietra of Verona (1758-61) › **M. Cofani**
ID 1590	Preliminary structural assessment of adobe archaeological remains of “Huaca De La Luna” In Trujillo, Peru › C. Chácara, F. Zvietcovich, **R. Aguilar**, R. Perucchio, R. Marques, B. Castañeda, S. Uceda, R. Morales
ID 1622	Experimental tests for the evaluation of shear strength of spandrels in ordinary masonry › **B. Calderoni**, E.A. Cordasco, P. Lenza, G. Pacella Gaetana

JULY 08	› Chairman: Michael Griffith
16:30-18:00	EARTHQUAKE RESISTANCE AND RETROFITTING — ROOM 3
ID 1090	Influence of timber lintels on the cyclic behaviour of stone masonry spandrels › **F. Graziotti**, A. Penna, G. Magenes

ID 1492	Observations on out-of-plane behaviour of URM walls in buildings with RC slabs › **M. Tondelli**, K. Beyer
ID 1502	Seismic strengthening of brick masonry walls with flexible polymer coating › **M. Gams**, A. Kwiecień, B. Zając, M. Tomaževič
ID 248	Static and cyclic experimental study of the out-of-plane bending behaviour of dry and mortar bound masonry walls › E. Bultot, **H. Degee**, L. Van Parys
ID 1413	Out-of-plane response of masonry infill walls › L. Liberatore, **M. Pasca**
ID 1197	Comparison of the seismic behaviour between three building tests, all based on a two storey model house › **J. Adell**, B. Orta, R. Bustamante, S. Martínez, B. Orenes
ID 2001	Pushover analysis of masonry buildings: Comparison of different modelling through four case studies › G. Brandonisio, A. Mazziotti, G. Giuseppe, E. Mele, **A. De Luca**

JULY 08	› Chairman: Shelley Lissel	
16:30-18:00	MASONRY MATERIALS AND TESTING	ROOM 4
ID 1269	Influence of mortar composition on masonry creep › S. Kioy, **P. Walker**, R. Ball, P. Ulrike, F. Verhelst	
ID 971	Laboratory tests on a masonry arch bridge under vertical and horizontal loading - Optimisation of monitoring concepts › A. Krawtschuk, O. Zeman, **J. Schellander**, T. Zimmermann, A. Strauss	
ID 1463	Experimental study on RC and steel frames with SIM infill › **Z. Wang**, Y. Totoev, K. Lin	
ID 1425	Numerical modelling of confined masonry walls subjected to cyclic shear experimental tests › N. Cavalagli, **F. Cluni**, V. Gusella	
ID 836	A performance-based method for granular-paste mix design › **H. Hoornahad**, E.A.B. Koenders	
	Bond stress-slip behaviour of FRP materials bonded to masonry elements › **M. Leone,** M.S. Sciolti, F. Micelli, M.A. Aiello	
ID 2007	Behaviour of SFRG and polyurethane reinforced concrete block assemblages in Shear › **R.T. Harris**, S. Lissel	

JULY 09	› Chairman: Gianmarco de Felice
9:00-9:40	KEYNOTE — AUDITORIUM
	Bond behaviour and durability of FRP composite applied externally to masonry structures › **Daniel V. Oliveira**, B. Ghiassi, P.B. Lourenço

PARALLEL SESSIONS

JULY 09	› Chairman: Manuela Almeida and Sonja Geiger
09:40-10:30	SPECIAL SESSION: ENERGY EFFICIENCY — AUDITORIUM
EE 2	Holistic strategies for the refurbishment to achieve energy-efficient residential buildings › **S. Geier**, D. Ehrbar, P. Schwehr
EE 1	Smart energy efficient active buildings: Opportunities for renewables in masonry buildings › **A. Knotzer**
EE 3	Energy performance of concrete earth tubes for the pre-heating and pre-cooling of supply air in cold climate › B. Ouazia, **M. Tardif**, N. Birgitta, L. Mike, D. Booth
EE 5	Theoretical and experimental characterization of thermal dynamic wall performance › **M. Perino**, A. Capozzoli, Y. Cascone

JULY 09	› Chairman: Daniel Quiun
09:40-10:30	ANALYSIS OF MASONRY STRUCTURES — ROOM 1
ID 1255	Structural response of Ortakoy Buyuk Mecidiye mosque in Istanbul › **M. Alaboz**, I.E. Bal, M.Kutanis
ID 1055	Multi-scale modelling and damage analysis of complex masonry walls › **M.M. Díaz**, D.G. Carrera
ID 1550	Analytical models for seismic assessment and strengthening of masonry arches › G. Monti, M. Vailati, **A. Gaetani**, A. Paolone
ID 1091	Numerical simulation of the experimental seismic response of unreinforced stone masonry buildings with stiffened diaphragms and improved wall-to-diaphragm connections › **A. Penna**, I. Senaldi, A. Galasco, G. Magenes

JULY 09	› Chairman: Rafael Aguilar
09:40-10:30	EARTHEN CONSTRUCTION — ROOM 2
ID 1000	Typological analysis of mixed rammed earth walls in monumental buildings in Castilla y León, Spain › **M.R. Muñoz**, J.S.J. Alonso
ID 1466	Mechanical characterization of dry-stack interlocking compressed earth masonry › **T. Sturm**, L.F. Ramos, P.B. Lourenço, A. Campos-Costa
ID 1388	Spectral-based damage identification technique on an earthen mock-up construction tested on a shaking table › **M.G. Masciotta**, P.B. Lourenço, L.F. Ramos, M. Vasta, T. Sturm, A. Campos-Costa
ID 916	Flexure study on adobe walls reinforced with polymeric geogrids › D. Torrealva, **P. Santillán**

JULY 09	› Chairman: Giancarlo Marcari
09:40-10:30	CODES AND STANDARDS TRAINING AND EDUCATION IN MASONRY — ROOM 3
ID 1301	Teaching concrete masonry unit construction › **A. Luescher**
ID 1516	Learning Earthen Masonry Basics › **G. VIlla Garcia**, F. Ginocchio, U. Tejada
ID 1529	Education and art for children › C.G.M. Alfagali, **B.A. Machado**, F.G. Silva, C.A. Pereira
ID 1278	Committee for European standardisation: technical committee 125test method development: The first 25 years › **G. Edgell**

10:30-11:00	COFFEE BREAK
	Poster Session 3

PARALLEL SESSIONS

JULY 09	› Chairman: Manuela Almeida and Sonja Geiger
11:00-12:30	SPECIAL SESSION: ENERGY EFFICIENCY — AUDITORIUM
EE 6	Cost effective renovation strategies to strive for zero energy or emission buildings › **W. Ott**, R. Bolliger

EE 7	Cost effective energy and carbon emission optimization of buildings renovation shown in an Austrian case study › **D. Venus**, K. Höfler
EE 8	Dynamic simulation of natural ventilation and impacts on energy and comfort in dwellings › **A.M. Rodrigues**, M.G. Gomes
EE 9	Thermal behaviour of GFRP sandwich panels for building applications › **P. Fernandes**, M.G. Gomes, A.M. Rodrigues
EE 11	In situ evaluation of the thermal performance of rammed earth walls › **S. Sampaio**, M.G. Gomes, A.B. Abel
EE 12	Performance of industrial thermal insulation renders › H. Vale, H. Melo, **A. Soares**, I. Flores-Colen, M.G. Gomes
EE 13	Cost optimality ranking of building renovation measures for the Portuguese building stock › M. Ferreira, **M. Almeida**, A. Rodrigues

JULY 09	› Chairman: Jürgen Frick	
11:00-12:30	ANALYSIS OF MASONRY STRUCTURES	ROOM 1
ID 1520	Out-of-plane behaviour of masonry walls strengthened with a GFRP reinforced mortar coating › **N. Gattesco**, I. Boem	
ID 1534	Numerical modelling of reinforced concrete block structural walls under seismic loading › **M. Ezzeldin**, L. Wiebe, M. Shedid, W. El-Dakhakhni	
ID 1497	Progressive collapse assessment of infill frame structures using mesoscale modelling › **F.B. Xavier**, L. Macorini, B.A. Izzuddin	
ID 1507	Nonlinear analysis of masonry arches using mesoscale partitioned modelling › **Y. Zhang**, L. Macorini, B.A. Izzuddin	
ID 1378	Influence of different masonry designs of refractory bottom linings › **A. Gasser**, E. Blond, J.-L. Daniel, K. Andreev	
ID 1532	Architectural morphology of masonry houses in Ba pinar rural settlement › **Y. Hakan**, Ç. Aynur	

JULY 09	› Chairman: Vlatko Bosiljkov	
11:00-12:30	REPAIR AND STRENGTHENING	ROOM 2
ID 1082	Masonry building in Pernambuco - Brazil: Current situation and perspectives › F.A. Silva, **R.A. Oliveira**, C.W.P. Sobrinho	
ID 1487	Techniques of reinforced resistant masonry in buildings – a technical and economic analysis case › **C.W.P. Sobrinho**, C.Q. Monteiro	
ID 1511	Development of retrofitting solutions: Remedial wall ties for masonry enclosure brick walls › S. Ribeiro, **R. Vicente**, H. Varum, J. Graça, B. Lobo, T.M. Ferreira	
ID 1509	Continuous basalt fibre stitching for dry masonry strengthening: First experimental results › F. Monni, **E. Quagliarini**, S. Lenci	
ID 2003	CIB guide for the structural rehabilitation of heritage buildings › **S. Pompeu-Santos**	

JULY 09	› Chairman: Tore Kvande	
11:00-12:30	RELIABILITY AND PERFORMANCE FIRE RESISTANCE	ROOM 3
ID 1274	Modelling time-to-cracking in brick masonry with corroding bed joint reinforcement › **O. Larsson**, M. Molnár	
ID 1540	Tie-columns effect on the performance of confined brick walls due to cyclic lateral loads › **A. Bourzam**, T. Ikemoto, S. Fukada, M. Miyajima	
ID 1231	Additions of cactus fibers in lime mortars for architectural heritage restoration › M.A. Sánchez, **W.M. Molina**, E.M.A. Guzmán, H.L.C. García, C.L. Gómez, A.A.T. Acosta, J.A.B. Arroyo	
ID 1571	Wall tie research for existing and new structures: Literature study › **M.G. Kobesen**, A.T. Vermeltfoort, S.G.C. Mulders	
ID 1027	Fire resistance of vertically perforated clay unit masonry › **U. Meyer**	
ID 1563	Digital image correlation for damage state identification in reinforced masonry buildings › **A. Ashour**, P. Heerema, M. Shedid, W. El-Dakhakhni	

12:30-14:00	LUNCH	UNIVERSITY CAMPUS RESTAURANT

JULY 09	› Chairman: Josep Adell	
14:00-14:40	KEYNOTE	AUDITORIUM
	Mixed masonry in historic buildings: Architecture and technology synthesis › **Victor Mestre, Sofia Aleixo**	

PARALLEL SESSIONS

JULY 09	› Chairman: Josep Adell	
14:40-16:00	ARCHITECTURE WITH MASONRY	AUDITORIUM
ID 1641	Perforated masonry – lightweight construction › **S. Ortlepp**, F. Schmidt	
ID 1351	Masonry structures in the medieval towers of San Gimignano, Italy › **P. Matracchi**	
ID 1503	Herringbone, Gualandrino and Brunelleschi's bricks › **A. Pizzigoni**	
ID 1367	The sixteenth century milreu rural house rehabilitation › **J.N. Bastos**	
ID 1302	Cappadocia region vernacular architecture in the context of conservation and sustainability of traditional masonry structures › **D.U. Binan**	

JULY 09	› Chairman: Vladimir G. Haach	
14:40-16:00	ANALYSIS OF MASONRY STRUCTURES	ROOM 1
ID 1493	Seismic assessment of 'gaioleiro' buildings in Lisbon › **A. Simões**, R. Bento, S. Cattari, S. Lagomarsino	
ID 1445	Residual capacity of damaged masonry arch bridges subjected to cyclic loading › **L. Augusthus-Nelson**, G. Swift	
ID 1543	Structural analysis of masonry panels with openings using cellular automata › **Z. Jingming**, Z. Yu, L. Xinhang, Z. Qingwen	
ID 1489	Simple modeling approach for the structural retrofitting of FRP-strengthened masonry systems › V. Gattulli, **G. Marcari**, A. Paolone, F. Potenza	
	Appropriate compressive strength for masonry considering the performance of units and mortar › **K. Michel**, W. Jaeger, K. Van Balen, T. Bakeer	

JULY 09	› Chairman: Arun Menon
14:40-16:00	EARTHQUAKE RESISTANCE AND RETROFITTING — ROOM 2
ID 1569	Simplified seismic assessment of old masonry buildings through a discrete verification of structural elements › L. Martins, **J. Padrão**, R. Vicente, H. Varum, A. Costa
ID 1222	Numerical study of in-plane behaviour and strength of concrete masonry infills › X. Chen, Y. Liu
ID 1603	Developing a seismic retrofitting solution for wall-to-floor connections of URM buildings with wood diaphragms › **S. Moreira**, L.F. Ramos, D.V. Oliveira, P.B. Lourenço, L. Mateus
ID 1405	A seismic vulnerability index method for masonry schools in the province of Yazd, Iran › **H. Azizi**, N. Mendes, P.B. Lourenço, N. Hajisadeghi

JULY 09	› Chairman: Udo Meyer
14:40-16:00	NEW DEVELOPMENTS IN DESIGN / VERIFICATION — ROOM 3
ID 1330	Spatial variability and stochastic strength prediction of unreinforced masonry walls in horizontal bending › **J. Li**, M.G. Stewart, M.J. Masia, S.J. Lawrence
ID 1271	The flexural strength of stack bonded masonry, stage 1 – a preliminary study › M.J. Masia, **G. Simundic**, A.W. Page
ID 1537	Digital tools for automated generation of vaulted brick assemblies for construction and structural analysis › **E. Moussavian**, R. Gentry
ID 1611	Stability of lightweight masonry basement walls for an out-of-plane loading › **D. Saenger**, W. Brameshuber
ID 1155	New masonry curtainwall systems – design and construction › **J.G. Tawresey**

16:00-16:30	COFFEE BREAK

JULY 09	› Chairman: Luis F. Ramos
16:30-18:00	CODES AND STANDARDS — AUDITORIUM
ID 1260	A simple design model for the diagonal shear of partially grouted concrete masonry panels › A. Oan, **N. Shrive**

ID 1455	Strength and elasticity of thin joint hollow concrete masonry made with dense or lightweight aggregates › **A. Trad**, L. Monfront
ID 1400	Estimation of clay-brick unreinforced masonry compressive strength based on mortar and unit mechanical parameters › D. Liberatore, A. Marotta, **L. Sorrentino**
ID 1490	Limit design of earthquake-resistant masonry › **S. Dill**, A. Lepage, B. Frederick, J. Hochwalt
ID 1447	The minimum intervention in built heritage: comparing the potential role of codes for conservation › **C. Ornelas**, J.M. Miranda, I. Breda-Vázquez
ID 1544	A Comparative numerical evaluation of masonry initial shear test methods and modifications proposed for EN 1052-3 › **M. Montazerolghaem**, W. Jäger
ID 1533	Radiation from masonry products: Dose assessment and classifications of emitted gamma radiation › **D. Rosen**

JULY 09	› Chairman: Yuri Totoev	
16:30-18:00	ANALYSIS OF MASONRY STRUCTURES	ROOM 1
ID 1526	Soil-structure interaction analysis of an ancient masonry wall affected by a deep excavation › **G. De Felice**, M.L. Malena, A. Amorosi, D. Aboldini, G. Di Mucci	
ID 1474	Size and shape effect of test specimens on shear strength of clay brick and AAC block masonry – a comparative study › **J. Kubica**	
D 1235	Buckling of masonry with low modulus of elasticity › W. Jäger, T. Pflücke, **T. Bakeer**, P.D. Christiansen	
ID 1294	Infill masonry: Simple analytical methods for seismic design › **M.F. Paulo Pereira**, M.F. Neto Pereira, J.E. Ferreira, P.B. Lourenço	
ID 1265	A lumped plasticity equivalent beam model for the pushover analysis of masonry buildings › **D. Liberatore**, D. Addessi	
ID 1441	Discontinuous analysis of soil-arch interaction in masonry arch bridges › **S. Ahmad**, G. Swift, L. Augusthus-Nelson	
ID 1600	Numerical modelling options for cracked masonry buildings › **D. Moradabadi**, D.F. Elaefer	

JULY 09	› Chairman: Marcio Correa
16:30-18:00	ARCHITECTURE WITH MASONRY — ROOM 2
ID 1362	Stone and brick masonries in the city of Rio de Janeiro in the 19th century › **I. Rocha**
ID 1538	Evaluating and categorizing the nomination files based on UNESCO available criteria to improve the conservation plan of Masjed-e Jame Isfahan › **Z. Abdollahnejad**, L. Watson, G. Aulakh, M. Mackie
ID 2004	The brick Neomudejar style in the Iberian bullrings. Lisbon-Barcelona-Madrid 1.892-1.929 › **G. Ferrari-González**, J. Adell
ID 1316	Stone and brick masonries in the city of Rio de Janeiro, C19 › **M. Hoirisch**

JULY 09	› Chairman: Els Verstrynge
16:30-18:00	MASONRY MATERIALS AND TESTING — ROOM 3
ID 1347	Influence of the freeze and thaw in the durability of granites used in vernacular masonry buildings › **L. Martins**, G. Vasconcelos, P.B. Lourenço, C. Palha
ID 1549	Support characteristics versus applied mortar behaviour › **I. Torres**, R. Veiga
ID 1605	Monitoring of weathering effect evolution in porous masonry construction materials: NDT and mechanical tests › **E. Gabrielli**, C. Colla
ID 1226	Microwave remote sensing of masonry towers › C. Gentile, **A. Saisi**
ID 2006	Efficacy of horizontal reinforcement in concrete masonry shear walls › S. Rizaee, **S. Lissel**
ID 1637	Analysis of masonry walls subjected to high strain rate out-of-plane loads with a rate dependent interface model › **R.S. Hashemi**, P.B. Lourenço, N. Peixinho

POSTER SESSIONS

JULY 07	
16:00 -16.30	
	Students Challenge Poster Session

POSTER SESSION 1

JULY 08	
10:30-11:00	ANALYSIS OF MASONRY STRUCTURES
ID 1579	Unreinforced masonry under axial and horizontal loading with controlled displacement › **N.D. Agüera**, Miguel E. Tornello, Carlos D. Frau
ID 870	Structural effects of brick arrangement on Persian four-centred arches › F. Jafari, M. Hejazi
ID 1435	Load-deformation calculations of uniaxially loaded masonry using the classical compression field model › **M. Weber**, H. Stempfle
ID 1263	3D Numerical analysis of crack growth in unreinforced baked brick shear wall by using particle discretization scheme FEM › **H. Chen**, L. Xie
ID 1476	The vulnerability assessment of tall slender masonry structures › **A. Čaušević**, M. Hrasnica, N. Rustempašić
ID 1055	Multi-scale modelling and damage analysis of complex masonry walls › **M.M. Díaz**, D.G. Carrera
ID 1534	Numerical modelling of reinforced concrete block structural walls under seismic loading › **M. Ezzeldin**, L. Wiebe, M. Shedid, W. El-Dakhakhni
ID 1519	Experimental and numerical characterization of the cyclic behaviour of unreinforced and reinforced masonry spandrels › G. Rinaldin, C. Amadio, **N. Gattesco**
ID 1639	Homogenized non-linear dynamic model for masonry walls in two-way bending › G. Milani, **P.B. Lourenço**
ID 1195	Structural analysis of a masonry parabolic and twisted arch › **J. Adell**, A.J. MAS-Guindal, D. Mencías
ID 1407	Structural characterization of “tabique” walls from the historic centre of viseu › R. Pinto, **J. Padrão**

ID 1410	Stiffness degradation of brick masonry subjected to uniaxially cyclic compressive loads › **J. Kubica**, I. Galman
ID 1604	Homogenization for random micropolar composites. The case of masonry–like materials › **P. Trovalusci**, A. Murrali, M.L. De bellis, M. Ostoja-Starzewski
	MASONRY MATERIALS AND TESTING
ID 1467	Experimental study of the out-of-plane behaviour of unreinforced sacco stone masonry walls: comparative analysis of two different test setups › A. Costa, A. Arêde, A. Costa, **T.M. Ferreira**, A. Gomes, H. Varum
ID 1615	Experimental analysis on the functional properties of rendering mortars with superficial addition of TiO2 nanoparticles › **G. Vasconcelos**, J. Carneiro, F. Fernandes, C. Jesus, C. Palha
ID 1311	Testing and modelling of seismic connector for traditional masonry walls › **F. Di Fabio**, L. Fanale, M. Totani
ID 1372	Experimental study of clay brick and concrete block masonry wallettes under uniaxial load › **F.B. Houti**, F. Ghomari
ID 1593	Preliminary study into the standardisation of masonry shear wall reporting methods › P. Dillon, F. Fonseca
ID 1315	Lightweight Masonry Grout made with Expanded Shale › A. Tanner, F. Fonseca
ID 1404	Strength Characteristics of Typical Adobe Material in the Southwestern United States › E. Wosick, T. Gebremariam, W. Tsegaye, B. Weldon, P. Bandini, U. Al-Aqtash
ID 1510	Hollowed clay brick masonry elements with chases: behaviour under compression › **R. Vicente**, H. Varum, A. Figueiredo, T.M. Ferreira
ID 1357	Reinforced mortars for masonry rehabilitation › A. Mobili, I. Magrini, G. Moriconi
ID 1354	Assessing water absorption of mortars in renders by the contact sponge method › R. Nogueira, A.P.F. Pinto, A. Gomes, N.G. Almeida
ID 1328	Micro and nanostructural characterization of surfaces and interfaces of cement mortars Portland using atomic force microscopy › M.F.O. Barreto, P.R.G. Brandão
ID 1349	Development of mortar-brick bondunder various storage conditions › **A.T. Vermeltfoort**

ID 1268	The performance of ultrasonic pulse velocity on the prediction of tensile granite behaviour: a study based on artificial neural networks › F. Martins, **G. Vasconcelos**, T. Miranda
ID 1329	Study of the block/grout interface in concrete block masonry structures › O.S. Izquierdo, Orieta M.R.S. Corrêa
ID 1371	Do binder types have influence on the interpretation of measured workability? › K. Van Balen, R. Hendrickx, B. Middendorf, D. Becker-Klein
ID 1415	Experimental study on the compressive cyclic behaviour of one-leaf stone masonry walls with different regularity patterns › **C. Almeida**, J.P. Guedes, A. Arêde, A. Costa
ID 1296	Study of the behaviour of reinforced masonry wallets subjected to diagonal compression through numerical modelling › V.G. Haach, G. Vasconcelos, P.B. Lourenço
ID 1556	Physical, pozzolanic and chemical properties of bricks of Karacahisar Castle Gate, Turkey › I. Güldoğan, Y. Güney, M.E. Altınsapan
ID 1597	Laboratory experience of flood effects monitoring in fired-clay bricks and adobe › **C. Colla**, E. Gabrielli, M. Savoia
ID 1402	Earthen mortars in Cremona: Characterization and first hypothesis of dating › A. Grimoldi, **M.P. Riccardi**, M. Cantu, M. Cofani, A. Landi, S.C. Tarantino

POSTER SESSION 2

JULY 08	
16:00-16:30	EARTHQUAKE RESISTANCE AND RETROFITTING
ID 1337	Application of a trilinear model for the analytical study of the out-of-plane behaviour of unreinforced stone masonry walls › **T.M. Ferreira**, A. Costa, R. Vicente, H. Varum, A. Arêde, A. Costa
ID 1292	The confining effect of masonry infill on the seismic behaviour of traditional timber frame walls › E. Poletti, **G. Vasconcelos**
ID 1531	Behavior of 100-mm silica lime parapet walls under out-of-plane seismic forces › A. San Bartolomé, **D. Quiun**, A. Icochea, A. Fernández
ID 1273	Out-of-plane flexural behaviour of masonry walls reinforced with UHPPl › **J. Guerreiro**, J. Ferreira, A. Gago, J. Proença, V. Cóias, P. Costa
ID 1071	Experimental investigation of the seismic response of a multi-drum stone column › M. Palmier, **A. Penna**, G. Magenes

ID 1527	Assessment and strengthening strategies of existing RC buildings with potential soft-storey response › A. Furtado, **H. Rodrigues**, H. Varum, A. Costa
ID 1369	Experimental behavior of parapet masonry walls braced under out-of-plane seismic forces › A. San Bartolomé, **D. Quiun**, R. Siancas, A. Manrique
ID 1281	Experimental tests on typical masonry of Messina area (Italy) retrofitted with CAM: Full scale panels › M. Cilia, P. Colajanni, R. Marnetto, A. Recupero, **N. Spinella**
ID 1170	Seismic analysis and retrofitting of Nyatapola Temple in Nepal with advanced materials › **S. Pokharel**, T. Triantafillou
	REPAIR AND STRENGTHENING
ID 1214	Strengthening of historic masonry walls using GFRP grids embedded into inorganic matrices › **J. Castori**, M. Corradi, A. Borri, R. Sisti
ID 1623	Bond strength of anchor pins for earth block masonry › **L. Miccoli**, P. Fontana
ID 1438	Tests on the bond performance of mortar-based strengthening systems on masonry substrates › S. De Santis, P. Casadei, **G. De Felice**
ID 2000	Bond behaviour of twisted stainless steel bars in mortar joints › **S. Moreira**, L.F. Ramos, B. Csikai, P. Bastos
ID 1270	Dry stone masonry: Mechanical characteristics and seismic retrofit › **A. Grazzini**, E. Quagliarini
ID 1433	Enhancement of reinforced concrete frame infill using collar jointed masonry › **C. Wang**, J. Forth
	CONSERVATION AND HISTORIC BUILDINGS
ID 1335	Impact of railway vibration on masonry of Nossa Senhora da Escada chapel › **R. Muñoz**, M.M. Oliveira, A.C. Magalhães, Y.G. Cafezeiro, S.P. D'Affonsêca
ID 1381	Medieval rubble walls of Castrum Sibrium (Italy) › **R. Bugini**, L.Folli
ID 1465	Seismic assessment of a masonry tower in the region stricken by the 20-29 may 2012 Emilia-Romagna, Italy, Earthquake › **G. Milani**, S. Marzocchi, F. Minghini, A. Tralli

ID 1514	Increased salt and frost damages in solid neo-gothic brickwork masonry due to low permeable restoration materials of the 20th century › **K. Balksten**, M. Lindholm, J. Lange
ID 1066	Designing indoor climate in the 19th Century: Thermal features of ancient masonry › **C. Manfredi**
ID 1505	A multidisciplinary study of stone elements of Paços Novos do Castelo de Leiria (Portugal) › **A. Pereira**, A. Dionísio, A. Carvalho, V. Carvalho
ID 1536	Walls of the Moorish castle (Sintra, Portugal) – methodology and criteria for conservation › **A.P.F. Pinto**, B. Silva, V. Ferreira, D.V. Silva, A. Lamas
ID 1557	The conservation problems of historical cisterns: a sample cistern in Istanbul Beylerbeyi › **Y. Gül**, A. Sevim
ID 1358	Effects of rising damp on the mechanical properties of brick and mortars › **E. Franzoni**, C. Gentilini, G. Graziani, S. Bandini
ID 1225	Dynamic monitoring for the structural assessment of a historic masonry tower › C. Gentile, **A. Saisi**
	NEW DEVELOPMENTS IN DESIGN
ID 1561	Force-displacement model for confined masonry walls with shear-dominated failure mode › M. Yekrangnia, **A. Bakhshi**, M.A. Ghannad
ID 1399	Problems caused by design incompatibilities on masonry structural buildings in Brazil › **U. Samara**, G. Mohamad, D. Machado, C. Félix, A. Temp
	EARTHEN CONSTRUCTION
ID 1333	Earth-based mortars for masonry plastering › P. Faria, T. Santos, V. Silva
ID 980	Micromechanics-based critical surfaces for adobe masonry › A. Caporale, F. Parisi, **D. Asprone**, R. Luciano, A. Prota
	ARCHITECTURE WITH MASONRY

ID 996	Building information modeling for masonry: Defining and modeling masonry walls › **R. Gentry**, A. Cavieres, D. Biggs

POSTER SESSION 3

JULY 09	
10:30-11:00	CASE STUDIES
ID 948	Dynamic behavior and F.E.M. modeling of masonry arch bridge “Sant’Apollonia” in L’Aquila (IT) › D. Galeota, S. Avola, **L. Fanale**
ID 1546	Large deformations on a XIIth Century Romanic church at Val d’Aran (Spain) › **A. Costa**, J.L. Ginovart, G. Fortuny, S. Coll
ID 1626	A Study of the impacts of calcitic aggregates on the properties of air lime mortar › **S. Scannell**, M. Lawrence, P. Walker
ID 964	Comparison of costs in masonry and reinforced concrete construction: application to a case study › P. Saraiva, **J.P. Gouveia**, G. Vasconcelos, P.B. Lourenço, P. Bernardino
ID 1282	Bibliometric analyses of the recent scientific literature on structural masonry › **A.S. Freire**, G.A. Parsekian, A.E. Jungles, H.R. Roman
ID 1360	Application of alternative materials: use of residual powder obtained from organic waste and sisal fiber in the production of concrete blocks › **I.S. Izquierdo**, M.A. Ramalho, A. Benedetti
ID 1448	Diagnosis of the condition of and a proposal for intervention on for Mondim da Beira Romanesque Bridge › **G.A. Rouxinol**, M.J.C. Morais
ID 1553	Bayesian approach to fuse NDT data to find dynamic elastic modulus of granite stone › **M. Mishra**, L.F. Ramos, T. Miranda
	INNOVATION AND SUSTAINABILITY IN MASONRY
ID 1434	The sustainable restoration project of the historic building through interoperability of BIM: the example of CASA21 › **P. Ronca**, S. Seddio, A. Zichi
ID 1564	The impact of roof tile type on the attic thermal performance of masonry housing in a moderate Australian climate › **D. Alterman**, A.W. Page, C. Zhang, B. Moghtaderi
	NEW DEVELOPMENTS IN DESIGN

ID 1468	Masonry works – breakdown structure and specifications on ProNIC application › P. Mêda, **H. Sousa**
ID 1254	Comparison of wall splice specimen test results with current code provisions for the development and splicing of reinforcement in masonry › R.D. Kelln, **L.R. Feldman**
	NEW CONSTRUCTION TECHNIQUES/TECHNOLOGIES
ID 1395	Application of titanium dioxide on clay brick façades for algal growth prevention › **L. Graziani**, E. Quagliarini, M. D'Orazio
ID 1627	Experimental study of different types of reinforcement in masonry lintel beams › P. Bernardino, P. Saraiva, **J.P. Gouveia**, G. Vasconcelos, P.B. Lourenço
ID 1365	The PANCAS – Palha palace: A rehabilitation process › **J.N. Bastos**
	RELIABILITY AND PERFORMANCE
ID 1229	Rehabilitation walls of ancient buildings, meeting the thermal requirements and maintaining the architectural façades › **V. Pereira**, C. Freire, L. Silva, N. Vieira
	CODES AND STANDARDS
ID 1232	Contribution of lime and sand mortar in the process of capillary water absorption in old brick masonry › **A. Llorente**, S. Camino, J. León, J. Olivar
ID 1196	Differences brick facade design to horizontal between the Spanish and European standards › **J. Adell**, D. Mencías
ID 1024	Influence of the span rise ratio on the capacity of masonry arch bridges › **J. Donaghy**, J. Wang, L. Augusthus-Nelson
	MASONRY AND BUILDING PHYSICS
ID 1594	Reducing linear thermal bridging at construction junctions with AAC masonry in the UK › **C. Fudge**
	ENERGY EFFICIENCY
EE 10	Thermal conductivity of compressed earth blocks (CEB) with different insulating materials › **S. Sampaio**, M.G. Gomes, J.A. Bogas, A.B. Abel
EE 4	In-situ performance of displacement ventilation system in Canadian schools with radiant heating systems – already submitted in the website › B. Ouazia, **M. Tardif**, L. MacDonald, A. Thompson, D. Booth
	MASONRY MATERIALS AND TESTING

ID 1253	Masonry material characterization methodology for micro-modeling › **A. Drougkas**, P. Roca, C. Molins, V. Alegre
ID 1288	Structural visualization and seismic damage detection on multi-leaf stone masonry by using NDT › P. Cotič, Z. Jagličić, M. Kržan, **V. Bosiljkov**
ID 1635	Experimental parametric study on the performance of wall ties › S. Mertens, A. Smits, Y. Grégoire
ID 1348	In-situ testing of stone masonry: A review of the state of the art › **L. Martins**, G. Vasconcelos, P.B. Lourenço
ID 1059	Effects of natural stone heterogeneity on its susceptibility to weathering processes › C. Alves, C. Figueiredo, A. Maurício, P. Figueiredo, L. Aires-Barros
	Compressive fatigue behaviour of refractory ceramics masonry › **K. Andreev**

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