

## INDEX

01

ISISE HIGHLIGHTS

02

R&D COMPLETED  
PROJECTS

03

R&D STARTED  
PROJECTS

03

COMPLETED PhD  
THESES

09

AWARDS & PRIZES

10

EVENTS

13

UPCOMING EVENTS

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## ISISE HIGHLIGHTS

The eighth issue of the ISISE Newsletter covers the main activities developed from November 2014 to May 2015. In this period, 6 new international R&D projects were initiated with an overall funding for ISISE of about 1.5 M€, 2 R&D projects and 9 PhD theses were concluded. ISISE has been involved in the international organization of 7 events and 5 prizes were awarded to ISISE members. Special emphasis is also given to the ISISE Day-Out and 6<sup>th</sup> PhD Workshop 2015. Finally, it should be emphasized that in the last Research Assessment Exercise (2008-2014) performed by the Portuguese Foundation for Science and Technology (FCT), ISISE was rated as Excellent.

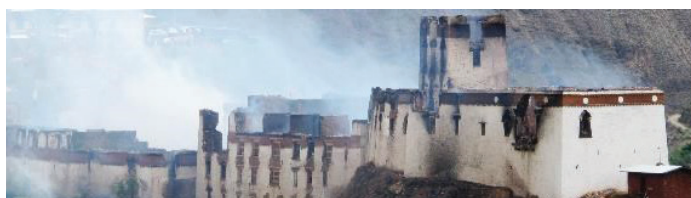
### **COST Action TU1406 – “Quality specifications for roadway bridges, standardization at a European level (BridgeSpec)”**



A new COST Action, whose application has been led by ISISE member José Matos, was recently approved. The Action is entitled TU1406 - “Quality specifications for roadway bridges, standardization at a European level (BridgeSpec)”, and currently involves 34 EU countries. The official kick-off of the Action occurred in April 16<sup>th</sup> at the first meeting of its Management Committee. Additional information at: <http://www.tu1406.eu/>



Expert recommendation for the Wangduephodrang Dzong Reconstruction Project: The Wangduephodrang Dzong in Bhutan was destroyed by a tragic fire accident in June 2012 and is currently under reconstruction. A group of international experts, funded by the World Bank, met to provide recommendations namely on: (a) Inspection methods for remaining walls; (b) Stabilizing and strengthening techniques; (c) Solutions for the reconstruction using traditional techniques; (d) General recommendations. The mission included also a visit to Punakha Dzong, to understand Dzong’s structure and function, a visit to Talo Dzong, to observe the damage due to the 2011 earthquake and meet the Queen Mother, and a forum between all stakeholders of Wangdue Dzong reconstruction project.



# R&D COMPLETED PROJECTS

> **ENCORE-Environmentally-friendly solutions for concrete with recycled and natural components**

**ISISE Principal Investigators:** Joaquim Barros  
**Budget:** Global: 197.400,00€/ISISE-UM: 50.400,00€  
**ID:** 295283  
**Funding Entity:** EU (Marie Curie-IRSES)  
**Principal contractor:** Università Degli Studi Di Salerno (UniSA)  
**Duration:** 36 months (Started: January 1<sup>st</sup>, 2012)

**Summary:** Since concrete is the most widely used construction material, several solutions are currently being developed and investigated for enhancing the sustainability of cementitious materials. One of these solutions is based on producing Recycled Concrete Aggregates (RCA) from existing concrete members resulting from either industrial processes or demolitions of existing structures as a whole. Moreover, waste resulting from industrial processes other than building construction (i.e., tire recycling, production of steel, powders resulting from other depuration processes) are also being considered as possible low-impact constituents for producing structural concrete and Fibre-Reinforced Cementitious Composites (FRCC). Furthermore, the use of natural fibres is another option for producing environmentally-friendly and cost-effective materials, depending on the local availability of raw materials. To promote the use of concretes partially composed of recycled constituents, their influence on the mechanical and durability performance of these concretes have to be deeply investigated and correlated. This was the main goal of the EnCoRe Project ([www.encore-fp7.unisa.it](http://www.encore-fp7.unisa.it)).



Steel fibers from tire recycling

## > ECOSTEELPANEL

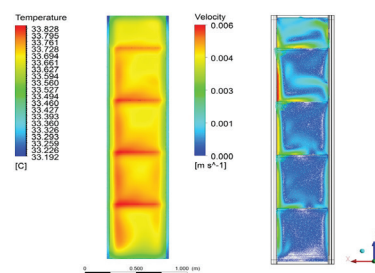
**ISISE Principal Investigator:** Luís Simões da Silva  
**Budget:** Global: 689.938,00€/ISISE-UC: 161.325,00€  
**Funding Entity:** QREN  
**Principal Contractor:** COOLHAVEN  
**Duration:** 30 months (Started: November 1<sup>st</sup>, 2012)

**Summary:** EcoSteelPanel project aimed to develop a new sustainable Lightweight Steel Framing (LSF) solution that could be used as a rain water harvesting wall and improve thermal behaviour and energy efficiency of buildings. Regarding the latter, the main goal was to take advantage of the water heat storage capacity in order to collect the heat from solar radiation in the LSF wall, acting as a thermal energy storage (TES) system and release it during the evening to the inside of the building. Given the usual low thermal inertia of LSF buildings, the benefits of this TES wall could be large in this type of construction.



Experimental prototype

In order to assess the TES potential of this LSF module when exposed to south European weather conditions (Coimbra, Portugal) an experimental campaign was prepared allowing to measure surface and water temperatures and the heat flux when exposed to solar radiation. Analytical and numerical 3D FEM solutions for transient thermal behaviour were developed to predict the thermal performance of the wall with several water volumetric levels, including moving the water between panels integrated in different façades.



Numerical modelling

# R&D STARTED PROJECTS

## > SHOWTIME

**ISISE Principal Investigator:** Carlos Rebelo  
**Budget:** Global:1.849.586,00€/ISISE-UC:333.250,00€  
**ID:** RFSR-CT-2015-00021  
**Funding Entity:** Research Fund for Coal and Steel  
**Principal Contractor:** ISISE-UC  
**Duration:** 36 months

## > PROLIFE

**ISISE Principal Investigator:** Luís Simões da Silva  
**Budget:** Global:1.514.602,00€/ISISE-UC:221.730,00€  
**ID:** RFSR-CT-2015-00025  
**Funding Entity:** Research Fund for Coal and Steel  
**Principal Contractor:** Lulea University of Technology  
**Duration:** 36 months

## > FREEDAM

**ISISE Principal Investigator:** Luís Simões da Silva  
**Budget:** Global:1.449.860,00€/ISISE-UC:251.812,00€  
**ID:** RFS-PR-14067  
**Funding Entity:** Research Fund for Coal and Steel  
**Principal Contractor:** Universita Degli Studi Di Salerno  
**Duration:** 36 months

## > MODCONS

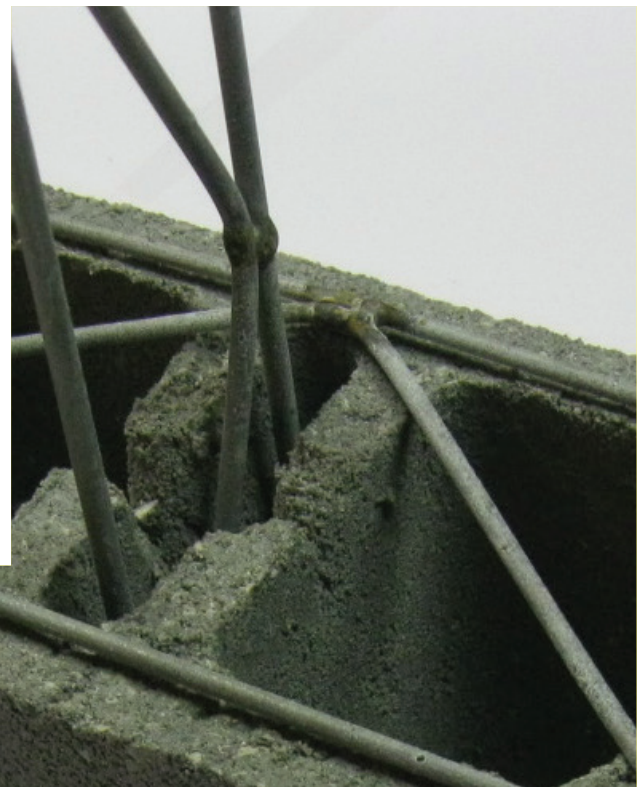
**ISISE Principal Investigator:** Helena Gervásio  
**Budget:** Global:1.298.918,00€/ISISE-UC:116.785€  
**ID:** FP7-SME-2012  
**Funding Entity:** Research Fund for Coal and Steel  
**Principal Contractor:** The Steel Construction Institute  
 LBG\*  
**Duration:** 34 months

## > SUPERCONCRETE - SUstainability-driven international/intersectoral Partnership for Education and Research on modelling next generation CONCRETE

**ISISE Principal Investigator:** Joaquim Barros  
**Budget:** Global:504.000,00€/ISISE-UM:117.000,00€  
**ID:** 645704 (H2020-MSCA-RISE-2014)  
**Funding Entity:** EU (Marie Skłodowska-Curie Research and Innovation Staff Exchanges)  
**Principal Contractor:** Universita Degli Studi Di Salerno  
**Duration:** 48 months

## > AEOLUS<sub>4</sub>FUTURE - Efficient harvesting of the wind energy

**ISISE Principal Investigator:** Carlos Rebelo  
**Budget:** Global:3.811.805,00€/ISISE-UC:476.713,00€  
**ID:** EU-643167  
**Funding Entity:** EU (Marie Curie - ITN)  
**Principal Contractor:** Lulea University of Technology  
**Duration:** 48 months



# COMPLETED PHD THESES

## > Behaviour of cylindrically curved steel panels under in-plane stresses

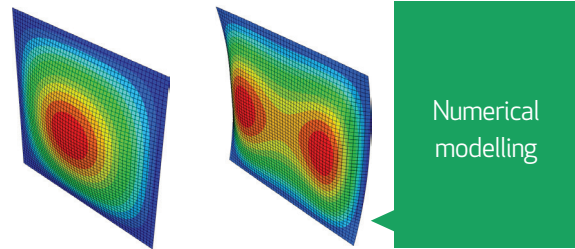
**Author:** João Pedro Martins

**Supervisors:** Luís Simões da Silva, António Reis

**Date:** November 4<sup>th</sup>, 2014

**Summary:** The objective of this work is to analyse the stability behaviour of curved steel panels under generalised in plane compressive stresses and to develop design rules which overcome some limitations of European Standards. For the simplest case of pure compressive axial stresses, the most relevant works have been revisited and analysed. In what concerns the elastic critical stress of curved panels, it was concluded that the expressions which are currently available return non negligible errors. Relying on the finite element method and on an analytical formulation based on energy methods, new expressions presenting significant improvements and allowing obtaining the elastic critical stress also for panels under non uniform in plane loading are presented. Concerning the ultimate

resistance, the proposed method also shows improvements, but its main contribution is that it allows obtaining the ultimate resistance also for panels under pure in plane bending.



**CV: João Pedro Martins** graduated (5 years) in Civil Engineering at the University of Coimbra in 2009. At the same year joined the Doctoral Programme in Steel and Mixed Construction and the ISISE research group at the University of Coimbra. He is the author of several papers in International Conference Proceedings and Scientific Magazines. Currently, he is lecturing at the University of Coimbra while maintaining his research activity at ISISE.

## > Seismic behavior of concrete block masonry buildings

**Author:** Leonardo Ávila Velez

**Supervisors:** Graça Vasconcelos, Paulo Lourenço

**Date:** December 12<sup>th</sup>, 2014

**Summary:** The PhD research program was focus in the study of the seismic behaviour of an innovative solution in structural masonry, for low to medium rise residential buildings. The constructive system is based on concrete block units and truss type reinforcement. Four buildings, 2 symmetric and 2 asymmetric (reinforced and unreinforced for each configuration), were tested on a shaking table and full nonlinear dynamic time history analyses of the symmetric UM building were carried out. Damage in RM buildings were mainly concentrate at the first floor and composed of smeared cracking for PGA values about 1.30g, instead in the UM buildings damage were distributed at both floors including crushing of units and sliding movements along bed joints for PGA values about 1.20g. From comparisons of PGA values attained and respective damage obtained it can be said that the proposed constructive system can be a competitive solution for

medium size buildings in regions of moderate to high seismicity.

**CV: Leonardo Avila** obtained his degree in Civil Engineering from the University of Medellin (Colombia) in 2006. After working in the construction industry he has been focusing in the research of seismic behaviour of residential buildings, obtaining his PhD in 2014 from the University of Minho. His research interests are mainly on structural analysis and numerical simulations of civil structures.



Asymmetric building

> **Shear strengthening technique for RC beams**

**Author:** Matteo Breveglieri

**Supervisors:** Alessandra Aprile, Joaquim Barros

**Date:** December 12<sup>th</sup>, 2014

**Summary:** The Embedded Through-Section (ETS) technique is a promising technique for the shear strengthening of existing RC elements. According to this technique, holes are drilled through the beam section, and bars of steel or FRP material are introduced into these holes and bonded to the concrete with adhesive materials. An experimental, analytical and numerical investigation on RC beams strengthened in shear using the steel and CFRP ETS bars was carried out. The research was focused on the evaluation of the ETS efficiency on beams with different percentage of existing internal transverse reinforcement. The good bond between the strengthening and the surrounding concrete allowed the yield initiation of the ETS steel bars and the attainment of high tensile strains in the CFRP rods, leading to significant increase of shear capacity (up to 136%), whose level was strongly influenced by the inclination of the ETS bars and the percentage of internal transverse reinforcement.



ETS installed bars (slip at the steel-epoxy adhesive interface)

CV: **Matteo Breveglieri** obtained his Master in Civil Engineering in 2010, at the University of Ferrara, Italy. He developed MSc thesis within the context of an Erasmus program at the University of Minho working on the flexural strengthening of RC continuous slab strips using NSM CFRP laminates. The PhD thesis was carried out under joint research agreement between University of Minho and University of Ferrara.

> **Modelling of the Seismic Performance of Connections and Walls in Ancient Masonry Buildings**

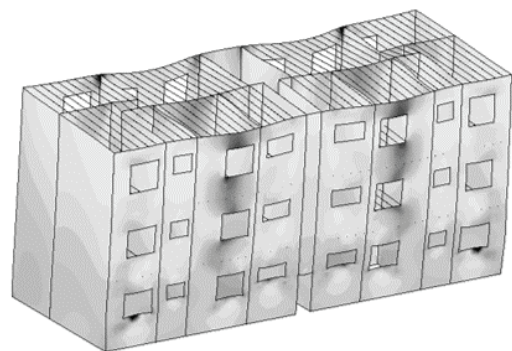
**Author:** Ana Sofia Freitas Ferreira Araújo

**Supervisors:** Paulo B. Lourenço, Daniel V. Oliveira, Guido Magenes

**Date:** December 15<sup>th</sup>, 2014

**Summary:** This thesis tackles the problem of earthquake-impact on heritage masonry construction. A numerical approach is proposed aiming at studying and further characterize the behaviour of stone masonry walls and anchors injected in masonry walls. The knowledge provided by these studies is then applied in the seismic assessment of a typical masonry building. The FE models of the in-plane behaviour of masonry walls were calibrated against experimental results. The validated models were further used to carry out parametric analyses. Finally, the usage of a simplified formulations to predict the strength capacity of walls was also addressed. The FE model of the injected anchors in masonry was validated against experimental results and then used as a "numerical laboratory". Finally, simplified analytical methods to

estimate the strength capacity of injected anchors on masonry were reviewed. The seismic assessment of a typical masonry building was carried out, based on different modelling assumptions related to the connections between structural components.



CV: **Ana S. Araújo** concluded her Master Degree in Civil Engineering at University of Minho in 2010, where she also developed and concluded her PhD degree in 2014 on the field of the seismic performance of masonry building. Since 2014 she develops an intense professional activity as structural designer.

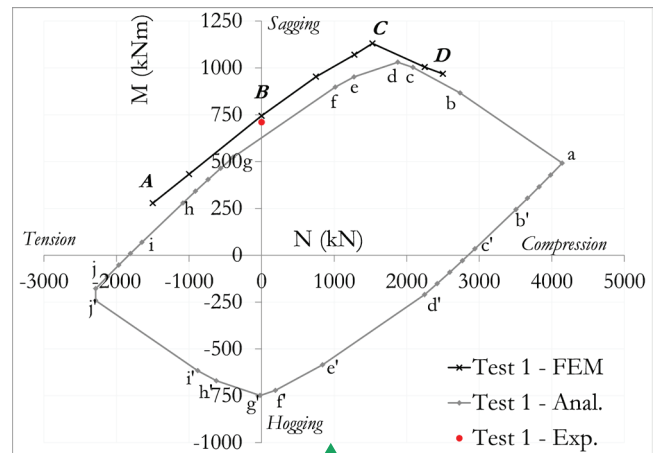
> **Robustness of car parks subjected to localized fire**

**Author:** Cécile Haremza

**Supervisor:** Aldina Santiago

**Date:** January 6<sup>th</sup>, 2015

**Summary:** The research work presented in this thesis is based on the European RFCS ROBUSTFIRE project, and the National IMPACTFIRE project. The various stages of this work are related to a case study involving a structural configuration that represents a typical open car park building. The main objective is to provide a detailed analysis of the heated joint behaviour subject to variable bending moments and axial loads when the column fails due to a localised fire. In this work: i) seven experimental tests are performed; ii) detailed 3D numerical models of the heated joint are developed; iii) the influence of some parameters that affect the robustness of this type of building are studied. Due to the low slenderness of the composite beam, high deformations are necessary to develop catenary action, and it is shown that in these conditions, this topology of composite joint does not possess sufficient capacity of rotation to reach the equilibrium deformed configuration.



Numerical and analytical M-N curves at ambient temperature

CV: **Cécile Haremza** was born in Liège, Belgium. She graduated in Civil Engineering at the University of Liège (ULg) in 2001. After two years of research at ULg, she joined the ISISE group at the University of Coimbra. She participated in research projects, she is the author of several papers in Conference Proceedings and Scientific Magazines, and she lectured. She is now technical secretary at ECCS in Brussels.

> **Experimental characterization of dry-stack interlocking compressed earth block masonry**

**Author:** Thomas Wilfried Sturm Moreira

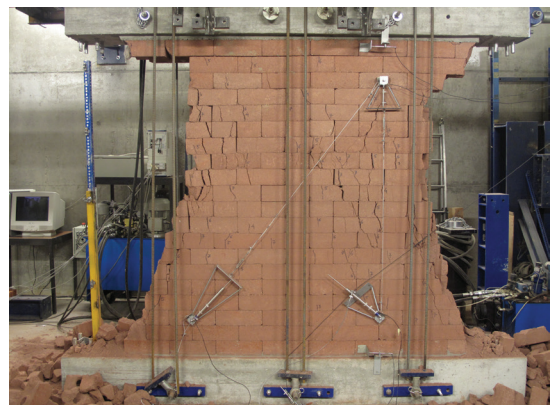
**Supervisors:** Luís Ramos, Paulo B. Lourenço

**Date:** January 30<sup>th</sup>, 2015

**Summary:** The thesis was focused on the study of Interlocking Compressed Earth Blocks (ICEBs) to be used in dry-stack masonry of one storey houses in regions with moderate seismicity. Malawi was selected as the case study country. The mechanical characterization of masonry included the study of soils, blocks, masonry specimens and the behaviour of a real structure under seismic action (a small masonry mock-up of a house was tested on a shaking table). Results showed that it is possible to produce ICEBs of sandy soils with sufficient strength. The tests of shear walls revealed that the shear strength is low, but comparable to that of other earthen walls. The walls also showed high values of ductility and behaviour factor. The shaking table test showed that the mock-up resisted without significant damage a peak ground accelerations (PGA) of 0.2 g. The behaviour factor was of 1.5, which is the maximum permitted by the

Eurocode 8 for unreinforced masonry. More info at [www.civil.uminho.pt/hilotec](http://www.civil.uminho.pt/hilotec).

CV: **Thomas Sturm** is graduated in Civil Engineering in 2008 at University of Chile. He got his MSc degree in 2010 at ČVUT (Prague) & University of Minho (Guimarães), on the role of SAHC Masters Course, and his PhD degree in 2015 at University of Minho. Currently, he is working at IDIEM (Chile) as Project Manager in the fields of forensic engineering, material studies and structural modelling.



> **Timber-concrete composite bridges and their practical potential applicability**

**Author:** João Nuno Amado Rodrigues  
**Supervisors:** Alfredo Dias, Paulo Providência e Costa  
**Date:** February 13<sup>th</sup>, 2015  
**Summary:** In this investigation program, a sample of Timber-Concrete Composite (TCC) bridges was firstly identified, which included examples from all around the world. An extensive characterization of these bridges led to the identification of their main features and to the recognition of two main types of TCC bridge decks ("standard type solutions"). The basic principles and guidelines for the design and construction of TCC bridge decks were then established, taking into account their specificities and particularities. The two mentioned standard type solutions were next submitted to a life cycle analysis. The results showed that the proposed TCC deck standard type solutions have a quite favourable environmental performance as well as a competitive life cycle cost. Finally, plans for the design, construction and preservation

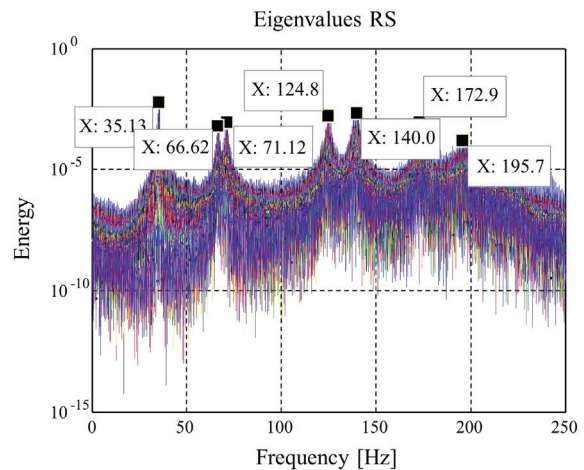
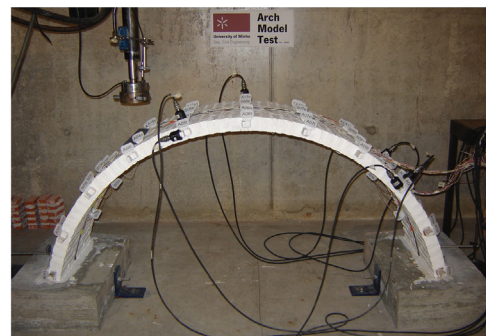
of TCC bridge decks, named "standard-solutions", were developed. These plans can be seen as a useful guide for the professionals responsible for bridge design and construction.

**CV:** João Nuno Amado Rodrigues graduated in Civil Engineering from the University of Coimbra in 2007. Master in Structural Engineering from the University of Coimbra in 2008. PhD in Structural Engineering from the University of Coimbra in 2015. He has over 8 years' experience on research regarding timber and timber-concrete composite structures, which are, in fact, his main interests.

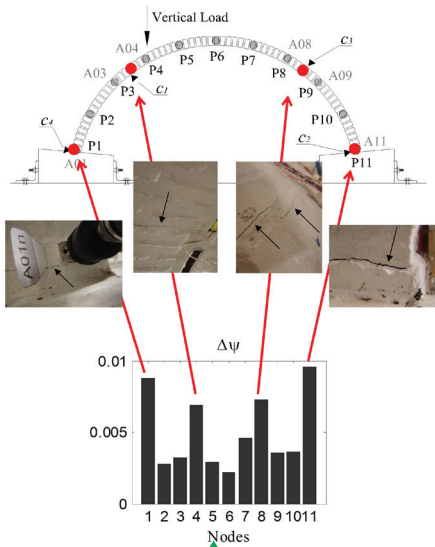


> **Damage Identification of Structures based on Spectral Output Signals**

**Author:** Maria Giovanna Masciotta  
**Supervisors:** Marcello Vasta (Ud'A, Italy), Paulo B. Lourenço, Luís F. Ramos  
**Date:** April 24<sup>th</sup>, 2015  
**Summary:** The preservation of built cultural heritage, the maintenance of strategic civil structures and the seismic risk mitigation require the use of reliable non-destructive tools able to provide a rapid condition screening of the system health and to identify potential vulnerable zones in order to prevent or at least reduce the risk of damage. Due to that, the practice of structural assessment is being continually enriched by different damage identification approaches. Within this context, vibration-based damage identification methods supported by continuous structural health monitoring play a leading role, but these techniques still present several limitations. This PhD thesis was conceived to provide a new approach for the damage identification of structures by exploiting the second order (or spectral) properties of measured nodal response processes. Based on the consideration that changes in the system's response caused by evolutionary damage scenarios are reflected by changes in the spectral proprieties of the system, a spectrum-driven damage



Masonry arch replica: dynamic test setup and frequencies identification via eigenvalues plotting



Damage localization: comparison between spectral and experimental results

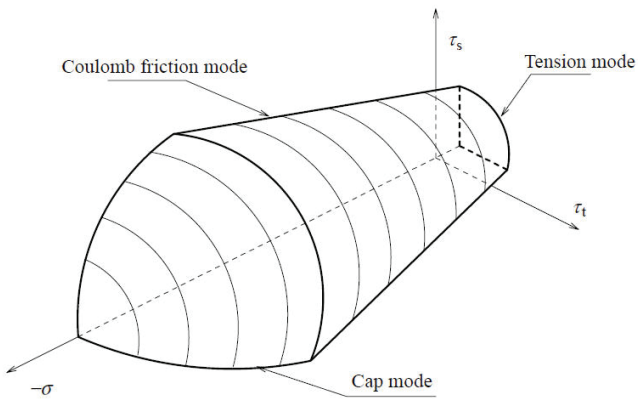
localization index was proposed making use of the eigenparameters extracted from the decomposition

of the response power spectral density matrix for different structural configurations. Numerical and laboratory experimental activities were performed to validate the developed formulation, paving the way for the subsequent application to real case studies. The work carried out demonstrated that the spectral-based algorithm is a valid and reliable tool for early-stage damage identification, suitable for both output-only and input-output dynamic identification techniques and applicable to any type of structure.

CV: **Maria Giovanna Masciotta** obtained her 5-year Architecture degree with honours in 2010 from the University "G. d'Annunzio" of Chieti-Pescara (Italy) and in 2012 she joined a co-tutelle PhD programme in 'Geology and Structural Engineering and Design' and in 'Civil Engineering' between the University "G. d'Annunzio" and the University of Minho. In 2015 she obtained her Dual-PhD degree with the thesis entitled 'Damage Identification of Structures based on Spectral Output Signals'. Presently, she develops research in the field of structural health monitoring and damage identification of non-conventional systems.

> **High strain rate constitutive modeling for historical structures subjected to blast loading**

**Author:** Seyedebrahim Hashemi Rafsanjani  
**Supervisors:** Paulo B. Lourenco, Nuno Peixinho  
**Date:** May 7<sup>th</sup>, 2015  
**Summary:** The PhD thesis has been accomplished at the Department of Civil Engineering of University of Minho. This work involves detailed numerical studies intended to better understand the blast response of masonry structures. The present study proposes a dynamic 3D interface model that includes non-associated flow rule and high strain rate effects. Furthermore, a new strain rate dependent anisotropic constitutive material continuum model is developed for impact and blast applications in masonry, with validation using the high strain rate response of masonry walls. Iso-damage curves are addressed for typical masonry infill walls in Portugal under blast with different loading conditions, which can be adopted for practical use in the case of enclosures. Finally, the new continuum plasticity model is taken into engineering applications to solve real problems. The full-scale numerical simulation of the blast response of Al-Askari holy shrine is considered to practice and validate the model capability.



Composite yield surface-Interface model

CV: **Seyedebrahim Hashemi Rafsanjani** completed his PhD at ISISE, Department of Civil Engineering of University of Minho. His research aimed at developing two rate dependent constitutive material models for masonry. He also completed his Master major in Earthquake Engineering at Sharif University of Technology, Tehran, Iran. He has published several papers in international conferences and Journals.



## AWARDS & PRIZES

> **José Granja, Miguel Azenha, Christoph Sousa, Rui Faria, Joaquim Barros:** Awarded by the Japanese Concrete Institute 2015, in recognition for their contribution to the Journal of Advanced Concrete Technology with the paper entitled "Hygrometric Assessment of Internal Relative Humidity in Concrete: Practical Application Issues" (<http://dx.doi.org/10.3151/jact.12.250>).

> **Luís Simões da Silva:** The Director of ISISE was elected Member of the Portuguese Academy of Engineering. The ceremony took place during the commemorative session of the Engineering Academy Day, December 2014.



> **Chrysl Aranha:** Best Presentation Award in the ISISE Day-Out and 6<sup>th</sup> Workshop, April 2015.



> **Paulo B. Lourenço, Daniel P. Abrams, Nuno Mendes, Alexandre A. Costa, Alfredo Campos Costa:** Best Paper Award in the Fifteenth North American Masonry Conference with the article "Challenges in modeling out-of-plane seismic response of existing masonry buildings", May 2015.



> **Ashkan Shahbazian and Yong Wang:** Henry Adams Award by the Institution of Structural Engineers (UK) in Annual People and Papers Awards Luncheon 2015 for the best research and development paper entitled "Performance-based fire resistance design method for wall panel assemblies using thin-walled steel sections", June 2015.



## EVENTS

### > Workshop LVS3

**Venue:** Department of Civil Engineering, University of Coimbra

**Date:** December 11, 2014

**Summary:** The workshop of the dissemination project LVS3 "Large Valorisation on Sustainability of Steel Structures" took place on the 12<sup>th</sup> December 2014, in the Department of Civil Engineering in the University of Coimbra. The workshop was coordinated by Prof. Helena Gervásio and Prof. Paulo Santos and the invited speakers were, apart from Helena Gervásio and Paulo Santos, Prof. Luís Simões da Silva. The audience of this workshop

consisted of mainly engineers and other professionals working on the steel industry. The audience showed a great interest on the different subjects provided during the workshop and different discussions took place during the event.



### > Advanced Course in "Reliability and Risk Analysis"

**Venue:** University of Minho, Guimarães

**Date:** February 6-19, 2015

**Summary:** An advanced course on "Reliability and Risk Analysis" took place last February at University of Minho. The course, taught by national and international experts in the field of risk analysis, covered topics such as reliability and design codes, hazard identification, system analysis and risk analysis. The course was attended by 23 participants from 9 countries.



### > Workshop on Trends and Challenges for Wind Energy Harvesting

**Venue:** DEC - UC

**Date:** March 30-31, 2015

**Website:** [www.winercost.com](http://www.winercost.com)

**Summary:** WINERCOST is a COST Action aiming to merge the efforts of the European research groups working on the Wind Energy Technology (WET) and the pathways to introduce it by means of robust applications to the urban and suburban built environment, thus enhancing the concept of Smart Future Cities. This Action revisits safe, cost-effective and societally accepted wind energy technology for consideration in the design and development of the future urban/suburban habitat. The Workshop "Trends and Challenges for Wind Energy Harvesting" addresses the state of art of Wind Energy Technology from the point of view of

the applications on wind simulation and characterization, Built Environment Wind Energy Technology (BWT) advances, ON- and OFFSHORE projects and the social acceptance of WET installations. The proceedings of the workshop are available at:

[http://www.winercost.com/cost\\_files/WINERCOST\\_Workshop\\_Coimbra\\_FINAL\\_PROCEEDINGS.PDF](http://www.winercost.com/cost_files/WINERCOST_Workshop_Coimbra_FINAL_PROCEEDINGS.PDF)



> **ISISE Day-Out and 6<sup>th</sup> PhD Workshop 2015**

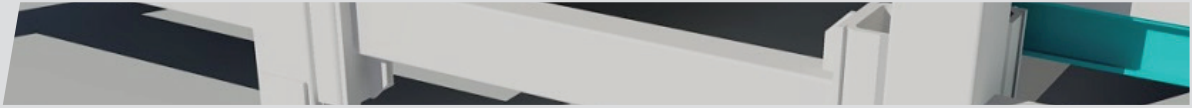
**Venue:** Santa Cruz do Douro, Baião, Portugal

**Date:** April 16-17, 2015

**Website:** [www.isise.net](http://www.isise.net)

**Summary:** The ISISE Day-Out and 6<sup>th</sup> PhD Workshop 2015 were a joint event, held on 16<sup>th</sup> and 17<sup>th</sup> April 2015. The event started with a boat cruise between Porto and Peso da Régua. During this trip “The Great Egg Drop” group activity was carried out. After arriving to Peso da Régua the group visited the “Quinta da Pacheca” and had the opportunity of tasting different Oporto wines. The 6<sup>th</sup> PhD Workshop 2015 was held at the Douro Palace Hotel, where 12 PhD students presented their current work. This was a great opportunity for all ISISE members (over 120 participants) to interact with each other, and also to have some nice time out. This event had also the participation of the new Advisory Committee of ISISE composed by Prof. Bozidar Stojadinovic, Prof. Thanasis Triantafillou and Prof. Olivier Vassart. The contribution of the previous Advisory Committee to the Research Centre was also highlighted.





> **1<sup>st</sup> Workshop of COST Action TU1404**

**Venue:** Ljubljana, Slovenia

**Date:** April 16-17, 2015

**Website:** [www.tu1404.eu](http://www.tu1404.eu)

**Summary:** The 1<sup>st</sup> Workshop of COST TU1404 Action entitled (“Focus on experimental testing of cement based materials”) was organized at University of Ljubljana, Faculty of Civil and Geodetic Engineering, (UL-FGG) Slovenia in April 16-17, 2015. The Action is chaired by ISISE member Miguel Azenha, who actively participated in the organization of the workshop,

which was mainly focused on the WG1 and the Round Robin Testing Program of COST TU1404.



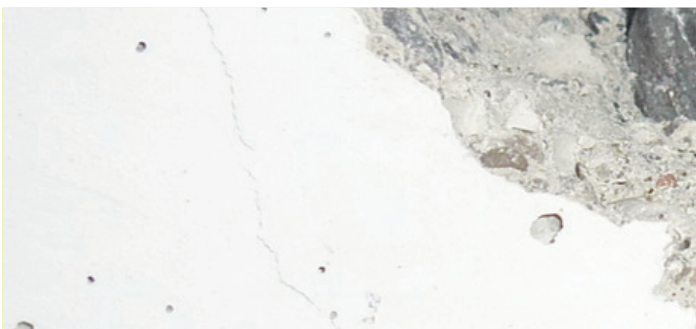
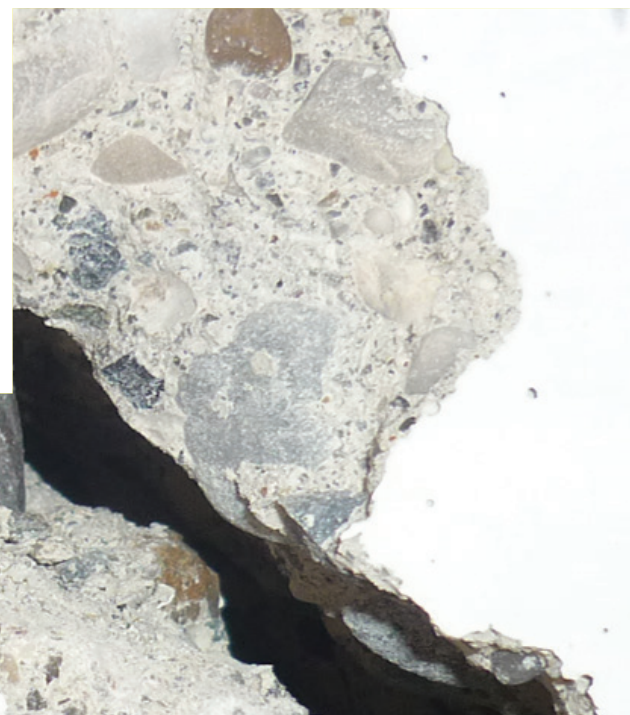
> **Offshore Structures Course**

**Venue:** University of Coimbra

**Date:** May 5-8, 2015

**Website:** [www.cmm.pt](http://www.cmm.pt)

**Summary:** The 2<sup>nd</sup> edition of the course “Offshore Structures” intended to provide knowledge regarding the design of offshore structures. This edition was attended by technicians connected to the oil and gas industry from all around Europe. The course was taught by experts from the University of Coimbra, Jérémy de Barbarin (Subsea 7) and Patrick Chopelin (Consultant, formerly Subsea 7), both well-renowned and active experts in the field of offshore structures.



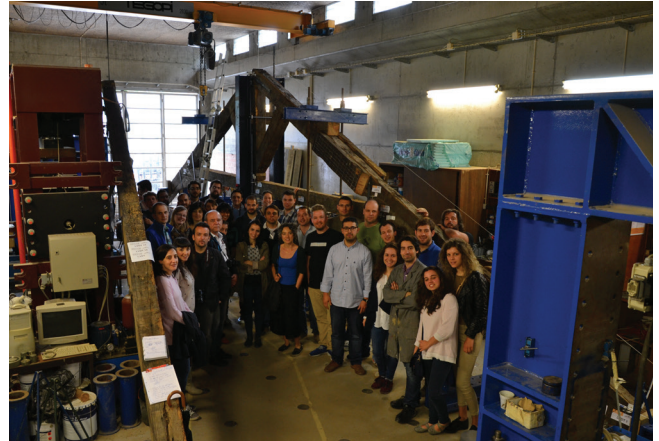
> FP1101 and RILEM TC 245 RTE Training School - Assessment and Reinforcement of timber elements and structures

**Venue:** University of Minho, Guimarães

**Date:** May 11-14, 2015

**Website:** <http://fp1101tsum.blogspot.pt/>

**Summary:** On the FP1101 and RILEM TC 245 RTE Training School experts of wood and timber engineering provided information on the assessment of existing timber structures, visual grading, intervention on heritage buildings and on repair and reinforcement. Full scale tests on ancient timber trusses and on traditional connections were made considering both the original conditions and reinforcement post failure.



## UPCOMING EVENTS

> *Seminário Paredes de Alvenaria*

**Venue:** Universidade Nova de Lisboa

**Date:** June 18<sup>th</sup>, 2015

**Website:** [www.civil.uminho.pt/paredes2015/](http://www.civil.uminho.pt/paredes2015/)

> *X Congresso CMM*

**Venue:** iParque - Parque Tecnológico de Coimbra

**Date:** November 26-27, 2015

**Website:** [www.cmm.pt/congresso10](http://www.cmm.pt/congresso10)

> *BIM Course (Building Information Modelling)*

**Venue:** Portuguese Engineers Association (Lisbon and Porto) - Course in Portuguese

**Date:** September to December, 2015

**Website:** [www.cursobim.com](http://www.cursobim.com)

