

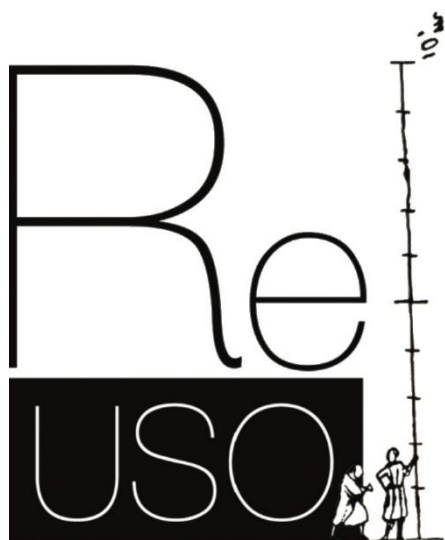


Documentation, Restoration and Reuse of Heritage

2-4 November 2022
Porto, Portugal

BOOK OF EXTENDED ABSTRACTS





Documentation, Restoration
and Reuse of Heritage

Book of Extended Abstracts

2-4 November 2022
Porto, Portugal

www.fe.up.pt/reuso

Extended Abstracts of the
Xth edition of the ReUSO - Documentation, Restoration and Reuse of Heritage

Format: Ebook (pdf)

ISBN: 978-972-752-297-2

Porto, Portugal, 2-4 November 2022

H. Varum, A. Furtado & J. Melo (eds.)

The Conference Organizing Committee are not responsible for the statements of opinions expressed in this publication. Any statements of views expressed in the extended abstracts contained in this Book are those of the author(s). Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

Chair

Humberto Varum
U.Porto / FEUP, Conference Chair

Honorary Committee

António Sousa Pereira (Rector) | UP | Portugal
Rui Artur Bártolo Calçada (Director) | FEUP | Portugal
João Pedro Xavier (Director) | FAUP | Portugal
Ignazio Marcello Mancini (Dean) | U. Basilicata | Italy
Giuseppe De Luca (Director) | U. Firenze | Italy
Aldo Corcella (Director) | DiCEM/U. Basilicata | Italy
Susanna Caccia Gherardini (Professor) | U. Firenze | Italy

ReUSO Founding Committee

Stefano Bertocci | U. Firenze | Italy
Giovanni Minutoli | U. Firenze | Italy
Fauzia Farneti | U. Firenze | Italy
Susana Mora | U.P. Madrid | Spain
Silvio Van Riel | U. Firenze | Italy

Organising Committee

Humberto Varum, Portugal
Alexandre Costa, Portugal
André Furtado, Portugal
Aníbal Costa, Portugal
António Arêde, Portugal
Bruno Marques, Portugal
Bruno Quelhas, Portugal
Cilísia Ornelas, Portugal
Clara Vale, Portugal
Esmeralda Paupério, Portugal
Hipólito Sousa, Portugal
Hugo Rodrigues, Portugal
João Miranda Guedes, Portugal

José Melo, Portugal
José Miguel Rodrigues, Portugal
Marco Faggella, Italy
Miguel Malheiro, Portugal
Nelson Vila Pouca, Portugal
Patrício Rocha, Portugal
Pedro Delgado, Portugal
Rui Póvoas, Portugal
Rui Silva, Portugal
Teresa Ferreira, Portugal
Vasco Freitas, Portugal
Xavier Romão, Portugal

Scientific Committee

Humberto Varum, Portugal
Agostino Catalano, Italy
Alexandre Costa, Portugal
Alice Tavares, Portugal
Ana Tostões, Portugal
Ana Velosa, Portugal
André Furtado, Portugal
Andrea Nanetti, Singapore
Angelo Lucchini, Italy
Aníbal Costa, Portugal
Antonella Guida, Italy
Antonello Pagliuca, Italy
Antoni Moreno-Navarro, Spain
António Arêde, Portugal
Antonio Conte, Italy
Calogero Bellanca, Italy
Camilla Mileto, Spain
Caterina Palestini, Italy
Clara Vale, Portugal
Damiano Lacobone, Italy

Juan A. García Esparza, Spain
Juan B. Aznar Mollá, Spain
Lorenzo Jurina, Italy
Luis Miguel Correia, Portugal
Luis Palmero Iglesias, Spain
Manlio Montuori, Italy
Manuela Grecchi, Italy
Marcello Balzani, Italy
Marco D'Orazio, Italy
Marco Faggella, Italy
Marco Morandotti, Italy
Marco Pretelli, Italy
Marco Tanganelli, Italy
Marcos Tognon, Brazil
Maria Fernandes, Portugal
María Paz Sáez Pérez, Spain
Mariana Correia, Portugal
Marianna Calia, Italy
Mariella De Fino, Italy
Marina Fumo, Italy

Daniel Oliveira, Portugal
 Daniela Concas, Italy
 Daniela Esposito, Italy
 Edoardo Curra, Italy
 Eduardo Júlio, Portugal
 Elena Cantatore, Italy
 Emanuela Chiavoni, Italy
 Emanuele Romeo, Italy
 Enrico Sergio Mazzucchelli, Italy
 Enrico Sicignano, Italy
 Enrico Spacone, Italy
 Esmeralda Paupério, Portugal
 Fabio Fatiguso, Italy
 Fauzia Farneti, Italy
 Fernando Branco, Portugal
 Fernando Pinho, Portugal
 Fernando Vegas, Spain
 Francesca Fatta, Italy
 Gianluca Belli, Italy
 Gianni Minutoli, Italy
 Giorgio Monti, Italy
 Giovanni Pancani, Italy
 Giovanni Santi, Italy
 Giuseppe Margani, Italy
 Graziella Bernardo, Italy
 Guido Camata, Italy
 Hipólito Sousa, Portugal
 Hugo Rodrigues, Portugal
 Ignacio Lombillo, Spain
 Inês Flores-Cólen, Portugal
 Ippolita Mecca, Italy
 Javier Mosteiro, Spain
 João Appleton, Portugal
 João Lanzinha, Portugal
 João Mascarenhas Mateus, Portugal
 João Miranda Guedes, Portugal
 Joaquim Teixeira, Portugal
 Jolanta Sroczynska, Poland
 Jorge Branco, Portugal
 Jorge Pinto, Portugal
 José Aguiar, Portugal
 José Melo, Portugal
 José Miguel Rodrigues, Portugal
 José Ramon Albiol Ibanez, Spain

Mario Bevilacqua, Italy
 Michele D’Amato, Italy
 Miguel Malheiro, Portugal
 Nadia Ieksarova, Ukraine
 Nelson Vila Pouca, Portugal
 Nicola Masini, Italy
 Nicola Santopuoli, Italy
 Nicola Tarque, Peru
 Nina Avramidou, Italy
 Nuno Valentim, Portugal
 Panagiotis Asteris, Greece
 Patrício Rocha, Portugal
 Paulo Cruz, Portugal
 Paulo Lourenço, Portugal
 Pedro Castro Borges, México
 Raffaella Lione, Italy
 Raimundo Mendes da Silva, Portugal
 Renata Prescia, Italy
 Reynaldo Esperanza Castro, Mexico
 Riccardo Gulli, Italy
 Rita Bento, Portugal
 Roberta Maria Dal Mas, Italy
 Roberta Spallone, Italy
 Roberto Castelluccio, Italy
 Romeu Vicente, Portugal
 Rosa Maria Caballero, Spain
 Rosário Veiga, Portugal
 Rui Póvoas, Portugal
 Sandro Parrinello, Italy
 Sérgio Lagomarsino, Italy
 Sibel Onat Hattap, Turkey
 Silvio Van Riel, Italy
 Soraya Genin, Portugal
 Stefano Bertocci, Italy
 Susana Alonso-Muñoyerro, Spain
 Tayyibi Abdelghani, Morocco
 Teresa Ferreira, Portugal
 Tiago Ferreira, Portugal
 Tiago Pinto, Portugal
 Vanessa Borges Brasileiro, Brazil
 Vasco Freitas, Portugal
 Veronica Vitiello, Italy
 Vito Domenico Porcari, Italy
 Xavier Romão, Portugal

CONTENTS

Plenary Keynote Lectures

Methodology for minimum intervention in sustainable Earthen architecture	1
<i>Aníbal Costa, Alice Tavares</i>	
Gran Canaria: patrimonio diverso	9
<i>Juan Sebastián López García</i>	
The rehabilitation of Bolhão Market, Porto. Project, process and the future of historical central markets	11
<i>Nuno Valentim</i>	

Participants communications

Process to optimize the life cycle of used timber elements.	13
<i>Stefania De Gregorio</i>	
The New Towns of Sierra Morena	15
<i>Emma Mora-Figueroa and José Luis Almansa</i>	
The Monastery of Sant Miquel d'Escornalbou (Tarragona, Spain): multidisciplinary research for the understanding of the relation between the religious complex, the territory and the European Franciscan network.	17
<i>Soler Maria, Ferretti Roberta and Cioli Federico</i>	
The abandoned mining complexes in Sardinia. Potential approaches to recover their value	19
<i>Dessì Maria</i>	
Problems of Intervention in Non-Monumental Architectures in Brazilian Historic Centers: a case study of the Tiradentes Town Hall.	21
<i>André Dangelo, Vanessa Brasileiro, Valéria França, David Machado and Luiza S. Araújo</i>	
The musealization of modern residential architecture	23
<i>Casale Teresa and Garda Emilia</i>	
Evaluating the impact of infrastructures on urban ecosystems: application of the Envision Protocol to the “Sopraelevata” of Genoa	25
<i>Vite Clara and Gaggero Marta</i>	
Valorisation and Reuse of Catholic Heritage in the Balkan Peninsula	27
<i>Trematerra Adriana, Gennaro Pio Lento and Luigi Corniello</i>	
The Palladian villas: landscape and architecture. Protection of an environmental system	29
<i>Giovanni Minutoli</i>	
Recovery and reuse in the walkway architecture: looking to the future for dismissed rural buildings in Italy and France	31
<i>Garda Emilia and Renzulli Alessandra</i>	
Natural hydraulic mortars for rehabilitation of historic buildings: review of the state of the art	33
<i>Fernanda Calado Mendonça and Lino Maia</i>	
Place and identity. Conceiving the Genius Loci	35
<i>Di Mari Giuliana, Garda Emilia Maria, Renzulli Alessandra and Vitale Denise</i>	
The Garden of Remembrance on the ruins of the Marburg synagogue in Germany: memory, identity and reuse	37
<i>Rossella Leone, Roberto Ragione and Nicola Santopoli</i>	
Maintaining and reusing in tourism accommodation construction in Baixo Tâmega Valley	39
<i>Jorge Pinto, Isabel Bentes, Cristina Reis, Paula Luísa, Sandra Pereira, Zięba Zofia and Anabela Paiva</i>	

Survey of the Leiria Castle Tower.....	41
<i>Carina Carmo, Ana Silva, Tamiris Dourado, Francisca Antunes, Francisca Pinto, Fábio Mota, Catarina Freitas, David Pereira, Vitor Antunes, Dener Silva, Inês Bourgeois, Ana Alves and Hugo Rodrigues</i>	
Understanding, interpreting, and shaping a dialogue between drawing and digital modelling. The case study of Donatello's Pulpit	43
<i>Sandro Parrinello, Francesca Picchio and Silvia La Placa</i>	
Earth-based mortars at the Wupatki Pueblo: a preliminary assessment through non-destructive testing	45
<i>Laura Gambilongo, Alberto Barontini and Paulo Lourenço</i>	
WoodBox modules: a flexible and re-usable emergency solution for temporary retail activities	47
<i>Lucchini Angelo, Mazzucchelli Enrico Sergio, Scrinzi Giacomo, Pastori Sofia, Stefanazzi Alberto, Silva Stefania and Severgnini Mario</i>	
The factory and its doom. Considerations about the non-application of the different knowledge for the restoration and use of industrial heritage in the case of Olivetti Brasil.....	49
<i>Di Mari Giuliana and Garda Emilia</i>	
The Rehabilitation Impact of Historic Houses on Cultural Heritage Sustainable Actions for the Historic Centre of Oporto, World Heritage Site.....	51
<i>Inês Rosa, Patrícia Moreira, João Miranda Guedes and Eduarda Vieira</i>	
Shen Joan Vladimirit Orthodox Monastery: reuse and conservation	53
<i>Trematerra Adriana</i>	
The Fort of SS. Salvatore in Messina. Relief, stratifications and degradation of a fortification between the Middle Ages and the Modern Age.....	55
<i>Alessio Altadonna, Giuseppe Martello, Antonino Nastasi and Fabio Todesco</i>	
Strategies for rural settlements and marginal areas regeneration: multiscale and multidisciplinary approach for a systemic process	57
<i>Fernanda Speciale, Manuela Grecchi and Laura Elisabetta Malighetti</i>	
Spaces, society, university: for a renewed teaching of restoration. The case study of Amideria Chiozza	59
<i>Alessandra Marin and Sergio Pratali Maffei</i>	
Improving Cultural Heritage conservation: LSTM neural networks to effectively processing end-user's maintenance requests.....	63
<i>Marco D'Orazio, Gabriele Bernardini and Elisa Di Giuseppe</i>	
CityGML-based models for the qualification of cultural built environment: the 3D Semantical City Model of the historic district of Carovigno (BR), Italy.....	65
<i>Margherita Lasorella, Elena Cantatore and Fabio Fatiguso</i>	
Recupero del campanile a vela della Chiesa di San Domenico a Bari	67
<i>Serra Alessandro de Marco Marina</i>	
Veiled Head. Restoration and extension of the town hall of Capo d'Orlando	69
<i>Pier Paolo Lagani</i>	
Towards zero plastic waste: reuse and recycling of PolyEthylene Terephthalate (PET) sand	71
<i>Beibei Xiong, Cristoforo Demartino, Devid Falliano and Giuseppe Carlo Marano</i>	
Bloco da Carvalhosa, The South Terraces Reinterpretation.....	73
<i>Henrique Ferreira, Carlos Maia and Paulo Mendonça</i>	
Adaptive reuse as a strategy for overcoming obsolescence: the "Mercato dei Fiori" in Pescia.....	75
<i>Maurizio De Vita, Laura Marchionne and Elisa Parrini</i>	
The recognition of cultural value as an element of the recovery project for the XX Century Heritage. Application of the ICOMOS Methodology to the ex S.M.O.M. of Pozzuoli	77
<i>Veronica Vitiello, Roberto Castelluccio and Silvia Trampetti</i>	
A methodology for the comfort upgrading and the microclimate management: a case study.....	79
<i>Mariangela De Vita, Chiara Marchionni, Marianna Rotilio, Giovanna Di Cresce and Pierluigi De Berardinis</i>	

Methodological proposal for the analysis of the heritage values of buildings for intervention decisions	81
<i>Fatima Benchenni and Juan Monjo-Carrió</i>	
Healthcare setting enhancements for Covid-19 emergency: sustainability and seismic management	83
<i>Chiara Marchionni, Martina Sciomenta, Giulio D'Alessandro, Francesco Carozza and Massimo Fragiaco</i>	
Circular approach for deep renovation of historic building heritage. The case of a manor villa in Argelato, Bologna	85
<i>Cecilia Mazzoli, Lorna Dragonetti, Rachele Corticelli and Annarita Ferrante</i>	
The use and the conservation of historic buildings. Case studies in the Alentejo region, Portugal	87
<i>Maria Fernandes and Maria João Costa</i>	
Place and identity. Conceiving the <i>Genius Loci</i>	89
<i>Giuliana Di Mari, Emilia Maria Garda, Alessandra Renzulli and Denise Vitale</i>	
The Preservation of Built Heritage Typical Characteristics in through the Codes of Practice. An Operational Tool for the Renovation of San Giovanni Lipioni's Heritage	91
<i>Carlo Constantino, Anna Chiara Benedetti, Nicola Mantini, Cristiana Bartolomei and Giorgia Predari</i>	
Influence of calcium chloride on the properties of lime pastes with pozzolanic additions.	93
<i>Leane Priscilla Bonfim Sales and Aline Figueiredo da Nóbrega</i>	
The building of the Gioventù Italiana del Littorio in Forlì converts into a Museum of Gymnastics and an Auditorium. Restoration and reuse of dissonant architecture	95
<i>Andrea Savorelli and Chiara Atanasi Brilli</i>	
Historical rural architecture of North Portugal and Spanish Galicia – analysis of vernacular forms and concept of adaptation for cultural tourism needs, case study of Porreiras in Portugal	97
<i>Marta Orszt and Elżbieta Raszeja</i>	
Glocalization design strategies of multinational enterprises in the context of revitalizing historic districts: Case studies in China and Europe	99
<i>Xi Wei, Xin Wu, Qiang Xu, Jiajun Li and Marianna Calia</i>	
Indoor air quality and ventilation: two fundamentals to define Healthy Buildings	101
<i>Maria Sofia Savoca Ludovica</i>	
Projection mapping for the enhancement of Estense wall paintings: a workflow for complex surfaces and the management of colors.....	103
<i>Manuela Incerti and Stefano Giannetti</i>	
Integrated investigation methodologies for architectural Heritage conservation and promotion: La Romita di Cesi (TR), Umbria, Italy	105
<i>Anastasia Cottini and Pietro Becherini</i>	
Bridging tradition and modernism in the reuse of built heritage. Fernando Távora's design approach at the Porto University Club	107
<i>David Ordoñez-Castañon and Teresa Cunha Ferreira</i>	
Review on the application of ceramic residues in mortars	109
<i>Fernanda Calado Mendonça and Lino Maia</i>	
The reuse of the architectural heritage in a state of ruin as a strategy for the conservation. The “Canto di Stampace” in Pisa	111
<i>Laura Marchionne and Elisa Parrini</i>	
Start over from the fragment. Some notes on old Gibellina and new Gibellina.	113
<i>Daniela Esposito and Daniela Concas</i>	
The energy requalification of an author's social housing complex Ridolfi's INCIS houses: a challenge for heat-reflective coatings.....	115
<i>Giuseppina Currò, Ornella Fiandaca and Giovanni F. Russo</i>	
Waterfront Renaissance in Bagnoli (Italy).	117
<i>Angelica Rocco and Dora Francese</i>	

Sustainability in historic centres. Analysis of different variables of the built environment	119
<i>Cristina Buenaño, Juan A. García-Esparza and Pablo Altaba</i>	
The reuse of Lisbon convent typologies into collective housing.....	121
<i>José Miguel Silva</i>	
Technical analysis of the use of the waste from ornamental rock in coating mortar	125
<i>Ivna Alves de Lima, Helaine Silva Nascimento, Perboyre Barbosa Alcântara</i>	
Ancient Monastery of S. Spirito in Bergamo: the rebirth.....	127
<i>Beatrice Bolandrini, Roberta Grazioli and Simone Tribbia</i>	
Fragility and recovery of colonial architecture: toward sustainable rehabilitation in Morocco	131
<i>Giovanni Santi and Majda Abida</i>	
The value of use and scheduled maintenance of historical buildings with architectural interest: the case study of the Quaglietta Castle in Campania (Italy).	133
<i>Eliana Basile and Gigliola D'Angelo</i>	
The reuse and reliving of space in architectural heritage. Proposal for intervention in Tabacalera, Valencia	135
<i>Graziella Bernardo and Luis Manuel Palmero Iglesias</i>	
Intervention Methodology in the Porto Burgeoise House – The conservation of heritage values is an environmentally sustainable action	137
<i>Joaquim Teixeira and Rui Fernandes Póvoas</i>	
The cloister of Santa Marta in Bergamo: from the restoration by Luigi Angelini to the current context of the new Piacentiniano Centre.....	139
<i>Antonella Versaci and Alessio Cardaci</i>	
Adaptive reuse of built heritage in Portugal: Alcino Cardoso House (1971-1991) by Álvaro Siza as a reference case study	141
<i>Teresa Cunha Ferreira, Eleonora Fanitini, David Ordoñez-Castañon, Miguel Coutinho and Tiago Cruz</i>	
The Rehabilitation Impact of Historic Houses on Cultural Heritage Sustainable Actions for the Historic Centre of Oporto, World Heritage Site.....	143
<i>Inês Rosa, Patrícia R. Moreira, João Miranda Guedes and Eduarda Vieira</i>	
Sustainable assessment for ancient timber structures with multi criteria decision analysis: the Cloister of Michelangelo in the Diocletian Baths	145
<i>Silvia Santini, Vittoria Borghese and Carlo Baggio</i>	
Presentation of a methodology for the analysis of old industrial chimneys	147
<i>Rui Silva, Nelson Vila Pouca, Patrício Rocha, Paupério Esmeralda and António Arêde</i>	
Understanding to maintain the INA-CASA experimentation. Minnucci and public housing in Brindisi.....	149
<i>Carla Chiarantoni</i>	
Fortresses in Portugal. Conservation and basis for new uses	151
<i>Esmeralda Paupério, António Arêde and Rui Silva</i>	
Raw earth and 'circular' application methodologies 4.0	153
<i>Giulio Pacente, Antonella Guida, Graziella Bernardo and Luis Manuel Palmero Iglesias</i>	
H-BET Historic Built Environment Typologies. Open spaces and SUOD events in the compact historic town	155
<i>Edoardo Currà, Alessandro D'Amico, Martina Russo, Marco Angelosanti, Enrico Quagliarini and Cassia De Lian Cui</i>	
The reuse of an aristocratic palace in inland Cilento (Salerno, Italy).....	159
<i>Francesco Polverino and Claudia Sicignano</i>	
Hypothesis of “Dogana” recovery at the Magdalena Bridge.....	161
<i>Renato Iovino, Ippolita Mecca, Emanuele La Mantia and Flavia Fascia</i>	
Garden as Architectural Heritage of the Bastion Castle Ensemble	163
<i>Olha Tikhonova</i>	

Recovering the modern. A “fragile” work of Ignazio Gardella.....	165
<i>Annalisa Dameri and Paolo Mellano</i>	
The difficult “reuse” of historical heritage: the case of the Scardavilla di Sopra Monastery in Meldola.....	167
<i>Fauzia Farneti and Silvio Van Riel</i>	
Traditional Dwellings as Wildlife Habitat – Baixo Tâmega Valley Case.....	169
<i>Jorge Pinto, Isabel Bentes, Zofia Zięba, Cristina Reis and Sandra Pereira</i>	
The palace of the Forest and Grove of Heras: intervention of Manuel del Olmo in a property of the duke of Infantado.....	171
<i>Carlos González Duque</i>	
Pro-mobility: analysis, study and research of the most inaccessible archaeological heritage.....	173
<i>Adela Rueda Márquez de la Plata, Pablo A. Cruz Franco and Jorge A. Ramos Sánchez</i>	
Polychrome majolica of Apulian domes: history, technique, pathology and conservation.....	175
<i>Mariella de Fino, Vito Domenico Porcari, Albina Sciotti, Stefano Sica, Antonella Guida and Fabio Fatiguso</i>	
Regeneration and salutogenic design and regeneration for building heritage.....	177
<i>Rosa Maria Vitranò</i>	
The role of landscape study in Architecture Degree courses.....	179
<i>Cecilia Sodano and Nicola Santopuoli</i>	
A teaching experience in cooperation between University and Municipality for the reuse of an architectural complex in Northern Italy.....	181
<i>Eva Coisson, Chiara Vernizzi and Elena Zanazzi</i>	
Traditional Materials in Higher Education.....	183
<i>Ana Velosa</i>	
The Sacro Monte and the Convent of San Vivaldo in Montaione (FI).....	187
<i>Giovanni Pancani and Lorenzo Matteoli</i>	
Architectural heritage: intervention to continue.....	189
<i>Miguel Malheiro</i>	
Villages and regeneration.....	191
<i>Claudia Battaino and Maria Paola Gatti</i>	
Diagnostics archive data for the analysis of the Architectural Heritage’s conservation state.....	193
<i>Laura Morero, Francesca Visone, Vito Domenico Porcari, Guida Antonella and Massini Nicola</i>	
Identity of Apulia’s wine heritage. Knowledge and valorisation of the F.lli Folonari wine establishment in Squinzano (LE).....	195
<i>Antonella Guida, Graziella Bernardo, Antonio Monte, Alessandro Lanzolla and Alexia Giannone</i>	
Documentation, conservation, and reuse planning activities for disused cultural heritage.....	197
<i>Marco Morandotti and Elisabetta Doria</i>	
Behavioural decision-making in sustainable conservation of built heritage.....	199
<i>Joana Gonçalves, Ricardo Mateus, José Silvestre and Ana Pereira Roders</i>	
Microclimatic monitoring as basis of a project process: an experimentation in Rome.....	201
<i>Gaia Turchetti</i>	
Around roman square: digital documentation and communication.....	205
<i>Martina Attenni, Vittoria Castiglione, Alfonso Ippolito, Mahsa Noursati Kordkandi and Simone Helena Tanoue Vizioli</i>	
The reuse of S. Domenico Church in L’Aquila; adaptive strategies for the design of a new congress hall.....	207
<i>Alessandra Bellicoso, Pierluigi De Berardinis, Mariangela De Vita, Danilo Di Donato, Gianni Di Giovanni, Tullio de Rubeis, Marianna Rotilio and Alessandra Tosone</i>	
Sustainable reuse of vernacular architecture for rural tourism development.....	209
<i>Albina Sciotti, Mariella De Fino and Fabio Fatiguso</i>	

The training of the conservator-restorer in the School of Arts of the Universidade Católica Portuguesa (Porto-Portugal). The challenges of 21st century towards sustainable conservation.....	211
<i>Eduarda Vieira and Patrícia Moreira</i>	
The theoretical foundation of architectural restoration.....	213
<i>Cesare Crova</i>	
Architectural Restoration between Research and Project: results of the first decade of experience in the Building Engineering-Architecture Course (2012-2022)	215
<i>Nicoletta Marconi and Valentina Florio</i>	
Teaching Architectural Conservation Design: a resilient experience during COVID-19 pandemic in Brazil	219
<i>Pedro Murilo Gonçalves de Freitas</i>	
Behavioural-design-based risk assessment and mitigation against floods in historical urban built environment: a virtual reality approach.....	221
<i>Gabriele Bernardini, Alessandro D'Amico, Enrico Quagliarini and Ruggiero Lovreglio</i>	
Toward quick multi-risk mitigation in historic Public Open Spaces: a behavioral-design approach in typological scenarios for heatwaves and terrorist acts	223
<i>Gabriele Bernardini, Enrico Quagliarini and Marco D'Orazio</i>	
Implementing open-source information systems for assessing and managing the seismic vulnerability of historical constructions.....	225
<i>Rafael Ramírez Eudave, Daniel Rodrigues, Tiago Ferreira and Romeu Vicente</i>	
Probabilistic analysis of the corrosion hazard at territorial scale for supporting the preservation of concrete structures in coastal areas.....	227
<i>Giuseppe Quaranta, Gian Felice Giaccu, Bruno Briseghella and Camillo Nuti</i>	
Spontaneous rural settlements in the Emilia 2012 seismic aftermath: strategies for the enhancement of the countryside landscape.....	229
<i>Montuori Manlio</i>	
Diagnostic campaigns and structural assessment of an existing masonry buildings	231
<i>Riccardo Mario Azzara, Vieri Cardinali, Maria Teresa Cristofaro and Marco Tanganelli</i>	
Compression behaviour of heavily damaged concrete specimens confined with FRP	233
<i>Alfonso Cobo Escamilla, María Isabel Prieto Barrio, Alicia Zaragoza Benzal and Daniel Ferrández Vega</i>	
Use of stainless-steel corrugated bar as reinforcements in new and heritage concrete structures that require enhanced durability	235
<i>Asunción Bautista and Francisco Velasco</i>	
Extreme wind events and risk mitigation: overview and perspectives for resilient building envelopes design in the Italian context.....	237
<i>Enrico S. Mazzucchelli, Giacomo Scrinzi, Sofia Pastori, Paolo Rigone, Angelo Lucchini, Dario Trabucco and Martino Milardi</i>	
Effect of corrosion on the mechanical behaviour of reinforcement in concrete structures.....	239
<i>Alfonso Cobo Escamilla, María Isabel Prieto Barrio, Alicia Zaragoza Benzal and Daniel Ferrández Vega</i>	
Traditional stone masonry walls subjected to blast and axial loadings	241
<i>J. F. M. Conceição, Fernando Pinho and Joaquim B.</i>	
Evaluation of the seismic vulnerability of Coimbra's old city center: A comparative study between 2009-2021	243
<i>Marcos Antonio Chiamulera, Tiago Ferreira, Romeu Vicente and J. Mendes da Silva</i>	
Optimal reinforcement of existing masonry and reinforced concrete structures using evolutionary algorithms.....	245
<i>Fabio Di Trapani, Antonio Pio Sberna, Cristoforo Demartino and Giuseppe Carlo Marano</i>	
Methodology for Assessing the Degradation Level of Existing Structures with a Parameterized Cubic Damage Model	247
<i>Erik Dutra and João Pantoja</i>	

SHM for failure propagation detection in steel truss bridges	249
<i>Manuel Buitrago, Giacomo Caredda, Elisa Bertolesi, Cristina Porcu, Pedro Calderón and José Adam</i>	
Seismic vulnerability assessment of a Medieval urban cluster identified as a complex Historical Palace: Palagio di Parte Guelfa in Florence	251
<i>Vieri Cardinali, Anna Caranti, Anna Livia Ciuffreda, Massimo Coli, Mario De Stefano and Marco Tanganelli</i>	
Three in one. A step towards a rehabilitation 4.0	253
<i>Isabel Bentes, Jorge Pinto, Sandra Pereira, Carla Teixeira and Anabela Paiva</i>	
Reflections on the mismatch between historic preservation and risk management policies in Brazil: case study of the municipality of Cachoeira, Bahia	257
<i>Alexandra Cruz Passuello, Eloisa Maria Adami Giazzon, Vanessa Gomes Gonçalves, Bruna Souza Rosa and Maria da Graça Andrade Dias</i>	
The Assessment of Urban Identity: A Methodological Approach.....	259
<i>Alexandra Calheiros, Joana Correia, Íris Gouveia and Inês Lopes</i>	
Catastrophic Destruction of the Cultural Heritage of Odessa, XX-XXI c.c.	261
<i>Nadiia Yeksarova, Vladimir Yeksarov and Andrii Yeksarov</i>	
Sarajevo military brownfields. Principles for adaptive reuse	263
<i>Salihbegović Amra and Chizzoniti Domenico</i>	
Mosul's cultural and social heritage reconstruction after ISIS war.....	267
<i>Laura Nicolini</i>	
Architectural heritage and armed conflicts. The bombing of Potenza in Basilicata in 1943	269
<i>Enza Tolla and Giuseppe Damone</i>	
War, yesterday and today. Documentation of the destruction of and damage to historic-monumental buildings through testimony and recounting by the mass media.....	271
<i>Maria Giovanna Putzu, and Fabrizio Oddi</i>	
The Fairground of Lebanon in Tripoli between pre-war and post-war period. Events, Meanings and Future	273
<i>Francesca Albani and Joe Zaatar</i>	
The DALIH database for recording disaster damage and loss data for cultural heritage	275
<i>Xavier Romão, Esmeralda Paupério and Olha Tikhonova</i>	
The renovation of the urban space of the industrial areas discontinued after the second world war. The case of the Costantino cotton factory in Bari.....	277
<i>Carla Chiarantoni</i>	
Workflow for virtualisation of historic gardens and their vegetation. The historic garden of la Arguijuela de arriba (Cáceres, España)	279
<i>Carlos Rodríguez Sánchez, Pablo Alejandro Cruz Franco and Elena Gómez Bernal</i>	
Some remarks on the interoperability performance of HBIM models for structural conservation and upgrading of building aggregates in the Italian minor centres.....	281
<i>Adriana Marra, Giovanni Fabbrocini and Ilaria Trizio</i>	
Pantalica Rupestre: digital survey for the image of rock-cut Architecture	283
<i>Carlo Inglese, Roberto Barni and Marika Griffo</i>	
Assessing the quality of Terrestrial Laser Scanning and Mobile Laser Scanning for a preliminary approach to a study on laser scanning of historic gardens	285
<i>Caroline Machado and Graziella Del Duca</i>	
Computational 3D modeling supporting the preservation of historic timber roofs: the case of San Pietro's Cathedral in Bologna	287
<i>Angelo Massafra, Davide Prati, and Giorgia Predari</i>	
On surfaces over time: assessment of degradation and monitoring of the effectiveness of consolidation and protective treatments	289
<i>Graziella Bernardo, Antonella Guida and Francesca Visone</i>	

Decay detection in historic buildings through image-based deep learning	291
<i>Bruno Silvana, Rosella Alessia Galantucci and Antonella Mussico</i>	
Methodology for the generation of 3D city models and integration of HBIM models in GIS: Case studies	293
<i>César A. Carrasco, Ignacio Lombillo and Javier M. Sánchez-Espeso</i>	
Implementation of a structural health monitoring using optic fiber sensors in the Monastery of Batalha	295
<i>Inês Bourgeois, Luís Pereira, Paulo Antunes, Carlos Marques, Victor Ferreira and Hugo Rodrigues</i>	
Physical prototyping of digital twins for the documentation, protection and dissemination of Heritage	297
<i>Maria Pérez Sendín, Pablo Alejandro Cruz Franco and Antonio Gordillo Guerrero</i>	
Integration of 3D modelling with photogrammetry applied on historical images for cultural heritage.....	299
<i>Francesca Condorelli and Sara Morena</i>	
LabSAMPA – Laboratory for documentation of historical architecture in São Paulo: An experience of didactic cooperation between the Faculdade de Arquitetura e Urbanismo da Universidade de São Paulo and the Dipartimento di Architettura dell'Università degli Studi di Firenze, using Laser Scanner 3 D technology and photogrammetry.....	301
<i>Stefano Bertocci, Regina Helena Vieira Santos, Luciano Migliaccio and Beatriz Piccolotto Bueno</i>	
Scan-to-BIM applied to heritage conservation: a case study of Aldeia do Fajaco	303
<i>Gabriel Sugiyama, Hugo Rodrigues and Fernanda Rodrigues</i>	
3D digitalisation techniques for the HBIM modelling of an existing building. Application to the inventory of defects and the management of the maintenance of a facade	305
<i>César A. Carrasco, Javier M. Sánchez-Espeso and Ignacio Lombillo</i>	
Photogrammetry and 3D printing for conservation and disclosure of Cultural Heritage	307
<i>Sara Gonizzi Barsanti and Adriana Rossi</i>	
New life for on-site concrete demolition for a recovery project in Tres Cantos, Madrid: from residue to green finishing.....	309
<i>Giuseppe Trinchese, Alessia Verniero and García López de la Osa Gregorio</i>	
Monitoring the thermal comfort of a multifamily housing building from the Modern Movement period	311
<i>Ivo Silva, Carlos Maia and Paulo Mendonça</i>	
Remote Sensing and architectural survey for the restoration of Al Raabiya mosque, Mosul (Iraq).....	313
<i>Stefano Bertocci, Matteo Bigongiari and Pietro Becherini</i>	
Material re-use in 3D printed building components	315
<i>Stelladrianna Volpe, Sangiorgio Valentino, Andrea Petrella, Michele Notarnicola, Humberto Varum and Fiorito Francesco</i>	
Integrated approach based on UAV and NDT for assessment of Roman Concrete Groin Vaults.....	317
<i>Silvia Santini, Carlo Baggio, Valerio Sabbatini and Claudio Sebastiani</i>	
Implementation of a wireless structural monitoring system and reverse engineering for numerical analysis purposes of a 16th century church	319
<i>António Arêde, Susana Moreira, Gabriel Ferreira, Clara Vale, Hugo Pires, Luís Garcia and Orlando SousaSilvia Santini, Carlo Baggio, Valerio Sabbatini and Claudio Sebastiani</i>	
Visual and beyond: densifying data for rehabilitation projects	321
<i>André Ferreira, Nuno Ramos, Miguel Almeida and Silvia Aires</i>	
Managing a complexity of details. Studies to re-use the stable of the Calendasco's castle.....	323
<i>Michela Marisa Grisoni, Nicola Badan and Davide Zanon</i>	
Climate impacts on architectural heritage, an overview on deterioration processes and potential use of new technologies.....	337
<i>Diogo Bernardes Pereira, Pedro Miguel Rodrigues, Eduarda Vieira, Patrícia Moreira and Liliana Araújo</i>	

Intervention Methodology in the Porto Bourgeois House - Conservation of heritage values as an environmentally sustainable action

Joaquim Teixeira – Centro de Estudos de Arquitectura e Urbanismo da Faculdade de Arquitectura da Universidade do Porto, Portugal, e-mail: jteixeira@arq.up.pt

Rui Fernandes Póvoas - Centro de Estudos de Arquitectura e Urbanismo da Faculdade de Arquitectura da Universidade do Porto, Portugal, e-mail: rpovoas@arq.up.pt

Extended abstract

Nowadays, it is very clear that it is no longer possible to maintain a position, be it political, ideological or of any other nature, defending infinite growth, when it is obvious that the planet doesn't grow, that the emission of pollutants keeps reaching historic highs and that natural resources are being exhausted. The increasing awareness of the non-sustainability of our society model, not only environmental, but also economic, social and political (because it has been unable to solve people's problems), calls for an urgent change of paradigm.

Having buildings and the construction industry major responsibilities in the emission of pollutants and the consumption of resources, they will certainly be targeted in the expected and necessary changes leading to a new paradigm of society in the near future, which should include paying more attention to existing buildings, making them more energy efficient and improving their performance, in order to reduce their environmental footprint. Nevertheless, for rehabilitation activity to be environmentally sustainable, it should be based on the concept of minimal intervention, avoiding profound transformations, so as to reduce as much as possible the actuation and focusing on the essential, thus seeking to maintain, as far as possible, the existing, promoting its reuse.

The bourgeois houses of Porto represent an inestimable heritage of the city, inseparable from its monuments and public spaces, currently at serious risk of disappearing, not only due to the neglect of several decades, but also to the current actions of speculative intervention. These are single-family houses, narrow, tall and very deep, with granite elevations of an austere appearance, which contain interiors that may present real surprises in the arts of stucco, falsework or woodwork and carpentry. This edification reflects centuries of cultural, historical, social and architectural values, which have been gradually disappearing, with the demolition of its interiors and the indiscriminate association of the parcels, erasing forever an important part of our identity.

The knowledge about the constructive system of these houses, deepened throughout hundreds of academic works, as well as the perception of the several attacks to its safeguard, motivated the development of a doctoral study [1] with the main goal of conceiving a methodology of intervention in this edification. In general terms, the methodology is composed of the following stages: decision to intervene; knowledge of the existing; intervention project; execution; and time of useful life, forming a circular sequence.

The evidence of a great systematisation of procedures, not only regarding the materials used, but also the construction techniques, enabled the conception of a constructive model of the houses, which constitutes the basis of the intervention methodology.

The constructive model becomes very useful in the stage of knowledge of the existing building, enabling the establishment of analogies with each case of intervention, either for the geometric and constructive surveys, or for the identification of elements of value, of changes introduced, or for the assessment of damages and anomalies. In the methodology, the knowledge of the existing is of the utmost importance for the development of the subsequent stages, as well as for the qualification of the interventions.

The recommended interventions contemplate five actions: selective demolition; structural reinforcement; repair of anomalies; performance improvement; and addition of new elements. Except for the demolition and the addition of new elements, the remaining actions propose intervention solutions in three degrees of intrusiveness: slightly, moderately and highly intrusive. As regards performance improvement, to each of the degrees of intrusiveness a level of performance is associated, i.e., the less intrusive interventions are those with the lowest level of performance, while the most intrusive come close to the standards established by the typified reference solutions.

Soon after the end of a rehabilitation a new cycle of useful life of the building starts, marked by a progressive and complex process of degradation, which should be mitigated by adequate maintenance operations, until it is necessary to carry out a more profound intervention. For this truly sustainable practice to work, it is important to adopt a Use and Maintenance Manual, complemented by the Identity Booklet of the building. In both documents, the adoption of the constructive model proved to be of the utmost importance in the detailed description of the basic rules of use and care of the building and its components, in the indication of the maintenance needs and in the register of the occurrences and interventions carried out, be they of maintenance, recuperation or replacement.

In short, the desirable and necessary change towards a truly sustainable architecture - environmentally, economically and socially - should be fundamentally directed towards intervention in the existing building, following principles of minimal intervention, based on maintenance and conservation, which preserve the identity and authenticity of the existing heritage values.

References

- [1] Teixeira J. Salvaguarda e Valorização do Edifício Habitacional da Cidade Histórica. Metodologia de Intervenção no Sistema Construtivo da Casa Burguesa do Porto. Tese de doutoramento. Porto: FAUP; 2014.