

Lecture Notes in Civil Engineering

Rossella Corrao · Tiziana Campisi ·
Simona Colajanni · Manfredi Saeli ·
Calogero Vinci *Editors*

Proceedings of the 11th International Conference of Ar.Tec. (Scientific Society of Architectural Engineering)

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Editors

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Editors

Rossella Corrao
Department of Architecture
University of Palermo
Palermo, Italy

Tiziana Campisi
Department of Architecture
University of Palermo
Palermo, Italy

Simona Colajanni
Department of Architecture
University of Palermo
Palermo, Italy

Manfredi Saeli
Department of Architecture
University of Palermo
Palermo, Italy

Calogero Vinci
Department of Architecture
University of Palermo
Palermo, Italy

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Preface

The series of technical conferences on Architectural Engineering (AE) annually involve academics and experts to discuss about the recent advancements of the research in the building sector, to find and promote innovative solutions, both at buildings and components scales; to develop building systems and materials, able to improve the energy efficiency of buildings and counteracting climate changes; to ensure the well-being of users by guaranteeing indoor and outdoor comfort; to preserve the building heritage and safeguarding cities, landscapes and territories. Since its beginning in Vico Equense, Naples, Italy, where the first Colloqui.AT.e conference was launched in 2014, the series of conference have been centered on three different Topics related to the main fields of research in Architectural Engineering. Actually, from 2004 Ar.Tec. Scientific Society promoted a series of itinerants thematic conferences focused on: the intersections between architecture and technology (Rome, 2004); the preservation of the building heritage (Tourin, 2006); the design of the building envelope (Ancona, 2007) and of the care spaces, between complexity and innovation (Pavia, 2008); the earthquake and the strategies to remember, prevent and plan (Messina, 2009); sharing technical knowledge derived from the research on building design and construction (Rome, 2011).

Colloqui.AT.e2024, subtitled: “Architectural Engineering in Italy and Worldwide. Comparing Experiences”, has also been structured upon traditional and emerging topics related to: “Construction and Conservation History”; “Construction and building performance”; “Building Design and Technologies” that allowed researchers and engineers to discuss at international level the latest developments in AE area. AE aims at providing “tools, methods, and models, including digital ones, for the knowledge and design of buildings, from the critical, systemic, functional, typological, technical, and constructive point of view”, by exploiting also the technology transfer from other fields of research belonging to different scientific sectors close to it.

The three topics have been defined as follow:

A_Construction and Conservation History

- A1. Materials and construction techniques in historical architecture*
- A2. Recovery, valorization, and reuse of existing building heritage*
- A3. Examples of interventions on monumental architecture*
- A4. Examples of industrial archaeology between knowledge and reuse*
- A5. Vernacular architecture: lessons learned and future projects*
- A6. Projects and policies for the regeneration of historic centers and suburbs*
- A7. Digital twins and immersive visualization for the valorization, management, and fruition of historical building heritage*

B_Building Construction and Performance - Vol. 2, ISBN 978-3-031-71862-5

- B1. Traditional and innovative technologies and materials for buildings*
- B2. Modeling, simulation, and diagnostics under uncertainty for performance control*
- B3. Building pathologies and intervention strategies*
- B4. Building-human-environment relationships: extended accessibility*
- B5. Building management and maintenance for safety and quality of living environments*
- B6. Mitigation and management of vulnerabilities and risks for the preservation of the built environment*
- B7. Regulatory updates, quality control of the project and construction process*

C_Building Design and Technologies - Vol. 2, ISBN 978-3-031-71866-3

- C1. Form, technique, and technology*
- C2. Circular Design, Embodied Carbon, and extended buildings life cycle*
- C3. Digital transition and design of 4.0 buildings*
- C4. Technological innovation: processes, patents, and products for the construction of the future*
- C5. Integral and participatory design for the quality of the built environment*
- C6. Adaptive and responsive buildings*
- C7. DfMA—Design for Manufacturing & Assembly and DfD—Design for Disassembly*

During the conference, 9 selected papers (among the 145 scientific contributions received) and three keynote lectures have been presented. The three volumes collect all submitted and double-blind peer reviewed papers as well as the contributes related to the three valuable key lectures that opened the conference sessions.

More specifically, these three lectures were kindly provided, for Topic A_Construction and Conservation History (Vol. 1), by James W.P. Campbell, Professor of Architecture and Construction History at the University of Cambridge and Director of Studies in Architecture and History of Art in Queens' College, Cambridge, UK; for Topic B_Building Construction and Performance (Vol. 2), by Mattheos Santamouris, Scientia, Distinguished, Professor of High Performance Architecture at University of New South Wales (UNSW), in Sydney, Australia, and past Professor in the University of Athens, Greece; for Topic C_Building Design and Technologies (Vol. 3), by Joachim Eble, Architect, founder and owner of Eble Messerschmidt Partner, Tubinga, Germany.

The research papers collected in these Volumes testify that today AE multi/interdisciplinary approach can effectively contribute to the analysis and solving problems affecting buildings, cities, and the built environment, by suggesting innovative technical solutions/materials/components and strategies, which are able to guarantee the preservation of the building heritage, the well-being of users, and the appropriate actions to counteract climate changes.

The eleventh edition of the Colloqui.AT.e conference has been jointly organized by Ar.Tec. Scientific Society and the Department of Architecture of the University of

Palermo, with the Patronage of: Department of Engineering of the University of Palermo, Sicilian Region, Agenzia del Demanio Sicilia, Provveditorato Opere Pubbliche Sicilia e Calabria - Ministry of Infrastructures and Transport, Confrestauro Association. The conference was also sponsored by: BCI Bautechnik Group Srl-Buffa S.r.l. (www.buffa.eu), CNT- Domodry S.r.l. (www.domodry.it), INNOVA S.r.l. (www.innovaenergie.com), MICROGEO S.r.l. (www.microgeo.it), XLAM Dolomiti S.p.a. (www.xlamdolomiti.it/en/), CusenzaMarmi (www.cusenzamarmi.com), Guglielmino Soc. Coop. (www.guglielminocooperativa.it), and S.E.P.A.M. Stone S.r.l. (www.sepamstone.it).

On behalf of the organizing committee of Colloqui.AT.e 2024, we express our gratitude to all keynote speakers, authors, as well as to the members of the international scientific and advisory committees. We also extend our appreciation to all the participants who took part in this important international scientific event.

Special thanks goes to the publisher, Springer Nature Switzerland AG and, in particular, to Pierpaolo Riva, for his support in publishing Colloqui.AT.e 2024 proceedings. This contribution enhances significantly both dissemination and impact of our research activities in the field of Architectural Engineering. As members of Ar.Tec. Scientific Society, we are committed to continuing the tradition of Colloqui.AT.e International Conferences of spreading knowledge, excellence, and innovation of our research works related to the building sector.

Rossella Corrao

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Contents

Key Lecture

Lessons from Construction History: Why Do Architectural Engineers Need to Understand the Past to Design for the Future?	3
<i>James W. P. Campbell</i>	

Topic A_Construction and Conservation History

Metal Construction from Laws. The Evolution of Technical Standards in the Twentieth Century	25
<i>Matteo Abita, Danilo Di Donato, Alessandra Tosone, and Renato Morganti</i>	
Design Experimentation and Scientific Research in the 70s and 80s Industrialized Construction in Palermo	39
<i>Tiziana Basiricò</i>	
The Active Conservation of an Andalusian Patio House: A Project Experience Between Italy and Spain	55
<i>Alessandra Bellicoso, Krizia Berti, and María Jesús Albarreal Nuñez</i>	
Critical Analysis of Restoration Practices: The Case of San Pietro Barisano's Church in Matera	70
<i>Graziella Bernardo, Cristina Rinaldi, and Antonella Guida</i>	
Philological HBIM for Knowledge, Management, and Valorisation of the Industrialized Building: The Case of Prefabricated Large Panels Systems (1950–80)	86
<i>Angelo Bertolazzi, Iliaria Giannetti, Francesca D'Uffizi, and Edoardo Vendetti</i>	
The Climate Issue in Modern Architecture Eileen Gray's Tempe à Pailla Villa (1931–1935)	101
<i>Vittoria Bonini and Renata Morbiducci</i>	
Architectural Engineering for Rehabilitation of Historical Architecture. A Tool for Safeguard and Revitalization of Palermo's Historical Center	121
<i>Andrea D'Amore, Tiziana Campisi, and Manfredi Saeli</i>	

Velasca Tower: An Italian-Style Structure Unveiled in a New Light Through the BBPR Archive	136
<i>Gianluca Capurso and Tullia Fidelbo</i>	
The Narrative Capacity of Spaces for Living. Le Corbusier's <i>Appartement-Atelier</i> in Paris	150
<i>Teresa Casale and Emilia Garda</i>	
Unveiling the Water Built Heritage: Preliminary Results Towards a Systematic Cataloguing of Italian Ports	167
<i>Federica Cassano, Mariella De Fino, Elena Cantatore, and Fabio Fatiguso</i>	
Resilient and Sustainable Development of Inland Areas: The RI.P.R.O.VA.RE Project Between Co-Planning and Multidisciplinary Approach	185
<i>Emanuela D'Andria, Attilio Ferraro, and Pierfrancesco Fiore</i>	
Recovery and Sustainable Regeneration: Architectural and Environmental Perspectives for Urban and Building Reuse	201
<i>Giuliola D'Angelo, Gianluigi Esposito, and Marina Fumo</i>	
Industrial Archaeologies of Complex Palimpsests. Application of Semantic Web Technologies to Digitalise the Knowledge Path from Data to Interpretation	218
<i>Cassia De Lian Cui, Stefano Cursi, Davide Simeone, Antonio Fioravanti, and Edoardo Currà</i>	
How Many Fragilities for How Many Architectures: The Taormina Stadium of P.L. Nervi	234
<i>Giuliana Di Mari, Alessandra Renzulli, and Federico Vecchio</i>	
Formworks in Thin Shell Construction: Past and Present	249
<i>Salvatore Di Maggio, Calogero Di Maggio, Rossella Corrao, and Calogero Vinci</i>	
Transformability Indicators for the Evaluation and Definition of Public Housing Regeneration Strategies: The "Palazzoni" Case Study in Latina	267
<i>Lorenzo Diana, Cristina Passarelli, and Francesco Polverino</i>	
<i>Sine Glossa</i> : The Coded Drawing for the Recovery with the Help of the IPDB	286
<i>Andrea Donelli</i>	

Information Systems and Automated Census Using Object Detection for the Management and Valuation of Built Cultural Heritage	299
<i>Elisabetta Doria and Marco Morandotti</i>	
The Engineering Approach to the Study of Roman Thermal Buildings: The Case Study of the Rotonda Roman Baths at Catania	315
<i>Laura Floriano, Mariangela Liuzzo, Giuseppe Margani, and Carola Tardo</i>	
City of Water. The Water Heritage as the Core of the Urban Identity of Salerno City: Don Tullio's 18th Century Fountain	331
<i>Anna Gallo</i>	
From Patented Prefabricated Panels to Energy Requalification Strategies. The Case of Nursery Schools in Emilia Romagna Region	347
<i>Barbara Gherri, Sara Matoti, and Federica Morselli</i>	
Historical-Constructive Investigations and Digital Modelling for Knowledge and Requalification of the Architecture of the Second Half of the Twentieth Century. The Case of the University of Calabria in Cosenza (1972–1986)	363
<i>Laura Greco, Giuseppe Fortunato, and Francesco Spada</i>	
University Buildings as an Opportunity for Urban Regeneration: Sustainable and Innovative Teaching and Research Spaces	378
<i>Alessandro Greco, Marco Morandotti, Daniela Besana, Mauro Mericco, and Francesca Pelini</i>	
Former Eridania of Forlì. A Path of Knowledge for the Purposes of Recovery ..	394
<i>Luca Guardigli, Andrea Mandarano, and Luca Venturi</i>	
Spontaneous Architecture and Construction. Typological Analysis of Vernacular Buildings from Italy to Morocco	410
<i>Emanuele Leporelli, Livio Petriccione, Giovanni Santi, and Ludovica Verricelli</i>	
Towards Sustainable Guéliz District: A Data-Driven Methodology for Preserving Architectural Heritage and Achieving Sustainable Development in Marrakech	426
<i>Emanuele Leporelli, Massimiliano Martino, Giammarco Montalbano, Giovanni Santi, and Abdelghani Tayyibi</i>	
From Abandoned Architectures to Smart Ecovillages Rehabilitation of Traditional Dwellings in the Madonie Inner Rural Area of Sicily	443
<i>Luisa Lombardo and Tiziana Campisi</i>	

Interdisciplinary Approaches to the Contextual Study of Multi-Layered Industrial Archaeology Sites: The Case of the Tabarca Building in Genoa	462
<i>Santi Maria Cascone, Lucrezia Longhitano, Salvatore Polverino, and Giuliana Sciacca</i>	
The Reuse of Abandoned Buildings Between Potential and Opportunities. The Minerva Cinema in Catania	478
<i>Grazia Massimino and Gaetano Sciuto</i>	
Recovery, Valorization and Reuse of a Characteristic Architecture of the Italian Building Heritage: The Roadman’s House. A Case Study	491
<i>Ippolita Mecca and Francesco Paolo Rosario Marino</i>	
Conservation and Safeguard of Color in Historic Building Surfaces	508
<i>Caterina Mele</i>	
Modernism Denied. Recovery and Regeneration of the Cinema—Theatre “Mastrogiacomo” in Gravina in Puglia	518
<i>Antonello Pagliuca, Federica Ribera, Donato Gallo, and Roberto Facendola</i>	
High-Altitude Architecture Beyond Constructive Limits: The Fürggen Cableway Arrival Station	532
<i>Antonello Pagliuca, Pier Pasquale Trausi, and Giulio Grimaldi</i>	
From Digital Survey to Stability Assessment in San Tomè, Almenno	544
<i>Vittorio Paris, Virna Maria Nannei, and Giulio Mirabella Roberti</i>	
Recovery, Enhancement and Reuse of Existing Building Assets: Towards a New Reuse for Students	556
<i>Francesca Pelini, Alessandro Greco, Daniela Besana, and Marco Morandotti</i>	
The Architecture of the Bridges	575
<i>Alberto Peñín Llobell</i>	
Parametric Deconstruction of the Technological Elements of the Sassi of Matera. Towards Digital Heritage Management	590
<i>Vito Domenico Porcari and Sara Porcari</i>	
Rainwater Harvesting and Reuse: A Preliminary Review	605
<i>Davide Prati, Giuseppe Ruscica, and Elgars Veigelts</i>	

Material-Constructive Features of the Roofs in the Basilica of San Francesco D'Assisi in Palermo. Decay, Instability, Hypotheses of Intervention and Monitoring	623
<i>Marianna Puccia, Rossella Corrao, Giuseppe Giambanco, and Calogero Vinci</i>	
Small Thickness Brick Vaults. Experimental Study of Single-Leaf and Lined Alentejo Tile Vaults	643
<i>João Rei and António Sousa Gago</i>	
Delving into the Research and Experimentation on the Patented Underground Tanks by Pier Luigi Nervi	659
<i>Federica Ribera, Pasquale Cucco, and Giulia Neri</i>	
<i>Patrimonio, Identidad y Nacionalidad. The Italian Club in Rosario, Santa Fe: An International Research Experience Italy-Argentina</i>	675
<i>Federica Ribera, Carolina Rainero, Giulia Neri, and Pasquale Cucco</i>	
Turning Rails into Trails: Inspiring Cases of Railway Conversion Around the World	690
<i>Yara Rizk and Simona Salvo</i>	
Digital Tools for the Study of the Industrial Building Heritage: From Data Acquisition to Parametric Modeling and Interactive Visualization	703
<i>Pio Lorenzo Cocco, Edoardo Currà, Ilaria Giannetti, and Martina Russo</i>	
Prefabrication of Structural Components for Medium-Span Roofs: Italian Manufacturing of the Hyperbolit Silberkuhl System (HPV)	717
<i>Francesco Spada</i>	
Interpretation of the Protection of the Garisenda Tower in Bologna: A Study of Critical Success Factors Incorporating Local Community Viewpoints	730
<i>Lei Sun and Luca Guardigli</i>	
Towards the Healthy City. Urban Regeneration in the Île-de-France Region: 3 Case-Studies	751
<i>Gabriele Tagliaventi and Alessandro Bucci</i>	
Earthquake-Resistant Timber Frame Techniques in the Calabrian Valleys of Gallico and Catona After the 1908 Messina Earthquake: Analysis and Typological Classification	765
<i>Gabriele Tedesco</i>	

The Archival Document in Support of Architectural Heritage
Enhancement: Comparing Approaches and Purposes in Messina and Ticino 782
Graziano Tomasello and Renzo Iacobucci

Small Towns' Heritage: Resilient Strategies and Projects for Their
Regeneration. The Case Study of Tocco Da Casauria in the Abruzzo Region . . . 797
*Alessandra Tosone, Matteo Abita, Renato Morganti,
and Danilo Di Donato*

Author Index 811