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Modeling Approaches and Computational Methods for Masonry Structures Strengthened by Fiber Reinforced Composite Materials

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PREFACE

ICCMSE 2021 is the 17th International Conference of Computational Methods in Sciences and Engineering. ICCMSE is a well known series of successful conferences edited by Prof. T. Simos with a long previous tradition of 16 past editions, with the first edition dating back to 2003. The main aim of the conference is to exchange knowledge and experience on computational methods applied to a wide blend of different engineering and science disciplines. Due to COVID-19 measures, the present edition has been conceived in a so called hybrid format, i.e. with physical and virtual participation. Although we are aware that virtual participation limits authors, organizers and attendees, we decided to organize the Special Session entitled “Modeling approaches and computational methods for masonry structures strengthened by Fiber Reinforced Composite materials” on line, because we believe that this is a reasonably effective solution of attending in a situation like the present one where health emergency is prioritizing a prudent conduct and observance of the rules imposed by authorities.

The Special Session is organized in the context of composite materials for the rehabilitation of constructions. In particular, the attention is focused on the development of modeling approaches and computational methods able to simulate the local and global behavior of masonry elements and structures strengthened by fiber reinforced composite materials. The contributions to this Special Session have indeed underlined the important role of methods and approaches for understanding the complex phenomena characterizing the interaction between masonry structures and fiber reinforced strengthening systems. Moreover, the contributions have also emphasized the crucial role of the modeling approaches and computational methods for the development of design formulas devoted to practitioners, to include in the actual technical documents and guidelines.

Closed form solutions, advanced Finite Element Models and, also, simplified approaches have represented the core of the Special Section. The contributions received have the potential to represent in the future a reference for scholars and practitioners active in this field.

The first paper by Scacco and Milani [1] concerns the development of a rational simplified procedure for modelling TRM reinforcement on curved masonry elements. In [2] the Authors presented a simple numerical model based on Knots for FRP to masonry interfaces and in [3] the same Authors proposed a closed-form solutions for FRP and FRCM strengthening systems applied to brittle substrates. A closed-form solutions for NSM strengthening systems applied to brittle substrates is proposed in [4] by Bertolesi et al. Finally, in [5], Bertolesi et al. presented a contribution concerning the development of advanced numerical models for the study of curved masonry supports strengthened with TRM materials.

Elisa Bertolesi



Elisa Bertolesi is Lecturer in Structural Engineering at the Department of Civil and Environmental Engineering at Brunel University London (UK). Dr Bertolesi obtained her PhD (with Honours) in Architecture, Built Environment & Construction Engineering at the Polytechnic University of Milan (Italy). The PhD Thesis obtained international recognition when it was awarded the Postgraduate Project Prize by the prestigious International Masonry Society (London, UK). In February 2018, Dr. Bertolesi won a competitive post-doctoral grant with a two-year contract from the Polytechnic University of Valencia and a Juan de la Cierva post-doctoral fellowship. Since 2018, Dr. Bertolesi has been collaborating with the spin-off company CALSENS and the Building Resilient Group at the Polytechnic University of Valencia (Spain). Her academic profile is characterized by a high degree of international activity. To date Dr Bertolesi has published more than 30 papers in high-impact journals (h-index 15 - Scopus). In addition, Dr Bertolesi is a peer reviewer for 17 high impact factor journals and collaborates with the editorial

board of the ASCE - Journal of Composites for Construction and the International Journal of Masonry Research and Innovation. The most important recognition of her scientific achievements was her appointment as Managing Editor of the prestigious first-quartile JCR-indexed Journal Construction and Building Materials. Dr Bertolesi participated as Guest Editor for the collection "Numerical Modelling Trends for Historical Masonry Structures", published by Frontiers in Built Environment (Computational Methods in Structural Engineering).

Ernesto Grande



Ernesto Grande Eng. PhD, is Associate Professor at the Department of Engineering Sciences - University Guglielmo Marconi in Rome. He has got the 5-year graduation degree in Civil Engineering on June 2001 and the PhD degree in Structural Engineering on January 2005, both at University of Naples "Federico II" (Italy). During the period 2010-2013 he has been Temporary Researcher at the Department of Civil and Mechanical Engineering of the University of Cassino and Southern Lazio. During the years he has got research grants and contracts at the Department of Structural Engineering of the University of Naples, the Department of Civil and Mechanical Engineering of the University of Cassino and Southern

Lazio, the European Centre for Training and Research in Earthquake Engineering (EUCENTRE) in Pavia. He is author of papers published both on international journals and conference proceedings, reports and chapters books concerning different research topics of Civil Engineering. Among these: the structural control of seismic and wind vibrations in tall buildings; the analysis and the design of dissipative devices based on shape memory alloys; the nonlinear behavior of steel structures with moment resisting frame and braced typology; the strengthened in shear of RC beams through FRP materials; the nonlinear analysis of masonry structures; the strengthening of masonry structure by FRP materials; the analysis of the debonding behavior of FRP laminates glues on masonry supports, algorithms for the design optimization of grid shell structures.

Gabriele Milani



Gabriele Milani, Eng. PhD, is Full Professor at the Department of Architecture, Built Environment and Construction Engineering. He was born in Cittadella-PD (Italy) in 1977. PhD in Civil and Industrial Engineering, MSc in Civil Engineering, both at the University of Ferrara, Italy.

From 2019: Full Professor, Mechanics of Solids and Theory of Structures, Technical University of Milan, Italy.

Previously, Associate (2014-2019) and Assistant Professor (2008-2014), Technical University of Milan, Italy, Post Doctoral Researcher, Swiss Federal Institute of Technology ETH Zurich, Switzerland (2008) and Post Doctoral Fellow, University of Ferrara, Italy (2004-2008).

He has about 500 SCOPUS records (accession date 3 November 2021), he published more than 250 indexed International Journal Papers, 11 Chapters in books, more than 250 Presentations at Conferences. h-index 47 (SCOPUS), more than 7500 total citations.

Reviewer for more than 250 papers in about 70 journals and 10 conferences. EB member in 8 journals and 7 congresses, editor in chief of a journal dedicated to masonry (International Journal of Masonry Research and Innovation by Inderscience Publishers) and a generalist journal in civil engineering (Open Civil Engineering Journal by Bentham Science), chairman in several congresses.

His scientific interests are the following: masonry, historical constructions, structural analysis, limit analysis, FEM, homogenization theory, FRP reinforcement, genetic algorithms (GA), rubber vulcanization, elastomeric seismic isolators.

Most Cited Author Years 2006-2010 Diploma, Computers & Structures. Telford Premium Award 2012, by the UK Institution of Civil Engineering. K.J. Bathe Award 2014, chair professor Yangzhou University, PRC (2019-2020).

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