Preface

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Biographical notes: Maurizio Angelillo is currently a Professor of Structural Engineering at the School of Engineering and Architecture of University of Salerno. He started his research on masonry, both from the theoretical and experimental point of view, since the early '80s, at the University of Naples. He has contributed to the advance, of masonry research by writing several papers concerning masonry structures published in leading journals, and being the coordinator of intensive doctoral and postdoctoral courses on masonry. He is one of the organisers of the International Summer School on Historic Masonry Structures (https://www.himass.org/).

Roberta Fonti is an independent researcher at the Chair of Conservation-Restoration of Technical University of Munich. Before, she was a Postdoctoral Fellow at the Chair for Structural Design of TUM. She was trained in conservation-restoration, architecture and structural mechanics at the Reggio Calabria and Naples. In general, her interests in research are laying into preservation theories especially for heritage lacking integrity. She has been awarded a prize by the International Masonry Society (IMS) within the 10th IMC Conference (2018), and the 'Kleine Fächer – Große Potenziale' Conference in Berlin (2017) for her excellence in science.

Among the community of masonry practitioners, researchers and scientists there is a wide agreement that many scientific uncertainties still need to be resolved in modelling masonry structures for their conservation and preservation, in various aspects concerning the history, design rules, construction methods and assessment tools of historic masonry constructions. The second part of this special issue consists of nine papers concerning these topics and focused largely on this aim, as described in some detail by Prof. Gianmarco De Felice, in a 'Foreword' that we had the pleasure to host to complete and elucidate its background in the first part.

The reinforcement of historic masonry constructions is often the cause of disproportioned damages during the process of reparation, restoration, and rehabilitation activities which follow major earthquakes. This fact, which is illustrated by many recent seismic events, is mainly due to a lack of knowledge in the engineering standards and techniques of the past time. This knowledge gap is reflected into our numerical models and day-by-day professional practice. Commonly, methodologies that are appropriate for modern building techniques are implemented by ignoring the basic evidence that masonry has stood the test of time, even in seismic prone areas.

Because of this, this special issue aims to collect contributions to a modelling of historic masonry constructions more sensitive to the characteristic features of those, while exploiting the historical dimension of the debate on the topic. Innovative approaches that are able to give full consideration to the unilateral behaviour of masonry constructions are expressly welcome, along with contributions whose purpose is to implement the qualitative characteristics of masonry into simplified numerical models.

This second part of this special issue consists of nine papers concerning these topics and focusing on this aim. In particular, the papers by Nougayrede, Ciblac and Guéna ('Limit analysis based interactive tool for bidimensional studies of complex masonry'), Pereira, Rossetti and Lourenço ('Numerical modelling of grouted anchors in masonry walls'), Aita ('Between stereotomy and mechanics: joints inclination and minimum thickness in frictionless pointed and circular arches'), Castellano, Elia, Fraddosio, Olivieri and Piccioni ('A new experimental approach for small-scale dynamic tests on masonry arches aimed at seismic assessment'), and Fortunato, Gesualdo, Mascolo and Monaco ('P-Bézier energy optimisation for elastic solutions of masonry-like panels'), are concerned with the analytical, experimental and numerical analysis of some special masonry structures. The contributions by Bruggi and Taliercio ('Nonlinear behaviour and macroscopic strength of Flemish bond masonry'), Barsi, Barsotti and Bennati ('Studying the equilibrium of oval-base pointed masonry domes: the case of Pisa Cathedral'), Formisano, Vaiano, Davino, Citro and D'Amato ('Seismic vulnerability assessment of two territorial case studies of Italian ancient churches: comparison between simplified and refined numerical models'), and Ferrero, Cusano, Yavuzer, Wu and Iannuzzo ('When cracks are (not) a structural concern: the case of 'Giovanni Vinciguerra' school in Anagni') are concerned instead with the critical application of limit analysis-based models to some real case studies.