NOVEL COMPUTATIONAL TECHNIQUES FOR MASONRY MECHANICS

2100 - YOUNG INVESTIGATORS INITIATIVE

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Key words: Masonry mechanics, computational mechanics, non-linear mechanics, masonry strengthening.

ABSTRACT

Masonry structures were built over a period of about seven thousand years and they represent the major part of the built heritage of European countries. As their structural conception was mainly based on resisting gravitational loads, these structures are particularly sensitive to extraordinary and environmental actions, suffering damage even with events of moderate intensity [1]. Thus, the in-depth knowledge of masonry mechanics is essential to guarantee the structural safety and the conservation of heritage buildings.

In the last fifty years, the scientific community focused attention to this topic and devoted a great effort to propose computational methods suitable for the evaluation of the mechanical response of historic masonry and structures. Different analysis strategies and computational approaches at different scales have been proposed using limit analysis-based solutions or incremental-iterative analysis procedures [1].

This mini-symposium will offer an opportunity to present and discuss the recent advances in the development of numerical models for masonry, including block-based models (or "micro-models" based on interface elements, contact, XFEM, DEM, DDA, etc.) [2], continuum models (no-tension models, anisotropic damage models, homogenization procedure and multi-scale approaches, etc.) [3-4], geometry-based models [5], and equivalent frame models (i.e. based on macro-elements).

Furthermore, the increasing use of composite materials for retrofitting masonry constructions, which has become prevalent in structural applications, requires computational tools capable to investigate both the local and global behavior of the strengthened members. While some promising computational approaches were proposed in this context [6-7], several open issues still require further investigation.

In line with these research developments, this mini-symposium will offer an opportunity for presenting and discussing the recent advances in this field. It will gather researchers with interest in computational mechanics within the context of masonry structures to share and compare their findings, and to explore new frontiers for reliable and efficient numerical simulations. The participation of young researchers will be particularly appreciated.

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