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A Perspective on procedural modeling based on structural analysis

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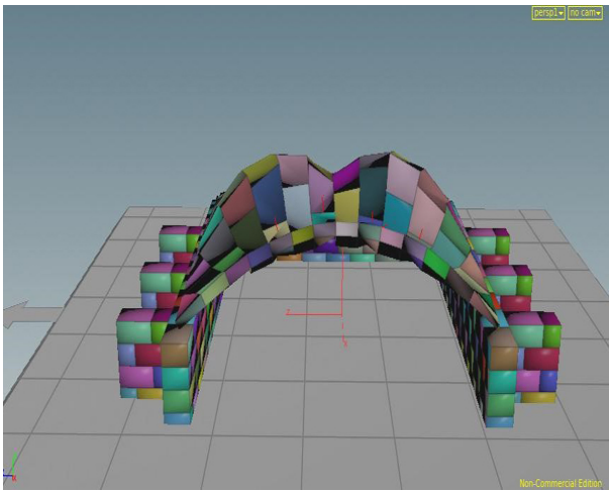

With the rise of available computing capabilities, structural analysis has recently become a key tool for building assessment usually managed by art historians, curators, and other specialist related to the study and preservation of ancient buildings. On the other hand, the flourishing field of procedural modeling has provided some exciting breakthroughs for the recreation of lost buildings and urban structures. However, there is a surprising lack of literature to enable the production of procedural-based buildings taking into account structural analysis, which has proven to be a crucial element for the recreation of faithful masonry structures. In order to perform an in-depth study of the advances in this type of analysis for cultural heritage buildings, we performed a study focused on procedural modeling that make use of structural analysis methods, especially in its application to historic masonry buildings such as churches and cathedrals. Moreover, with the aim of improving the knowledge about structural analysis of procedurally-recreated historical buildings, we have taken a geometric structure, added a set of procedural walls structured in masonry bricks, and studied its behavior in a generic, freely-available simulation tool, thus showing the feasibility of its analysis with non-specialized tools. This not only has allowed us to understand and learn how the different parameter values of a masonry structure can affect the results of the simulation, but also has proven that this kind of simulations can be easily integrated in an off-the-shelf procedural modeling tool, enabling this kind of analysis for a wide variety of historical studies, or restoration and preservation actions.

http://dx.doi.org/10.4995/var.2017.5765.

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