

## **NONLINEAR STATIC AND DYNAMIC ANALYSIS OF A HISTORICAL MASONRY TOWER**

The study deals with the evaluation of the seismic response of the medieval civic tower of Soncino (Cremona, Italy). A 3d finite element model of the brick masonry tower has been calibrated on the results of an experimental campaign of dynamic identification, that gave important information about the material properties and the boundary constraints. The tower is surrounded on three sides by other constructions; the interaction of the tower with the surrounding constructions has been simulated utilizing springs of suitable stiffness. The seismic assessment of the structure has been performed by means of nonlinear static and dynamic analysis. The capacity curve of the structure has been extrapolated through the static analysis; the obtained results have been further investigated through an incremental dynamic analysis carried out utilizing as seismic input the El Centro accelerogram. The implementation of the material nonlinearity allowed to evaluate the damage levels and the collapse mechanisms of the structure under seismic actions. The study underlines the importance of an advanced modeling and analysis, taking into account the material nonlinearity and the effect related to a dynamic input, to evaluate the actual seismic capacity of the masonry structure. These results are of great importance for the definition of possible strengthening and restoration interventions.