

Discrete element analysis of a masonry cupola under seismic loading

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In the presentation the dynamical mechanical behaviour of a masonry cupola composed of discrete elements is investigated. The cupola is designed in innovative and modern ways and was recently constructed with stone blocks in the centre of Budapest. The necessity of applying an accurate numerical modelling method being able to take into account the real geometry of each non-convex block is also presented and discussed. The presentation shows the first development of a three-dimensional computational model, based on the Discrete Element Method (DEM), which was used to investigate the load carrying capacity and failure mechanism of masonry cupola under seismic loading. Each element of the cupola was represented as a distinct block jointed by zero thickness interfaces. In this way, complete block separation and large movements of the masonry blocks are allowed. To apply the seismic load time history analysis was used. The time series are coming from Hungarian earthquakes. During the analysis the damage of the structure, and the probability of collapse are calculated.

References

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