

## Failure Mechanisms of Isolated vs. in Aggregate Historical Buildings: A Case Study for Timisoara, Romania

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**Abstract :** Romania is a seismic country, with two major seismic zones, Vrancea and Banat. One of the most important cities from Banat seismic area is Timisoara, where a lot of valuable historical buildings were built before any design codes, but still they kept their stability during past earthquakes. This article presents the influence of the adjacent buildings during an earthquake and the way that the specific failure mechanism is changed when the building is part of an aggregate. The investigation was made using nonlinear analysis based on Tremuri software, first analyzing the buildings as isolated and second, considering the entire aggregate of buildings. There were noticed significant differences through the two situations regarding the specific failure mechanism activated for each building, showing the fact that in some situations, the presence of the adjacent buildings has positive or negative contribution for the seismic behavior of the analyzed one. The difference between the failure mechanism of the same buildings considered isolated and in aggregate aims to provide explications for the good structural state of the existing historical areas of Timisoara, as part of a larger multidisciplinary study, which will help local authorities to prioritize the consolidation works for the historical buildings in order to assure that the history of the city will be kept alive for the next generations.

**Keywords :** failure mechanism, analysis, aggregate, masonry, earthquake

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