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Analytical fragility curves proposal for Tuscan masonry building typologies

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Abstract

Fragility curves allow expressing the seismic vulnerability of a given building typology in terms of different damage levels. This work aimed at drawing analytical fragility curves for an existing masonry building type widespread in the Casentino area, within the Arezzo district, dating back to the 1960s-1970s. Generally, these buildings consist of three- or four-storey and they are provided with floors well connected to the vertical walls. The studied building stock was obtained partly from known geometries of actual buildings and partly from a morphological study of existing buildings. The geometric and structural parameters variance was evaluated based on actual features of the buildings within the investigated area. A series of nonlinear FME (Frame by Macro Element) simulations were carried out to calibrate the fragility curves and highlight the most influencing parameters: the material type, the percentage of openings on the building ground floor and the number of floors. Finally, a database of fragility curves was created concerning these most significant parameters on the seismic response of the investigated building typology.

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Keywords: Fragility curves, FME Simulations, Masonry buildings.

1. Introduction

Fragility curves are a very useful tool for assessing seismic vulnerability of buildings, defined as the susceptibility of a building to suffer damage if an earthquake of a certain intensity occurs. Namely, fragility curves for a structural

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