Equivalent frame method combining flexural and shear responses of masonry buildings

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ABSTRACT

This work presents the results of quasi-static non-linear analyses of two masonry buildings using, for the discretization of walls, a macro-element that combines the bending and the in-plane shear responses. The macro-element uses the force-based beam-column element equipped with cross sections discretized in fibers, where the behavior of each fiber is described by uniaxial constitutive models [1] [2].

To describe the shear response of the structural element, the macro-element embeds a shear hinge at mid-span, with a phenomenological non-linear constitutive model calibrated on experimental data.

The analyzed buildings are two tangibles examples of un-reinforced and reinforced masonry of the Italian Heritage: The un-reinforced masonry building is a strategic building monitored by the O.S.S. [3], partially damaged by the seismic events in center Italy in 2016; The reinforced masonry building, a four-storey residential structure, is subject of evaluations carried out in the Reluis RINTC project [4], designed as per DM 2018 [5].

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