

NONLINEAR MACROELEMENT BASED ON BOUC-WEN FORMULATION WITH DEGRADATION FOR THE EQUIVALENT FRAME MODELLING OF MASONRY WALLS

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The equivalent frame model takes into account the shear and bending mechanisms that take place in piers and spandrels through plastic hinges. It represents a good compromise between accuracy and computational burden in the analysis of complex masonry walls.

For the purposes of dynamic analysis, in addition to the hysteretic behaviour of the plastic hinges, it is also necessary to introduce their degradation of strength and stiffness.

This study presents a macroelement model for piers and spandrels in which the bending mechanism is described by two hinges at the ends of the macroelement, and the shear mechanism by a shear link. They are characterized by a hysteretic behaviour with progressive plasticity, described by the Bouc-Wen model, and by degradation of strength and stiffness. Degradation is described through a damage parameter, which governs both strength and stiffness decay, and a flexibility increase parameter, which only governs stiffness reduction. In this way it is possible to independently control both strength and stiffness degradation.

The model is applied to simulate experimental tests on panels and on a real scale masonry wall, highlighting a good agreement with the experimental results.

REFERENCES

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