

Author's Accepted Manuscript

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PII: S2352-7102(17)30722-2
DOI: <https://doi.org/10.1016/j.jobe.2018.09.001>
Reference: JOBE573

To appear in: *Journal of Building Engineering*

Received date: 21 November 2017
Revised date: 31 August 2018
Accepted date: 2 September 2018

Cite this article as: Choayb Belghiat, Ali Messabhia, Jean-Patrick Plassiard, Mohamed Guenfoud, Olivier Plé and Pascal Perrotin, Experimental Study of Double-Panel Confined Masonry Walls under Lateral Loading, *Journal of Building Engineering*, <https://doi.org/10.1016/j.jobe.2018.09.001>

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Experimental Study of Double-Panel Confined Masonry Walls under Lateral Loading

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Abstract

Confined masonry structures are one of the most widely used construction systems in Algeria, in which both walls and confining elements contribute to carrying the gravity and seismic loads. Several types of confining elements are used (uniform confinements, toothed confinements), each one giving the structure a different mechanical behavior while the wall density is considered as a key safety factor for those structures. The study presented in this paper is an experimental study on two types of confinement. The study originality stems from the size of the tested samples, which included double-panel confined masonry and experimental pushover tests. First, uniform masonry walls and confinements are studied. Second, toothed masonry walls consisting of two panels of Algerian clay bricks are tested. The objectives were on one hand to study the impact of the frame/panel connection on the quasi-static behavior of the structure as well as the loading and unloading behaviors. On the other hand, to highlight the impact of using double-panel walls on resisting mechanism of confined masonry walls. Moreover, the obtained data were used for evaluating the existing analytical models to predict lateral capacities of confined masonry walls. The results indicate that the two sample-types show some similar resisting mechanisms but various capacities under progressive lateral loading, which may have consequences on the seismic resistance of the structure. A mixture of shear-flexural mechanism can be noticed when double-panel walls are used.

Keywords: Confined masonry; uniform confinement; toothed confinement; wall density; double-panel; pushover test.

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