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OUT-OF-PLANE FAILURE RESISTANCE OF ADOBE FACADES IN CUENCA-ECUADOR FOR DIFFERENT SEISMIC ACCELERATIONS

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Abstract

Author keywords

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Abstract

A considerable amount of the world's population lives in houses built with raw earth, using different techniques such as adobe, mud, bahareque, cob, etc. This research studies buildings built with adobe located in the city of Cuenca-Ecuador, which since 1999 is recognized by UNESCO as a World Heritage Site. The buildings studied have different geometric and material configurations, but all have adobe-bearing walls. This article performs an analysis of the seismic vulnerability of the adobe facade walls.

The study considers 45 buildings with one and several floors, studying the behavior before outof- plane loads and for five different failure mechanisms for different seismic intensities. The behavior of the facade walls is analyzed under the capacity-demand methodology, in which an analysis of the main factors that determine the operation in the event of an earthquake of a certain magnitude is established. As a main result, this procedure has made it possible to establish a classification of buildings according to the degree of seismic vulnerability, in addition to establishing the influence of certain parameters on the variability of seismic vulnerability.

Author keywords

Adobe; Capacity; Demand; Mechanism; Seismic vulnerability

SciVal Topics

References (21)

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1 Doat, P., Hays, A., Houben, H., Matuk, S., Vitoux, F.
(1991) *Building with Earth, First Engl*. Cited 33 times.
New Delhi: The Mud Village Society

2 Gandreau, D., Delboy, L.
(2012) *World Heritage Inventory of Earthen Architecture*. Cited 35 times.
CRATerre-ENSAG. Grenoble, France

3 (2019) *Infraestructura física De Las Viviendas Particulares*
INEI
https://www.inei.gob.pe

4 (2010) *Base De Datos De población Y Vivienda 2010*
Instituto Nacional de Estadísticas
https://www.ecuadorencifras.gob.ec/resultados/

5 Tarque, N., Crowley, H., Pinho, R., Varum, H.
Displacement-based fragility curves for seismic assessment of adobe buildings in Cusco, Peru
(2012) *Earthquake Spectra*, 28 (2), pp. 759-794. Cited 34 times.
http://earthquakespectra.org/doi/pdf/10.1193/1.4000001
doi: 10.1193/1.4000001
View at Publisher

6 Blondet, M., Villa Garcia, G., Brzev, S., Rubiños, Á.
Earthquake-Resistant Construction of Adobe Buildings: A Tutorial
(2011) *EERI/IAEE World Hous. Encycl*, 56 (2), pp. 13-37. Cited 72 times.

7 Cárdenas-Haro, X., Todisco, L., León, J.
Database with compression and bending tests on unbaked earth specimens and comparisons with international code provisions

(2021) *Construction and Building Materials*, 276, art. no. 122232. Cited 5 times.
https://www.journals.elsevier.com/construction-and-building-materials
doi: 10.1016/j.conbuildmat.2020.122232

View at Publisher

8 Cárdenas-Haro, X., Todisco, L., León, J., Jurado, C., Vergara, E.
Geometry and Proportions of Adobe Vernacular Buildings in Cuenca, Ecuador

(2022) *International Journal of Architectural Heritage*, 16 (8), pp. 1270-1288. Cited 4 times.
http://www.tandf.co.uk/journals/titles/15583058.asp
doi: 10.1080/15583058.2021.1879312

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9 Donkor, P., Obonyo, E.
Earthen construction materials: Assessing the feasibility of improving strength and deformability of compressed earth blocks using polypropylene fibers

(2015) *Materials and Design*, 83, pp. 813-819. Cited 53 times.
doi: 10.1016/j.matdes.2015.06.017

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10 Lourenço, P.B., Greco, F., Barontini, A., Ciocci, M.P., Karanikoloudis, G.
(2019) *Seismic Retrofitting Project: Modeling of Prototype Buildings*. Cited 5 times.
Los Angeles
http://www.getty.edu/

11 Nicola, T., Guido, C., Humberto, V., Enrico, S., Marcial, B.
Numerical simulation of an adobe wall under in-plane loading

(2014) *Earthquake and Structures*, 6 (6), pp. 627-646. Cited 16 times.
http://techno-press.org/download.php?journal=eas&volume=6&num=6&ordernum=3
doi: 10.12989/eas.2014.6.6.627

View at Publisher

12 Gautam, D., Rodrigues, H., Bhetwal, K.K., Neupane, P., Sanada, Y.
Common structural and construction deficiencies of Nepalese buildings (Open Access)

(2016) *Innovative Infrastructure Solutions*, 1 (1), art. no. 1. Cited 97 times.
https://www.springer.com/journal/41062
doi: 10.1007/s41062-016-0001-3

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13 Sumiterrie, G., Levon, H., Tarque, N., Chacara, C.
Assessment of combined in-plane and out-of-plane fragility functions for adobe masonry buildings in the peruvian andes
(Open Access)

(2020) *Frontiers in Built Environment*, 6, art. no. 52. Cited 14 times.
journal.frontiersin.org/journal/built-environment
doi: 10.3389/fbuil.2020.00052

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14 Minke, G.
(2005) *Manual De construcción En Tierra: La Tierra Como Material De construcción Y Su aplicación En La Arquitectura Actual*. Cited 44 times.
Segunda ed. Editorial Fin de Siglo

15 (2017) *NTE, E.080.Adobe: Diseño Y construcción Con Tierra Reforzada*, p. 24.
Perú

16 (2015) *Peligro Sísmico/Diseño Sismo Resistente*, p. 69. Cited 4 times.
Ecuador

17 D'Ayala, D., Speranza, E.
Definition of Collapse Mechanisms and Seismic Vulnerability of Historic Masonry Buildings

(2003) *Earthquake Spectra*, 19 (3), pp. 479-509. Cited 314 times.
https://journals.sagepub.com/home/eqs
doi: 10.1193/1.1599896

View at Publisher

18 Doherty, K., Griffith, M.C., Lam, N., Wilson, J.
Displacement-based seismic analysis for out-of-plane bending of unreinforced masonry walls

(2002) *Earthquake Engineering and Structural Dynamics*, 31 (4), pp. 833-850. Cited 244 times.
http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1096-9845
doi: 10.1002/eqe.126

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19 Restrepo, L.
(2003) *A Simplified Mechanics-Based Procedure for the Seismic Risk Assessment of Unreinforced Masonry Buildings*. Cited 3 times.
Istituto Universitario di Studi Superiori di Pavia

20 Cárdenas-Haro, X., Tarque, N., Rodiseo, L., León, J.
Loss Estimation for Typical Adobe Façades of Cuenca (Ecuador) Due to Earthquake Scenarios

(2021) *International Journal of Architectural Heritage*
http://www.tandf.co.uk/journals/titles/15583058.asp
doi: 10.1080/15583058.2021.1977417

View at Publisher

21 (2020) *HAZUS Earthquake Model, Technical Manual*. Cited 37 times.
no. October. Washington DC

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