

Artificial Neural Network to Predict the Shear Strength of Partially Grouted Masonry Walls

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Abstract:

Determining the shear strength of partially grouted (PG) masonry walls subjected to lateral loads is complex, due to the anisotropy of masonry and nonlinear interactions between the mortar, grouted cells, ungrouted cells, and reinforcing steel. Although current masonry design codes provide equations to predict the shear strength of PG walls, most are empirical and rely on data that has not been subject to rigorous meta-analyses. Artificial neural networks (ANN) have demonstrated potential in engineering research applications to predict nonlinear relationships. This paper presents an ANN model for the shear strength of PG masonry walls using a compiled database of PG wall specimens. The effect of previously unaccounted parameters in code-based approaches is discussed. The process of synthesization and meta-analysis used to prepare the database for the ANN model is discussed. A sensitivity analysis is performed to evaluate the ANN model and gain insight for future research based on its predictions.

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DOI: 10.70803/001c.137193

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