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Abstract

This paper studies the results of compression diagonal tests conducted on a series of retrofitted and non-retrofitted small-scale masonry walls (which are also known as wallettes). Wallettes with the same characteristics and mechanical properties of large masonry walls were retrofitted by using two arrays of glass fiber reinforcement polymer (GFRP) sheets (grid and diagonal), two arrays of carbon fiber reinforcement polymer (CFRP) sheets (grid and diagonal), and near surface mounted bars (steel and GFRP). FRP sheets were applied to both surfaces of the wallettes, and rebar was mounted onto one of the surfaces in two horizontal and two vertical arrangements. All of the methods significantly increased loading capability and ductility of wallettes. Wallettes retrofitted with near surface GFRP bars had the highest value of final load, and specimens retrofitted with CFRP sheets in a diagonal array demonstrated the highest ductility among all tested specimens. Wallettes retrofitted with near surface mounted steel bars showed poor performance in terms of both loading capability and ductility. This study also includes discussion of failure modes, elastic characteristics, shear stresses and strains, and other variables that impact retrofitting.