

# Seismic Resistance of Brick-Infilled Steel Frames With and Without Retrofit

J.B. Mander<sup>1</sup> and B. Nair<sup>2</sup>

## Abstract:

Three masonry infilled frame sub-assemblages were tested in-plane under quasi-static reversed cyclic loading. A thin coating of ferrocement was used either to repair or retrofit the specimens. The first specimen was initially tested, repaired, and then re-tested. The second specimen was a retrofitted specimen. The third specimen was tested in three phases: (i) as an ordinary infill; (ii) with supplementary diagonal reinforcing bars; (iii) with an enhanced ferrocement repair which consisted of a combination of reinforcing bars and a thicker coating of ferrocement, containing layers of mesh in both diagonal and horizontal orientations. Results from these experiments indicated that all specimens performed well for drifts up to  $\pm 1.5\%$ , with the presence of infills greatly stiffening and strengthening the structural system. By placing the strain gauges on the steel frame it was possible to measure frame moments and hence infer masonry contact stresses. Results show that initially a diagonal corner-to-corner compression strut forms within the infill. Later, at larger drift amplitudes, redistribution due to cracking leads to the formation of a secondary strut mechanism which gives the infill panel substantial post-elastic ductility. The inclusion of the ferrocement gave a marginal improvement in the energy dissipation. Conclusions are drawn based on the results obtained from the contact stresses on the frame, the energy absorption, the shear strength assessment of the infill panel and a classical code-based empirical approach.

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<sup>1</sup> Assistant Professor, (Member) Dept. of Civil Engineering, State University of New York at Buffalo, NY 14260.

<sup>2</sup> Research Assistant, Dept. of Civil Engineering, State University of New York at Buffalo, NY 14260.