In-Plane Behavior of a Confined Masonry Wall

Khashaiar Pourazin[1] and Sassan Eshghi[2]

Abstract:

In accordance with some codes of practice for the seismic resistant design of buildings (e.g. Iranian Standard No. 2800 – 3rd edition), bond-beams and tie-columns must be used in all load carrying walls of masonry buildings. The seismic behavior of these buildings and their components such as walls can be improved by confining the walls and anchoring the floors to the bond beams. For seismic design and/or vulnerability analysis of this type of building, in-plane behavior of confined masonry walls should be investigated. For this purpose, experimental and numerical studies have been carried out on a half scale typical confined masonry wall. This wall was designed based on Iranian seismic code requirements. Two identical specimens of the wall were tested under static monotonic lateral loading. A finite element 2D model of the wall was developed and a pushover analysis was performed. In the FE model, the masonry panel was assumed to be continuum and its behavior governed by Rankine-Hill multisurface plasticity model with low orthotropic factor. Since the Reinforced Concrete (RC) bond-beams and tie-columns can crack under lateral loads, the Rankine yield surface was employed in their modeling. Also, sliding, cracking, and gap opening at the interface between the masonry panel and the surrounding bond-beams and tie-columns were considered within the model. Based on the experimental and numerical results, the obtained crack pattern and capacity curves were compared and good agreement was achieved.

DOI: 10.70803/001c.138863

[1] Ph.D. Candidate, International Institute of Earthquake Engineering and Seismology North Dibajee (IIEES), Farmanieh, Tehran, Iran.

[2] Assistant Professor, Structural Engineering Research Center, International Institute of Earthquake Engineering and Seismology (IIEES), Tehran, Iran.