

Abstract of the Experimental work on
"In-Plane Behavior of Brick Infilled RC Frames with Door and
Window Opening, and Lintel Beam under Lateral Loads"
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Functional openings such as windows, doors etc. provided in the infill walls have considerable influence on the seismic performance of Reinforced Concrete (RC) frames. Generally, structural engineers neglect contribution of infills in the RC frames. Current code does contain any provisions regarding modeling of masonry infills. As a simplistic approach solid infills are modeled as a “diagonal strut” in documents like FEMA – 273, ATC – 40. However, they lack adequate provisions for infills with openings. Normally, lintel beams are provided over the opening and occasionally they continue up to columns and anchored in to the columns. The present study was carried out to study the behavior of masonry infilled RC frames with window opening and lintel beam connected to columns.

Parametric non-linear finite element analysis has been carried out on single bay single storey frame to examine the effect of lintel beams over window opening provided at central location. The finite element model was verified using experimental results of five different specimens described in the literature. Same finite element model was used to compare analytical and experimental results.

Experimental study on single bay single storey bare frame with lintel beam subjected to forced vibration test, load-controlled slow-cyclic test, and displacement-controlled slow-cyclic test has been carried out. Similar tests have been conducted on infilled frame with door as well as window opening and lintel beam. Results obtained from analytical study and experimental study was compared. Based on both the studies shear strength of masonry infills was estimated, for a central window opening in the infilled R. C. frame with lintel beam. Results of infilled frame with door opening and lintel beam were compared with the one obtained from window opening and lintel beam.

Infilled frame with one central window opening and lintel beam had shown development of strut action in the infill and has better shear deformation behavior as compared with infilled frame that had door opening and lintel band. Masonry infill above lintel beam had sliding joint failure typical of infills with strong brick, weak mortar, and large length to height aspect ratio. Strut action passed through RC frame at lintel beam and column joint and resulting in the failure of frame. Lintel beam anchored in the column proved to have detrimental effect.