

ABSTRACT

Indonesia lies between four active tectonic plates which results in higher occurrence of earthquakes. Earthquake gives shear force which often causes damages to buildings. Shear failure must be avoided because this kind of failure is brittle. Normally, most building which are designed based on earthquake codes will only suffer light damage during earthquake. This research was subjected to know the performance of structural retrofit method using "kawat jala las segi empat" (galvanized welded wire mesh) on lightly damaged structure (first crack phase).

The specimens were the model of exterior beam-column joint. Cyclic lateral load was applied to simulate earthquake load. This research was using 5 specimens : 1 standard shear-fail specimen, 2 retrofitted shear-fail specimens, 1 unretrofitted flexure-fail specimen, and 1 standard flexure-fail specimen. A constant axial load of 100 kN was given to the column and then an increasing cyclic lateral load was applied to the beam. Standard specimens were loaded until collapse and not retrofitted as they were used as benchmark. Other specimens (retrofitted) were loaded until first crack occurred and then retrofitted by peeling the concrete cover. The cracked parts were wrapped with 1 or 2 layers of proposed wire (kawat jala las segi empat), and the concrete cover were re-established afterward using specific cement mortar (Renderoc RG). Finally, after the re-established concrete cover dried, the retrofitted specimens were loaded again until collapse.

The result shows that the strength of retrofitted specimens are not just fully recovered, but also increased significantly. The ultimate shear strength of retrofitted specimen increased by 40.19 % (1 layer) and 44.71 % (2 layers), ultimate flexure strength of retrofitted specimen increased by 34.85 % (2 layers). The ductility increased by 51.83 % – 116.58 %. The structural stiffness of retrofitted specimens decreased. The crack pattern of all specimens occurred as planned.

Keywords : shear strength, cyclic load, retrofit