

ABSTRACT

Plastic hinge regions of beam needs special attention, especially in the face of the column while receiving sizeable negative moment by both gravity and the added due to earthquake load. When an earthquake, the compression zone of beam's section must hold the negative moments and great transverse force while usually compression concrete area is very small so prone to collapse. In this research it intended a more ductile structure elements in the plastic hinge region of beam by providing confinement in compression zone of beam's section.

An experimental investigation was conducted to examine the effect of confinement in the compression zone beam's section in the plastic hinge that subjected to monotonic and cyclic loading. Six beam specimen with stub that describes the end of the beam – columns joint were prepared. Four specimens were given additional confinement in the compression zone in form of hoops or cross-ties, while the others were made as a beam without additional confinement as a reference. Beams specimen were designed with the greater tensile reinforcement ratio so that it has compressive larger areas of concrete and effective for restraint. An experimental parameters such as an additional form of confinement in a compression zone beam's section and type of loading given on beam specimens were evaluated and comparisson to ductility, load capacity, energy disipation, and to the pattern of cracks that occur both on beam with additional / without confinement.

Test results indicate that presence of confinement in compression zone beam's section is able to improve the beam's ductility of displacement and curvature ductility when subjected to monotonic and cyclic loading with an increase of 10 to 100 percent. The existance of confinement in the compression zone beam's section also increase energy dissipation of beam significantly ranging two until six times energy dissipation of beam without confinement in compression zone. However, confinement in a compression zone beam's section little influence on the increase in load capacity or the moment capacity when given monotonic and cyclic loading with of below 10 percent. Tests also showed that the area of the beam plastic hinge area damage on all specimens ranged $2/3h$ to $3/2h$ from the end of beam - column face.

Key word : Confinement, compression zone, ductility, monotonic, cyclic