

Seismic Behavior of Low Yield Point Steel Plate Shear Walls

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ABSTRACT

The seismic resistant characteristics of low yield point (LYP) steel shear wall are examined in this reported research. In the LYP steel plate shear wall system, the LYP steel plate is selected for steel panel while the boundary frame is constructed by conventional structural steel. A series of experimental studies were carried out to examine the elastic and inelastic shear buckling of LYP plate under monotonic load. The effects of width-to-thickness ratio and different boundary conditions on the shear buckling of LYP steel plates were examined. A simplified model is suggested to evaluate the onset of shear buckling and the inelastic behavior of LYP steel plate with different aspect ratios. Good correlations were obtained from experimental studies and simplified analytical method. Cyclic loading tests were also carried out for LYP steel plate shear wall in order to examine its stiffness, strength, deformation capacity, and energy dissipation capacity. The effect of width-to-thickness ratio of steel plate and the design of beam-to-column connections on the boundary frame were also studied. Excellent deformation capacities and energy dissipation capacities were obtained for all specimens tested. The LYP steel plate shear walls were able to maintain stably even have deformed to 5% of story drift angle. Fig. 1 shows the failure mode and hysteresis behavior of LYP shear wall system. The ultimate strength of LYP shear wall can be predicted accurately as compared with experimental results. Based on these studies, suggestions are made for the design of LYP steel plate shear wall systems.

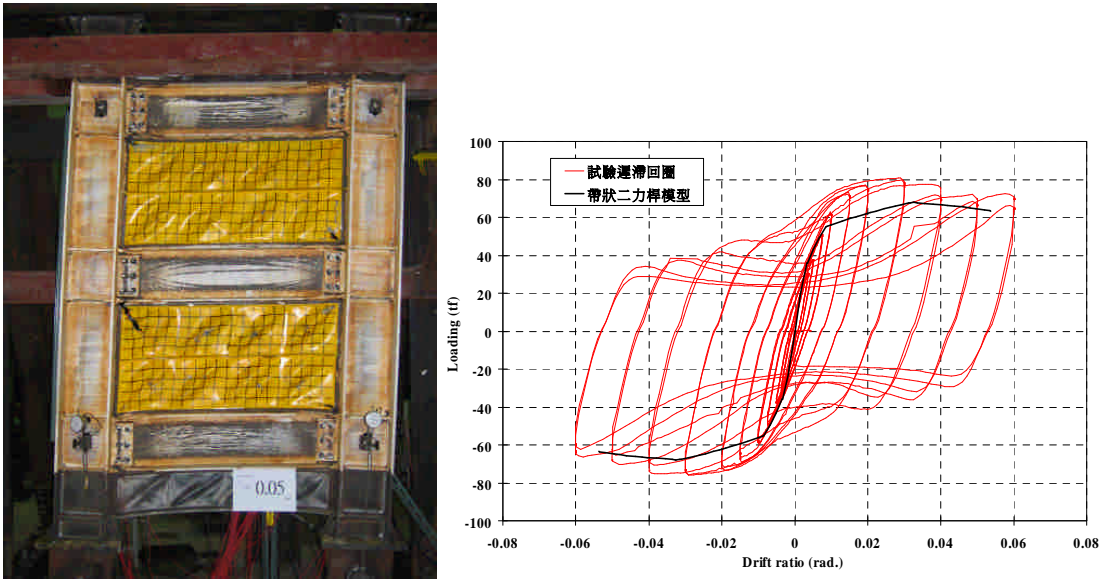


Fig. 1 Failure mode and hysteresis behavior of LYP shear wall system

Possible session: Research Advance (Experimental research results)

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