

Residual Seismic Performance of Damaged Reinforced Concrete Shear Walls

*Wen-I Liao¹⁾

¹⁾ *Department of Civil Engineering, National Taipei University of Technology, Taipei,
100, Taiwan*

¹⁾ wiliao@ntut.edu.tw

ABSTRACT

This study investigates the seismic residual performance of RC shear walls with different levels of pre-earthquake damage through cyclic loading tests. The test specimens include lightly damaged, moderately damaged, and post-repair specimens. The test results are compared with the seismic performance reduction factors for stiffness, strength, deformation capacity, and energy dissipation capacity in the FEMA 306 and JBDPA post-earthquake assessment guidelines to assess their applicability. From the test and analysis results, it is evident that the strength and maximum deformation capacity of lightly and moderately damaged RC shear walls do not decrease due to earthquake damage. However, stiffness and energy dissipation capacity significantly decrease. Additionally, this study proposes a simple method to simulate capacity curves of RC shear walls at different damage levels, allowing engineers to easily simulate the lateral capacity curves of damaged RC shear walls. Finally, by observing the relationship between test damage behavior and residual crack width, a suggested classification for earthquake damage levels is presented.

REFERENCES

- FEMA-306, (1998), Evaluation of Earthquake damaged concrete and masonry wall buildings-Basic Procedures manual. Federal Emergency Management Agency, Washington, D.C.
- JBDPA, (2016), Standard for Post-earthquake Damage Level Classification and Restoration Technical of Buildings. Japan Building Disaster Prevention Association.

¹⁾ Professor