

Studies on the deformation at shear failure of RC members after flexural yielding and failure modes of RC shear walls

This paper compiles the research results on the deformation at the shear failure of RC shear wall, column, and beam after their flexural yielding. The formulation to estimate the deformation includes all factors related to deformation capacity, such as the ratio of shear stress to concrete compressive strength, axial stress ratio, shear-span ratio, and tensile reinforcing bar ratio. However, the formulation is simple, applicable, and useful for an expected seismic design based on earthquake response deformation. Failure modes of RC shear walls are classified into flexural failure, shear failure, and slip failure. The effect of RC shear wall configuration and reinforcing bars arrangement on its failure mode is settled quantitatively. Seismic design method utilizing coupled shear wall that has good energy dissipation system is also proposed. Research results compiled in this paper are mainly based on large-scale test conducted with my many collaborators. A physical model to classify the failure modes of RC members and to formulate estimating the deformation at shear failure after their flexural yielding are hit upon by many large-scale test and other test.

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