

A series of studies on seismic performance evaluation of concrete filled tubular frame structures

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This achievement is a series of studies on an estimation method of seismic-resistant performance and the practical design method for the current and newly-developed structural system composed of the concrete-filled steel tubular (CFT) members. The uniqueness of the achievement is a research view point, where the structural performance is evaluated as a whole framed structure but not each individual member. One of the topics of this achievement is the investigation on the fundamental structural performance such as the strength, deformability and damage estimation of CFT members under earthquake excitations. As the result of CFT member behaviors under axial loading, a couple of new structural systems using CFT trusses have been developed. With regard to beam-to-column connections, the local deformation of connections around beam flanges, the bond strength between a steel tube and encased high performance concrete, and the shear transmission from inner diaphragms of a steel tube to encased concrete have been investigated. As a frame study, the design method for plastic mechanism to permit CFT column yielding and a method to make story drift responses equality in a dynamic response analysis has been investigated. All of the results have been evaluated as a whole frame performance.