Code Development for Nonstructural Components

by Tsu T. Soong

Abstract

The importance of nonstructural component issues in seismic design and performance evaluation is now well recognized. Today, major building codes and seismic design guidelines exist which address seismic design forces for various nonstructural components In these provisions, the design force is formulated as an equivalent static lateral force applied to the approximate center of gravity of the component being considered. While simple formulas are necessary for the sake of design applications, they contain a certain amount of arbitrariness and subjectivity which produce ambiguous results and inconsistent design forces among different codes and provisions. Furthermore, they do not reflect the level of understanding of the behavior of nonstructural components that has been achieved through theoretical analyses, experiments, and observation data from past earthquakes.

A major thrust of NCEER s work in this area has been to critically assess current design force formulas for nonstructural components as they exist in the 1991 NEHRP provisions, to identify their shortcomings, and to recommend revisions which would bring them more in line with current state-of-the-knowledge in this area. These revisions were recommended within the framework of the equivalent lateral force format for practical applicability

Another major activity in this area has been concerned with the development of system-based design provisions for nonstructural components. Research activities in risk analysis of nonstructural components have led to a new classification scheme for components which are susceptible to earthquake-induced vibratory effects and critical enough to require special consideration. Since component damage may be less critical than overall system functionality, classification based on the seismic fragility of systems of nonstructural components have also been given priority for the development of design and performance analysis procedures.

Collaboration

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