

ATC & SEI 2009 EARTHQUAKE CONFERENCE

December 9-11, 2009

Non-Structural Seismic Performance for Facilities in Seismic Regions: is the Expected Earthquake Performance Really being achieved

By:

Michael J. Griffin, P.E.¹ & Victoria Winn²

ABSTRACT

The International Building Code (IBC 2006), and the attendant structural design standard ASCE 7-05 “Minimum Design Levels for Buildings and Other Structures” provides the structural criteria for buildings, as well as the seismic design requirements for nonstructural components, equipment, and systems. Over the years this criteria has been expanded from essentially nominal design requirements (2 pages) to an entire chapter of content dedicated to nonstructural components in ASCE 7-05, not including additional referenced industry standards for certain components. With this additional design complexity, are we really sure that we will achieve the expected earthquake performance intended for nonstructural components, equipment, and systems, or are there other issues affecting desired performance that require greater attention?

This paper will present issues that compromise achieving the expected nonstructural component earthquake performance that the codes and standards intend by examining several case examples of projects in the Midwest. Specifically, four (4) new construction projects will be examined where the Owner has specified to his design team that the building structure and nonstructural components are to be designed and constructed to an enhanced earthquake performance level – Occupancy Category IV facility. The paper will present the issues affecting the seismic performance of nonstructural components from initial design, development of contractor implemented seismic design performance criteria, contract language, contractor seismic design implementation, contractor construction, and monitoring construction quality. As the paper will conclude, achieving enhanced earthquake performance for nonstructural components, equipment, and systems is difficult, but not impossible. Suggested solutions are offered for improved earthquake performance of nonstructural components on future projects.

¹ Principal, CCS Group, Inc., Chesterfield, Missouri 63017. mike.griffin@ccsgroupstl.com

² Project Engineer, CCS Group, Inc., Chesterfield, Missouri 63017. victoria.winn@ccsgroupstl.com