ASCE 7-02/05 reference section(s)		2001 CBC reference section(s)	Other standard reference section(s)
ASCE 7-02	ASCE 7-05	106.3.2	2003 IBC 1603.1
9.1.2.4		1633.2.3	2006 IBC 1603.1
9.2.1	11.2		2003 NFPA 5000 sec. 1.7.6.3
9.5.5	12.8		2003 NFPA 5000 sec. 35.1.2
9.6.1.4	13.3.2		2003 NFPA 5000 sec. 35.4.2
9.6.1.7	13.2.7		2003 NFPA 5000 sec. 45.6.2

Background

Inadequate design documentation can result in longer times required for plan review and permitting, additional time and expense for field coordination, additional requests for information, lack of flexibility during construction, an incomplete quality assurance plan, and construction delays.

The engineer of record knows the load paths, structural systems, and material capabilities needed to resist the required design loads. It is the engineer's responsibility to communicate this information to others involved in the design, permitting, construction, and inspection of the building. Good documentation is also beneficial for planning later alterations.

Failure to consider such fundamental earthquake design elements as load paths and connections is believed to have contributed to poor performance in past earthquakes. Studies of damage from the 1994 Northridge earthquake, for example, indicated that deformation compatibility and load path requirements were overlooked by designers in several failed parking structures and soft-story wood framed apartment buildings (SEAOC Seismology Committee 1996, Appendix A).

Design documentation may be even more important for performance-based designs in which engineers seek to control damage and maintain function, as well as preserve life safety. Detailing and construction quality are crucial to enhanced structural performance, and both rely on thorough design documentation. Post-earthquake function of nonstructural components is also associated with enhanced performance objectives, so thorough documentation of those details is important as well.

Types of Documentation

Structural design documentation includes calculations, drawings, specifications, soils/geotechnical reports, local rainfall and snow data, building component data, equipment weight, size, and anchorage requirements, and other supporting data used to define the structural design. Different documents may be produced for different projects and for different phases of design. Each type of document, at each phase, might have a specific purpose. Collectively, the design documentation must allow plan check of the design, allow appropriate peer review, define the work for bidding purposes, facilitate construction in accord with the design intent, and provide a basis for necessary inspections.

The SEAOC Professional Practice Committee has produced a set of guidelines for the practice of structural engineering (SEAOC Professional Practice Committee 1999). With respect to structural design documentation, the guidelines identify three principal document types to be produced by the engineer of record (refer to the SEAOC guidelines for details):

- Structural drawings: contract documents necessary for construction of the building.
- Structural specifications: contract documents that supplement the drawings and are also necessary for construction.
- Structural calculations: although not contract documents, and strictly speaking, they are not necessary for construction, these are often necessary to validate the design and to enable both plan check and design peer