CODE

COMMENTARY

service-level loading, characteristic points should represent loads and deformations less than those corresponding to yielding of reinforcement. For nonlinear analysis to support design or assess response under design-level loading, characteristic points should represent loads and deformations less than those corresponding to yielding of reinforcement as well as points corresponding to yielding of reinforcement and onset of strength loss. Strength loss need not be represented if design loading does not extend the response into the strength-loss range. Typically, inelastic analysis to support design should employ specified material strengths and mean values of other material properties and component stiffnesses. Nonlinear response history analysis to verify the design of earthquake-resistant concrete structures should employ expected material strengths, expected material properties, and expected component stiffnesses, as specified in A.6.2.

6.8.1.3 Unless slenderness effects are permitted to be neglected in accordance with 6.2.5.1, an inelastic analysis shall satisfy equilibrium in the deformed configuration. It shall be permitted to calculate slenderness effects along the length of a column using 6.6.4.5.

R6.8.1.3 Refer to R6.7.1.2.

6.8.1.4 The cross-sectional dimensions of each member used in an analysis to calculate slenderness effects shall be within 10 percent of the specified member dimensions in construction documents or the analysis shall be repeated.

6.8.1.5 Redistribution of moments calculated by an inelastic analysis shall not be permitted.

R6.8.1.5 Section 6.6.5 allows for redistribution of moments calculated using elastic analysis to account for inelastic response of the system. Moments calculated by inelastic analysis explicitly account for inelastic response; therefore, further redistribution of moments is not appropriate.

6.9—Acceptability of finite element analysis

6.9.1 Finite element analysis to determine load effects shall be permitted.

6.9.2 The finite element model shall be appropriate for its intended purpose.

R6.9—Acceptability of finite element analysis

R6.9.1 This section was introduced in the 2014 Code to explicitly recognize a widely used analysis method.

R6.9.2 The licensed design professional should ensure that an appropriate analysis model is used for the particular problem of interest. This includes selection of computer software program, element type, model mesh, and other modeling assumptions.

A large variety of finite element analysis computer software programs are available, including those that perform static, dynamic, elastic, and inelastic analyses.

The element types used should be capable of determining the response required. Finite element models may have beam-column elements that model structural framing members, such as beams and columns, along with plane stress elements; plate elements; and shell elements, brick elements, or both, that are used to model the floor slabs, mat foundations, diaphragms, walls, and connections. The model mesh size selected should be capable of determining