

CODE

sustaining deformations and forces associated with earthquake effects.

A.2.4 All concrete structures designed or verified by this Appendix shall be proportioned and detailed as required by **Chapter 18** and the requirements of A.12 when applicable.

A.2.5 It shall be permitted to use the provisions of Appendix A to demonstrate the adequacy of a structural system as required by **18.2.1.7**.

A.2.6 Independent structural design review consistent with A.13 shall be required for use of Appendix A.

A.2.7 The licensed design professional shall provide justification for any interpretation required for the application of Appendix A, and if accepted by the independent structural design reviewers, justification shall be provided to the building official for acceptance.

A.3—General

A.3.1 Action Classification and Criticality in A.7, and Acceptance Criteria in A.10 and A.11 provide a comprehensive design approach following the intent of Chapter 16 of **ASCE/SEI 7** and the general building code, and shall take precedence over those of Chapter 16 of **ASCE/SEI 7**.

A.4—Earthquake ground motions

A.4.1 Nonlinear response history analysis shall include the effects of horizontal earthquake ground motions.

A.4.2 Vertical earthquake ground motion shall be considered simultaneously with horizontal earthquake ground motions where inclusion of vertical ground motion will substantially affect the structural design requirements.

A.4.3 Earthquake ground motion acceleration histories shall be selected and modified in accordance with procedures established by the general building code.

COMMENTARY

RA.2.7 It is anticipated that the initial design of a earthquake-resistant structure will be performed using elastic analysis combined with engineering judgment. A nonlinear response history analysis following the requirements of this Appendix can then be performed to demonstrate the design, which may not fully comply with all provisions of **ASCE/SEI 7** or the general building code.

RA.3—General

RA.3.1 Due to inconsistencies between ACI 318 and Chapter 16 of **ASCE/SEI 7-16** in the approach to Action Classification and Acceptance Criteria for concrete members, the requirements in this Appendix take precedence over those of ASCE. The requirements of this Appendix are closely aligned with those in **TBI (2017)** and **LATBSDC (2017)**.

RA.4—Earthquake ground motions

RA.4.1 Nonlinear response history analysis commonly is performed using two horizontal components of earthquake ground motion applied to a three-dimensional model of the building.

RA.4.2 Structures with vertical discontinuities in the gravity-load-resisting systems can experience vertical earthquake response that can affect building performance. Examples include columns or walls that terminate on beams or slabs. Some structures with long spans or long cantilevers can be sensitive to vertical ground motion. Engineering judgment should be exercised when considering the sensitivity of structures to vertical ground motions.

RA.4.3 The analysis procedures in Appendix A are based on ground motion selection and scaling consistent with Chapter 16 of **ASCE/SEI 7**, which includes scaling to a risk-targeted maximum considered earthquake ground acceleration. **ASCE/SEI 7** describes appropriate procedures for selection and modification of earthquake ground motions in terms of acceptable hazard and risk levels.