1.3.3 Self-Straining Forces

Provision shall be made for anticipated self-straining forces arising from differential settlements of foundations and from restrained dimensional changes due to temperature, moisture, shrinkage, creep, and similar effects.

1.3.4 Analysis

Load effects on individual structural members shall be determined by methods of structural analysis that take into account equilibrium, general stability, geometric compatibility, and both short- and long-term material properties. Members that tend to accumulate residual deformations under repeated service loads shall have included in their analysis the added eccentricities expected to occur during their service life.

1.3.5 Counteracting Structural Actions

All structural members and systems, and all components and cladding in a building or other structure, shall be designed to resist forces due to earthquake and wind, with consideration of overturning, sliding, and uplift, and continuous load paths shall be provided for transmitting these forces to the foundation. Where sliding is used to isolate the elements, the effects of friction between sliding elements shall be included as a force. Where all or a portion of the resistance to these forces is provided by dead load, the dead load shall be taken as the minimum dead load likely to be in place during the event causing the considered forces. Consideration shall be given to the effects of vertical and horizontal deflections resulting from such forces.

1.4 GENERAL STRUCTURAL INTEGRITY

All structures shall be provided with a continuous load path in accordance with the requirements of Section 1.4.1 and shall have a complete lateral force-resisting system with adequate strength to resist the forces indicated in Section 1.4.2. All members of the structural system shall be connected to their supporting members in accordance with Section 1.4.3. Structural walls shall be anchored to diaphragms and supports in accordance with Section 1.4.4. The effects on the structure and its components due to the forces stipulated in this section shall be taken as the notional load, N, and combined with the effects of other loads in accordance with the load combinations of Section of Section 1.4.1. Where material resistance is dependent on load duration, notional loads are permitted to be taken as having a duration of 10 minutes. Structures

designed in conformance with the requirements of this Standard for Seismic Design Categories B, C, D, E, or F shall be deemed to comply with the requirements of Sections 1.4.1, 1.4.2, 1.4.3, 1.4.4 and 1.4.5.

1.4.1 Load Combinations of Integrity Loads

The notional loads, N, specified in Sections 1.4.2 through 1.4.5 shall be combined with dead and live loads in accordance with Section 1.4.1.1 for strength design and 1.4.1.2 for allowable stress design.

1.4.1.1 Strength Design Notional Load Combinations

a. $1.2D + 1.0N + L + 0.2S$
b. $0.9D + 1.0N$

1.4.1.2 Allowable Stress Design Notional Load Combinations

a. $D\ 0.7N$
b. $D + 0.75(0.7N) + 0.75L + 0.75(L_r\ or\ S\ or\ R)$
c. $0.6D + 0.7N$

1.4.2 Load Path Connections

All parts of the structure between separation joints shall be interconnected to form a continuous path to the lateral force-resisting system, and the connections shall be capable of transmitting the lateral forces induced by the parts being connected. Any smaller portion of the structure shall be tied to the remainder of the structure with elements having strength to resist a force of not less than 5% of the portion's weight.

1.4.3 Lateral Forces

Each structure shall be analyzed for the effects of static lateral forces applied independently in each of two orthogonal directions. In each direction, the static lateral forces at all levels shall be applied simultaneously. For purposes of analysis, the force at each level shall be determined using Eq. 1.4-1 as follows:

$$F_x = 0.01\ W_x \qquad (1.4\text{-}1)$$

where

F_x = the design lateral force applied at story x and
W_x = the portion of the total dead load of the structure, D, located or assigned to level x.

Structures explicitly designed for stability, including second-order effects, shall be deemed to comply with the requirements of this section.

1.4.4 Connection to Supports

A positive connection for resisting a horizontal force acting parallel to the member shall be provided