

## CODE

## COMMENTARY

Consideration should be given to various combinations of loading to determine the most critical design condition. This is particularly true when strength is dependent on more than one load effect, such as strength for combined flexure and axial load or shear strength in members with axial load.

If unusual circumstances require greater reliance on the strength of particular members than circumstances encountered in usual practice, some reduction in the stipulated strength reduction factors  $\phi$  or increase in the stipulated load factors may be appropriate for such members.

Rain load  $R$  in Eq. (5.3.1b), (5.3.1c), and (5.3.1d) should account for all likely accumulations of water. Roofs should be designed with sufficient slope or camber to ensure adequate drainage accounting for any long-term deflection of the roof due to the dead loads. If deflection of roof members may result in ponding of water accompanied by increased deflection and additional ponding, the design should ensure that this process is self-limiting.

Model building codes and design load references refer to earthquake forces at the strength level, and the corresponding load factor is 1.0 (ASCE/SEI 7; BOCA 1999; SBC 1999; UBC (ICBO 1997); 2018 IBC). In the absence of a general building code that prescribes strength level earthquake effects, a higher load factor on  $E$  would be required. The load effect  $E$  in model building codes and design load reference standards includes the effect of both horizontal and vertical ground motions (as  $E_h$  and  $E_v$ , respectively). The effect for vertical ground motions is applied as an addition to or subtraction from the dead load effect ( $D$ ), and it applies to all structural elements, whether part of the seismic force-resisting system or not, unless specifically excluded by the general building code.

**5.3.2** The effect of one or more loads not acting simultaneously shall be investigated.

**5.3.3** The load factor on live load  $L$  in Eq. (5.3.1c), (5.3.1d), and (5.3.1e) shall be permitted to be reduced to 0.5 except for (a), (b), or (c):

- (a) Garages
- (b) Areas occupied as places of public assembly
- (c) Areas where  $L$  is greater than 4.8 kN/m<sup>2</sup>

**5.3.4** If applicable,  $L$  shall include (a) through (f):

- (a) Concentrated live loads
- (b) Vehicular loads
- (c) Crane loads
- (d) Loads on hand rails, guardrails, and vehicular barrier systems
- (e) Impact effects
- (f) Vibration effects

**R5.3.3** The load modification factor in this provision is different than the live load reductions based on the loaded area that may be allowed in the general building code. The live load reduction, based on loaded area, adjusts the nominal live load ( $L_0$  in ASCE/SEI 7) to  $L$ . The live load reduction, as specified in the general building code, can be used in combination with the 0.5 load factor specified in this provision.