β_0 = foundation damping factor as specified in Section 19.2.1.2
γ = average unit weight of soil (lb/ft^3 or N/m^3)
Δ = design story drift as determined in Section 12.8.6
$\Delta_{fallout}$ = the relative seismic displacement (drift) at which glass fallout from the curtain wall, storefront, or partition occurs
Δ_a = allowable story drift as specified in Section 12.12.1
δ_{max} = maximum displacement at Level x, considering torsion, Section 12.8.4.3
δ_M = maximum inelastic response displacement, considering torsion, Section 12.12.3
δ_{MT} = total separation distance between adjacent structures on the same property, Section 12.12.3
δ_{avg} = the average of the displacements at the extreme points of the structure at Level x, Section 12.8.4.3
δ_x = deflection of Level x at the center of the mass at and above Level x, Eq. 12.8-15
δ_{xe} = deflection of Level x at the center of the mass at and above Level x determined by an elastic analysis, Section 12.8-6
δ_{xm} = modal deflection of Level x at the center of the mass at and above Level x as determined by Section 19.3.2
$\overline{\delta}_x$, $\overline{\delta}_{x1}$ = deflection of Level x at the center of the mass at and above Level x, Eqs. 19.2-13 and 19.3-3 (in. or mm)
θ = stability coefficient for P-delta effects as determined in Section 12.8.7
ρ = a redundancy factor based on the extent of structural redundancy present in a building as defined in Section 12.3.4
ρ_s = spiral reinforcement ratio for precast, prestressed piles in Section 14.2.3.2.6
λ = time effect factor
Ω_0 = overstrength factor as defined in Tables 12.2-1, 15.4-1, and 15.4-2

11.4 SEISMIC GROUND MOTION VALUES

11.4.1 Mapped Acceleration Parameters

The parameters S_S and S_1 shall be determined from the 0.2 and 1 s spectral response accelerations shown on Figs. 22-1, 22-3, 22-5, and 22-6 for S_S and Figs. 22-2, 22-4, 22-5, and 22-6 for S_1. Where S_1 is less than or equal to 0.04 and S_S is less than or equal to 0.15, the structure is permitted to be assigned to Seismic Design Category A and is only required to comply with Section 11.7.

User Note: Electronic values of mapped acceleration parameters, and other seismic design parameters, are provided at the USGS Web site at http://earthquake.usgs.gov/designmaps, or through the SEI Web site at http://content.seinstitute.org.

11.4.2 Site Class

Based on the site soil properties, the site shall be classified as Site Class A, B, C, D, E, or F in accordance with Chapter 20. Where the soil properties are not known in sufficient detail to determine the site class, Site Class D shall be used unless the authority having jurisdiction or geotechnical data determines Site Class E or F soils are present at the site.

11.4.3 Site Coefficients and Risk-Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

The MCE_R spectral response acceleration parameter for short periods (S_{MS}) and at 1 s (S_{M1}), adjusted for Site Class effects, shall be determined by Eqs. 11.4-1 and 11.4-2, respectively.

$$S_{MS} = F_a S_S \quad (11.4\text{-}1)$$

$$S_{M1} = F_v S_1 \quad (11.4\text{-}2)$$

where

S_S = the mapped MCE_R spectral response acceleration parameter at short periods as determined in accordance with Section 11.4.1, and
S_1 = the mapped MCE_R spectral response acceleration parameter at a period of 1 s as determined in accordance with Section 11.4.1

where site coefficients F_a and F_v are defined in Tables 11.4-1 and 11.4-2, respectively. Where the simplified design procedure of Section 12.14 is used, the value of F_a shall be determined in accordance with Section 12.14.8.1, and the values for F_v, S_{MS}, and S_{M1} need not be determined.

11.4.4 Design Spectral Acceleration Parameters

Design earthquake spectral response acceleration parameter at short period, S_{DS}, and at 1 s period, S_{D1}, shall be determined from Eqs. 11.4-3 and 11.4-4, respectively. Where the alternate simplified design procedure of Section 12.14 is used, the value of S_{DS} shall be determined in accordance with Section 12.14.8.1, and the value for S_{D1} need not be determined.

$$S_{DS} = \frac{2}{3} S_{MS} \quad (11.4\text{-}3)$$

$$S_{D1} = \frac{2}{3} S_{M1} \quad (11.4\text{-}4)$$