$$\Gamma_1 = \frac{\bar{W}_1}{\sum_{i=1}^{n} w_i \phi_{il}} \tag{18.5-4}$$

where

h_i = the height above the base to Level i
h_r = the height of the structure above the base to the roof level
w_i = the portion of the total effective seismic weight, W, located at or assigned to Level i

The fundamental period, T_1, shall be determined either by dynamic analysis using the elastic structural properties and deformational characteristics of the resisting elements, or using Eq. 18.5-5 as follows:

$$T_1 = 2\pi \sqrt{\frac{\sum_{i=1}^{n} w_i \delta_1^2}{g \sum_{i=1}^{n} f_i \delta_i}} \tag{18.5-5}$$

where

f_i = lateral force at Level i of the structure distributed in accordance with Section 12.8.3
δ_i = elastic deflection at Level i of the structure due to applied lateral forces f_i

18.5.2.4 Fundamental Mode Seismic Response Coefficient

The fundamental mode seismic response coefficient, C_{S1}, shall be determined using Eq. 18.5-6 or 18.5-7:

For $T_{1D} < T_S$,

$$C_{S1} = \left(\frac{R}{C_d}\right)\frac{S_{D1}}{\Omega_0 B_{1D}} \tag{18.5-6}$$

For $T_{1D} \geq T_S$,

$$C_{S1} = \left(\frac{R}{C_d}\right)\frac{S_{D1}}{T_{1D}\,(\Omega_0 B_{1D})} \tag{18.5-7}$$

where

S_{DS} = the design spectral response acceleration parameter in the short period range
S_{D1} = the design spectral response acceleration parameter at a period of 1 s
B_{1D} = numerical coefficient as set forth in Table 18.6-1 for effective damping equal to β_{mD} (m = 1) and period of the structure equal to T_{1D}

18.5.2.5 Effective Fundamental Mode Period Determination

The effective fundamental mode period at the design earthquake, T_{1D}, and at the maximum considered earthquake, T_{1M}, shall be based on explicit consideration of the post-yield force deflection characteristics of the structure or shall be calculated using Eqs. 18.5-8 and 18.5-9:

$$T_{1D} = T_1\sqrt{\mu_D} \tag{18.5-8}$$

$$T_{1M} = T_1\sqrt{\mu_M} \tag{18.5-9}$$

18.5.2.6 Residual Mode Base Shear

Residual mode base shear, V_R, shall be determined in accordance with Eq. 18.5-10:

$$V_R = C_{SR}\bar{W}_R \tag{18.5-10}$$

where

C_{SR} = the residual mode seismic response coefficient as determined in Section 18.5.2.8
$\bar{W}_R$ = the effective residual mode effective weight of the structure determined using Eq. 18.5-13

18.5.2.7 Residual Mode Properties

Residual mode shape, ϕ_{iR}, participation factor, Γ_R, effective residual mode seismic weight of the structure, $\bar{W}_R$, and effective period, T_R, shall be determined using Eqs. 18.5-11 through 18.5-14:

$$\phi_{iR} = \frac{1-\Gamma_1\phi_{i1}}{1-\Gamma_1} \tag{18.5-11}$$

$$\Gamma_R = 1 - \Gamma_1 \tag{18.5-12}$$

$$\bar{W}_R = \mathrm{W} - \bar{W}_1 \tag{18.5-13}$$

$$T_R = 0.4T_1 \tag{18.5-14}$$

18.5.2.8 Residual Mode Seismic Response Coefficient

The residual mode seismic response coefficient, C_{SR}, shall be determined in accordance with Eq. 18.5-15:

$$C_{SR} = \left(\frac{R}{C_d}\right)\frac{S_{DS}}{\Omega_0 B_R} \tag{18.5-15}$$

where

B_R = numerical coefficient as set forth in Table 18.6-1 for effective damping equal to β_R, and period of the structure equal to T_R

18.5.2.9 Design Lateral Force

The design lateral force in elements of the seismic force-resisting system at Level i due to fundamental mode response, F_{i1}, and residual mode