17.6.4 Minimum Lateral Displacements and Forces

17.6.4.1 Isolation System and Structural Elements below the Isolation System

The isolation system, foundation, and all structural elements below the isolation system shall be designed using all of the appropriate requirements for a nonisolated structure and the forces obtained from the dynamic analysis without reduction, but the design lateral force shall not be taken as less than 90 percent of V_b determined in accordance as prescribed by Eq. 17.5-7.

The total design displacement of the isolation system shall not be taken as less than 90 percent of D_{TD} as specified by Section 17.5.3.5. The total maximum displacement of the isolation system shall not be taken as less than 80 percent of D_{TM} as prescribed by Section 17.5.3.5.

The limits on displacements specified by this section shall be evaluated using values of D_{TD} and D_{TM} determined in accordance with Section 17.5.5 except that D_D' is permitted to be used in lieu of D_D and D_M' is permitted to be used in lieu of D_M as prescribed in Eqs. 17.6-1 and 17.6-2:

$$D_D' = \frac{D_D}{\sqrt{1 + (T/T_D)^2}} \qquad (17.6\text{-}1)$$

$$D_M' = \frac{D_M}{\sqrt{1 + (T/T_M)^2}} \qquad (17.6\text{-}2)$$

where

D_D = design displacement, in in. (mm), at the center of rigidity of the isolation system in the direction under consideration, as prescribed by Eq. 17.5-1

D_M = maximum displacement in in. (mm), at the center of rigidity of the isolation system in the direction under consideration, as prescribed by Eq. 17.5-3

T = elastic, fixed-base period of the structure above the isolation system as determined by Section 12.8.2

T_D = effective period of seismically isolated structure in s, at the design displacement in the direction under consideration, as prescribed by Eq. 17.5-2

T_M = effective period, in s, of the seismically isolated structure, at the maximum displacement in the direction under consideration, as prescribed by Eq. 17.5-4

17.6.4.2 Structural Elements above the Isolation System

Subject to the procedure-specific limits of this section, structural elements above the isolation system shall be designed using the appropriate requirements for a nonisolated structure and the forces obtained from the dynamic analysis reduced by a factor of R_I as determined in accordance with Section 17.5.4.2. The design lateral shear force on the structure above the isolation system, if regular in configuration, shall not be taken as less than 80 percent of V_s, or less than the limits specified by Section 17.5.4.3.

EXCEPTION: The lateral shear force on the structure above the isolation system, if regular in configuration, is permitted to be taken as less than 80 percent, but shall not be less than 60 percent of V_s, where the response-history procedure is used for analysis of the seismically isolated structure.

The design lateral shear force on the structure above the isolation system, if irregular in configuration, shall not be taken as less than V_s or less than the limits specified by Section 17.5.4.3.

EXCEPTION: The design lateral shear force on the structure above the isolation system, if irregular in configuration, is permitted to be taken as less than 100 percent, but shall not be less than 80 percent of V_s, where the response-history procedure is used for analysis of the seismically isolated structure.

17.6.4.3 Scaling of Results

Where the factored lateral shear force on structural elements, determined using either response-spectrum or response-history procedure, is less than the minimum values prescribed by Sections 17.6.4.1 and 17.6.4.2, all response parameters, including member forces and moments, shall be adjusted upward proportionally.

17.6.4.4 Drift Limits

Maximum story drift corresponding to the design lateral force including displacement due to vertical deformation of the isolation system shall not exceed the following limits:

1. The maximum story drift of the structure above the isolation system calculated by response-spectrum analysis shall not exceed $0.015h_{sx}$.
2. The maximum story drift of the structure above the isolation system calculated by response-history analysis based on the force-deflection characteristics of nonlinear elements of the seismic force-resisting system shall not exceed $0.020h_{sx}$.

Drift shall be calculated using Eq. 12.8-15 with the C_d of the isolated structure equal to R_I as defined in Section 17.5.4.2.

The secondary effects of the maximum considered earthquake lateral displacement of the structure