2005 Edition of ASCE 7
Minimum Design Loads for Building and Other Structures

Supplement No.2

Supplement No. 2 of ASCE 7-05 revises the minimum base shear equations for both buildings and non-building structures. The need for this change was indicated by the results from the 75% Draft of *ATC-63, Quantification of Building System Performance and Response Parameters,* which indicate that tall buildings may fail at an unacceptably low seismic level and therefore the minimum base shear equation for buildings is being restored to that which appeared in the 2002 edition of ASCE 7.

Because nonbuilding structures not similar to buildings have low R-values compared to the special reinforced concrete moment frames studied in ATC-63, the ASCE 7 standards committee chose not to restore the high minimum base shears for nonbuilding structures not similar to buildings found in ASCE 7-02. In many cases, these previous minimum base shears gave many nonbuilding structures not similar to buildings effective R-values less than 1.0. Therefore, the Seismic Subcommittee believes that the minimum base shear equation of $0.044S_{DS}I$ used for buildings should also be applied to nonbuilding structures not similar to buildings.

Supplement No. 2 modifies three equations of the standard (Eq. 12.8-5, 15.4-1 and 15.4-3) as shown below:

Supplement No. 2 to ASCE 7-05:

Revise Equation 12.8-5 of Section 12.8.1.1 of ASCE 7-05 as shown below:

12.8.1.1 Calculation of Seismic Response Coefficient. The seismic response coefficient, C_s, shall be determined in accordance with Eq. 12.8-2.

$$C_s = \frac{S_{DS}}{\left(\frac{R}{I}\right)} \qquad \text{(Eq. 12.8-2)}$$

where:

S_{DS} = the design spectral response acceleration parameter in the short period range as determined from Section 11.4.4

R = the response modification factor in Table 12.2-1, and

I = the occupancy importance factor determined in accordance with Section 11.5.1

The value of C_s computed in accordance with Eq. 12.8-2 need not exceed the following:

$$C_s = \frac{S_{D1}}{T\left(\frac{R}{I}\right)} \qquad for \quad T \le T_L \qquad \text{(Eq. 12.8-3)}$$

$$C_s = \frac{S_{D1}T_L}{T^2\left(\frac{R}{I}\right)} \qquad for \quad T > T_L \qquad \text{(Eq. 12.8-4)}$$

C_s shall not be less than

C_s = ~~0.01~~ $0.044S_{DS}I \geq 0.01$ (Eq. 12.8-5)

In addition, for structures located where S_1 is equal to or greater than 0.6g, C_s shall not be less than

$$C_s = \frac{0.5S_1}{\left(\frac{R}{I}\right)} \qquad \text{(Eq. 12.8-6)}$$

where I and R are as defined in Section 12.8.1.1 and

S_{D1} = the design spectral response acceleration parameter at a period of 1.0 sec, as determined from Section 11.4.4
T = the fundamental period of the structure (sec) determined in Section 12.8.2
T_L = long-period transition period (sec) determined in Section 11.4.5
S_1 = the mapped maximum considered earthquake spectral response acceleration parameter determined in accordance with Section 11.4.1

Revise Equations 15.4-1 and 15.4-2 of Section 15.4.1, item 2, as shown below:

2. For nonbuilding systems that have an R value provided in Table 15.4-2, the seismic response coefficient (C_s) shall not be taken less than

   C_s = ~~0.03~~ $0.044S_{DS}I \geq 0.03$ (15.4-1)

   and for nonbuilding structures located where $S_1 \geq 0.6g$, C_s shall not be taken less than

$$C_s = \frac{0.8 S_1}{\left(\frac{R}{I}\right)} \qquad (15.4\text{-}2)$$

EXCEPTION: Tanks and vessels that are designed to AWWA D100, AWWA D103, API 650 Appendix E, and API 620 Appendix L as modified by this standard, shall be subject to the larger of the minimum base shear values defined by the reference document or the following equations:

C_s = ~~0.01~~ $0.044 S_{DS} I \geq 0.01$ (15.4-3)

and for nonbuilding structures located where $S_1 \geq 0.6g$, C_s shall not be taken less than

$$C_s = \frac{0.5 S_1}{\left(\frac{R}{I}\right)} \qquad (15.4\text{-}4)$$

Minimum base shear requirements need not apply to the convective (sloshing) component of liquid in tanks.