

## PROPOSAL 2-9 (2009)

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### SCOPE: Introduction to Part 1 of 2009 Provisions

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#### PROPOSAL FOR CHANGE:

1 **Adopt ASCE-7-05 Including Supplement No. 2 as the recommended design**  
2 **provisions for the 2009 Provisions as indicated below:**  
3

4 **Introduction**

5 The *NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other*  
6 *Structures* (referred to hereinafter as the *Provisions*) are presented in three parts.  
7

8 Part 1 of the *Provisions* contains the minimum design provisions recommended at this time. To  
9 the extent possible, the recommended design provisions are identical to those in ASCE/SEI 7-05  
10 Including Supplement No. 2, *Minimum Design Loads for Buildings and Other Structures*.

11 However, major or significant changes to ASCE 7 may be recommended from time to time based  
12 on analysis of earthquake damage or ongoing research. These changes are also contained in Part  
13 1 and become part of the recommended design provisions.  
14

15 Part 1 also contains a statement about the seismic performance expected from use of these  
16 provisions. This performance is stated in broad terms and more specific expectations for various  
17 occupancies when shaken at different levels of intensity are contained in the commentary in Part  
18 2.  
19

20 Lastly, Part 1 includes proposed procedures to be followed to determine adequacy of materials,  
21 systems, or design methods used as alternates to the recommended design provisions.  
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23 Part 2 of the Provisions comprise a commentary for Part 1. Since, with few exceptions, Part 1  
24 will reference ASCE 7 for specific provisions, Part 2 will also serve as a commentary to the  
25 seismic provisions of ASCE 7. The section and paragraph numbering of this part mirrors ASCE  
26 7 for easy reference.  
27

28 Part 3 contains individual summaries of focused committee work that is ongoing, that needs  
29 research to complete, or that did not result in changes to the provisions that were recommended  
30 by the Provisions Update Committee. New procedures or provisions, not currently contained in  
31 the referenced standards, are introduced for consideration by the design community, researchers,  
32 the standards development organizations, and building codes. Generally it is intended that  
33 material presented in this part would be available for provisional use by design professionals and  
34 for study by researchers prior to being considered for adoption by reference standards.  
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37 **REASON FOR PROPOSAL:**

1  
 2 The purpose of this change is to adopt ASCE/SEI 7-05 Including Supplement No. 2 as the  
 3 recommended design provisions for the 2009 *Provisions*. Supplement No. 2 is shown below in  
 4 its entirety. Supplement No. 2 revises the minimum base shear equations for both buildings and  
 5 non-building structures. The need for this change was indicated by the results from the 75%  
 6 Draft of *ATC-63, Quantification of Building System Performance and Response Parameters*,  
 7 which indicate that tall buildings may fail at an unacceptably low seismic level and therefore the  
 8 minimum base shear equation for buildings is being restored to that which appeared in the 2002  
 9 edition of ASCE 7.

10  
 11 Because nonbuilding structures not similar to buildings have low R-values compared to the  
 12 special reinforced concrete moment frames studied in ATC-63, the ASCE 7 standards committee  
 13 chose not to restore the high minimum base shears for nonbuilding structures not similar to  
 14 buildings found in ASCE 7-02. In many cases, these previous minimum base shears gave many  
 15 nonbuilding structures not similar to buildings effective R-values less than 1.0. Therefore, the  
 16 Seismic Subcommittee believes that the minimum base shear equation of  $0.044S_{DS}I$  used for  
 17 buildings should also be applied to nonbuilding structures not similar to buildings.

18  
 19 Supplement No. 2 was approved by the ASCE 7 standards committee in the summer of 2007 and  
 20 went through the public review period without comment. As such, Supplement No. 2 is now  
 21 fully adopted by ASCE.

22  
 23 Upon the next printing of ASCE 7-05 it will be included directly in the text of the document.  
 24 The complete text of Supplement No. 2 is as follows:

25  
 26 **Supplement No. 2 to ASCE 7-05:**

27  
 28 **Revise Equation 12.8-5 of Section 12.8.1.1 of ASCE 7-05 as shown below:**

29  
 30 **12.8.1.1 Calculation of Seismic Response Coefficient.** The seismic response coefficient,  $C_s$ ,  
 31 shall be determined in accordance with Eq. 12.8-2.

32  
 33 
$$C_s = \frac{S_{DS}}{\left(\frac{R}{I}\right)} \quad (\text{Eq. 12.8-2})$$

34 where:

35  
 36  $S_{DS}$  = the design spectral response acceleration parameter in the short period range as  
 37 determined from Section 11.4.4

38  
 39  $R$  = the response modification factor in Table 12.2-1, and

40  
 41  $I$  = the occupancy importance factor determined in accordance with Section 11.5.1

42  
 43  
 44 The value of  $C_s$  computed in accordance with Eq. 12.8-2 need not exceed the following:

1 
$$C_s = \frac{S_{DI}}{T\left(\frac{R}{I}\right)} \quad \text{for } T \leq T_L \quad (\text{Eq. 12.8-3})$$

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

3  
4  $C_s$  shall not be less than

5  
6 
$$C_s = \underline{0.01} \quad 0.044S_{DS}I \geq 0.01 \quad (\text{Eq. 12.8-5})$$

7  
8 In addition, for structures located where  $S_1$  is equal to or greater than 0.6g,  $C_s$  shall not be less  
9 than

10 
$$C_s = \frac{0.5S_1}{\left(\frac{R}{I}\right)} \quad (\text{Eq. 12.8-6})$$

11 where  $I$  and  $R$  are as defined in Section 12.8.1.1 and

- 12  
13  $S_{DI}$  = the design spectral response acceleration parameter at a period of 1.0 sec, as  
14 determined from Section 11.4.4  
15  $T$  = the fundamental period of the structure (sec) determined in Section 12.8.2  
16  $T_L$  = long-period transition period (sec) determined in Section 11.4.5  
17  $S_1$  = the mapped maximum considered earthquake spectral response  
18 acceleration parameter determined in accordance with Section 11.4.1  
19  
20

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

- 22  
23 2. For nonbuilding systems that have an  $R$  value provided in Table 15.4-2, the seismic  
24 response coefficient ( $C_s$ ) shall not be taken less than

25  
26 
$$C_s = \underline{0.03} \quad 0.044S_{DS}I \geq 0.03 \quad (15.4-1)$$

27  
28 and for nonbuilding structures located where  $S_1 \geq 0.6g$ ,  $C_s$  shall not be taken less than

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30 
$$C_s = \frac{0.8S_1}{\left(\frac{R}{I}\right)} \quad (15.4-2)$$

31  
32 **EXCEPTION:** Tanks and vessels that are designed to AWWA D100, AWWA D103,  
33 API 650 Appendix E, and API 620 Appendix L as modified by this standard, shall be  
34 subject to the larger of the minimum base shear values defined by the reference document  
35 or the following equations:

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37 
$$C_s = \underline{0.01} \quad 0.044S_{DS}I \geq 0.01 \quad (15.4-3)$$

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

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

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

**End of Supplement No. 2 to ASCE 7-05**

**TS 2 VOTE:**

*YES = 8      Yes with Reservations = 0      No = 0      Not Voting = 1*