

1 **PROPOSAL 2-4 (2009)**  
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4 **SCOPE: Part I, Section 1.4, Exception 1 of the 2009 Provisions**  
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8 **PROPOSAL FOR CHANGE:**  
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10 **I. Revise Provisions Section 1.4 Exception #1 as follows:**  
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12 **Exception #1**

13 Sec. 5.2.6.2 of the 2003 NEHRP on *P-delta limit* will be retained in place of Sec. 12.8.7 of ASCE 7-05 as follows:  
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15 **12.8.7/5.2.6.2 P-delta limit.** Stability coefficient,  $\theta$ , as determined for each level of the structure by the  
16 following equation, shall not exceed 0.10:

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$$\theta = \frac{P_x \Delta I}{V_x h_{sx} C_d} \quad (5.2-16)$$

18 where:

19  $P_x$  = the total vertical design load at and above Level  $x$ . Where calculating the vertical design  
20 load for purposes of determining P-delta effects, the individual load factors need not  
21 exceed 1.0.

22  $\Delta$  = the design story drift calculated in accordance with Sec. ~~12.8.6.2-6.4~~.

23  $I$  = the occupancy importance factor determined in accordance with Sec. ~~11.5.1.1-3~~

24  $V_x$  = the seismic shear force acting between Level  $x$  and  $x - 1$ .

25  $h_{sx}$  = the story height below Level  $x$ .

26  $C_d$  = the deflection amplification factor from Table ~~12.2-14.3-4~~.

27 **Exception:**

28 **EXCEPTIONS:**

- 29 1. The stability coefficient,  $\theta$ , shall be permitted to exceed 0.10 if the resistance to lateral forces  
30 is determined to increase continuously in a monotonic nonlinear static (pushover) analysis to  
31 150% of the target displacement as determined in Sec. ~~12.15.6A5.2.3~~. P-delta effects shall be  
32 included in the analysis. ~~Modeling, analysis, and design review shall conform to Sec.~~  
33 ~~12.15.2-12.15.6 and 12.15.10, except that where the analysis is performed for this purpose~~  
34 ~~using elastic-plastic force-deformation relations at each location of nonlinear strain, design~~  
35 ~~review is not required.~~  
36 2. The stability coefficient,  $\theta$ , shall be permitted to exceed 0.10 if compliance with the  
37 provisions of the nonlinear response history procedure in Chapter 16 is demonstrated.

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39 **REASON FOR PROPOSAL:**  
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41 Section references were updated to use ASCE 7-05 section numbers as applicable.  
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43 The use of simple elastic-plastic force-deformation relations achieves the intent of Exception #1 while  
44 being simple enough that the requirement for peer review can be waived; this will be particularly useful in  
45 SDCs B and C, which are the locations most likely to have stability coefficients greater than 0.10.

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The change to 150% of the target displacement was considered necessary to have increased confidence that story mechanisms will not occur at the MCE level of shaking.

Exception #2 was added to allow for dynamic analysis, in response to a negative vote from the PUC on an earlier version of this proposal.

This proposal makes reference to section numbers as revised in pending Proposal 2-3. If Proposal 2-4 should pass and Proposal 2-3 fails, it will be necessary to bring parts of the 2003 Appendix into Part 1.

**TS 2 VOTE:**

YES = 9      Yes with Reservations = 0      No = 0      Not Voting = 0