

1 **PROPOSAL 2-4 Edit (2009) with Editorial Amendments**

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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:**

11 **Exception #1**

12 **12.8.7 P-delta limit.** Stability coefficient, θ , as determined for each level of the structure by the
13 following equation, shall not exceed 0.10:

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

17 where:

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

21 Δ = the design story drift calculated in accordance with Sec. 12.8.6.

22 I = the occupancy importance factor determined in accordance with Sec.11.5.1.

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

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

25 C_d = the deflection amplification factor from Table 12.2-1

26 **EXCEPTION. The stability coefficient, θ , shall be permitted to exceed 0.10 if either of the**
27 **following applies:**

- 28 1. The resistance to lateral forces is determined to increase continuously in a monotonic
29 nonlinear static (pushover) analysis to 150% of the target displacement as determined
30 according to ~~Sec. 12.15.6.~~ 3.3.3.3.2 of ASCE/SEI 41 Supplement 1, using S_a defined as a
31 risk-adjusted MCE spectral response acceleration according to the Provisions at the effective
32 period. Modeling, and analysis, and design review shall conform to Sec. 12.15.2-12.15.6 and
33 12.15.10. 3.3.3 of ASCE/SEI 41 Supplement 1, except that the analysis shall be done for
34 seismic actions occurring simultaneously with the effects of dead load in combination with
35 not less than 25 percent of the required design live loads, reduced as permitted for the area of
36 a single floor. P-delta effects shall be included in the analysis. Design review as prescribed in
37 Chapter 16 is required.
- 38 2. Compliance with the provisions of the nonlinear response history procedure in Chapter 16 is
39 demonstrated.

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42 **II. Add the following entry within Sec. 23.1 of Part 1 of the 2009 Provisions:**

43 ASCE/SEI 41-06, Supplement 1

44 Section 3.3.3

45 Seismic Rehabilitation of Existing Buildings, 2007

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REASON FOR PROPOSAL:

Shown in red underline and black strikeout are editorial changes required to update the P-Delta exceptions of Part 1, which were approved by the PUC on April 8, 2008 (Proposal 2-4). These editorial updates were needed because Proposal 2-4 cites material that currently resides in Part 3, because Proposal 2-3 did not pass. Because requirements for the nonlinear static procedure are now specified in ASCE 41, it is simpler to refer to that document than to write applicable requirements into the *Provisions*. However, some modifications to the ASCE requirements were introduced here to maintain consistency with the nonlinear static procedure presented in the 2003 *Provisions*.