CODE

11.8.4.1 Out-of-plane deflection due to service loads, Δ_s, shall be calculated in accordance with Table 11.8.4.1, where M_a is calculated by 11.8.4.2.

Table 11.8.4.1—Calculation of Δ_s

M_a	Δ_s	
$\le(2/3)M_{cr}$	$\Delta_s = \left(\frac{M_a}{M_{cr}}\right)\Delta_{cr}$	(a)
$>(2/3)M_{cr}$	$\Delta_s = (2/3)\Delta_{cr} + \frac{(M_a - (2/3)M_{cr})}{(M_n - (2/3)M_{cr})}(\Delta_n - (2/3)\Delta_{cr})$	(b)

11.8.4.2 The maximum moment M_a at midheight of wall due to service lateral and eccentric vertical loads, including $P_s\Delta_s$ effects, shall be calculated by Eq. (11.8.4.2) with iteration of deflections.

$$M_a = M_{sa} + P_s\Delta_s \qquad (11.8.4.2)$$

11.8.4.3 Δ_{cr} and Δ_n shall be calculated by (a) and (b):

(a) $$\Delta_{cr} = \frac{5M_{cr}\ell_c^2}{48E_cI_g} \qquad (11.8.4.3a)$$

(b) $$\Delta_n = \frac{5M_n\ell_c^2}{48E_cI_{cr}} \qquad (11.8.4.3b)$$

COMMENTARY

11.8.4.1 Test data (Athey 1982) demonstrate that out-of-plane deflections increase rapidly when the service-level moment exceeds $2/3M_{cr}$. A linear interpolation between Δ_{cr} and Δ_n is used to determine Δ_s to simplify the design of slender walls if $M_a > 2/3M_{cr}$.

Service-level load combinations are not defined in Chapter 5 of this Code, but they are discussed in Appendix C of ASCE/SEI 7. Appendixes to ASCE/SEI 7 are not considered mandatory parts of that standard. For calculating service-level lateral deflections of structures, Appendix C of ASCE/SEI 7 recommends using the following load combination:

$$D + 0.5L + W_a$$

in which W_a is wind load based on serviceability wind speeds provided in the commentary to Appendix C of ASCE/SEI 7. If the slender wall is designed to resist earthquake effects E, and E is based on strength-level earthquake effects, the following load combination is considered to be appropriate for evaluating the service-level lateral deflections

$$D + 0.5L + 0.7E$$