2006 IBC Structural/Seismic Design Manual, Vol. 3

ERRATA — FIRST AND SECOND PRNTINGS

Page 17, middle of page, 3rd equation now reads . . .

$$0.9\,D + 1.0\,E = 0.62\,D + \rho\,Q_E = 323 \text{ kips (tension)}$$

Page 20, top of page, 3rd equation now reads . . .

$$\Omega_o\,Q_E = 2.0\,Q_E = 2.0\,(286 \text{ kips}) = 572 \text{ kips}$$

middle of page, equation now reads . . .

$$P_{Em} = 1.4(42 \text{ ksi})\left(11.9 \text{ in}^2 + \frac{1}{2}7.86 \text{ in}^2\right)\sin(37.6^\circ) = 615 \text{ kips}$$

last equation now reads . . .

$$P_u = 1.48\,D + E_m + 0.5L = 1.48\,(78 \text{ kips}) + 615 \text{ kips} + 0.5\,(44 \text{ kips}) = 752 \text{ kips}$$

Page 25, bottom of page, equation now reads . . .

$$P_E \le \left[R_y\,F_y\,A_4 - 0.3\,F_{cr}\,A_5\right]\cos\gamma - F_{4\,right}$$

$$F_{4\,right} = \frac{1}{2}\,[(R_yF_y + 0.3F_{cr})A_4 - (R_yF_y + 0.3F_{cr})A_5]\cos\gamma$$

$$= \frac{1}{2}\,[(1.4 \times 42 \text{ ksi} + 0.3 \times 34.7 \text{ ksi})11.9 \text{ in}^2$$

$$- 1.4 \times 42 \text{ ksi} + 0.3 \times 33.2 \text{ ksi})7.86 \text{ in}^2]\cos 37.6^\circ$$

$$= 112 \text{ kips}$$

Page 26, top of page, new equation reads . . .

$$P_E \le (1.4 \times 42 \text{ ksi} \times 11.9 \text{ in}^2 - 0.3 \times 33.2 \text{ ksi} \times 7.86 \text{ in}^2)\cos 37.5^\circ - 112 \text{ kips}$$

$$= 380 \text{ kips}$$

first equation now reads . . .

$$P_u = 1.48\,D + Q_{E(\max)} + 0.5L = 1.48\,(2.1 \text{ kips}) + 380 \text{ kips} + 0.5\,(1.1 \text{ kips}) = 384 \text{ kips}$$

last equation in series at midpage now reads . . .

$$\phi P_n = 0.9\,A_g\,F_{cr} = 0.9(19.1 \text{ in}^2)41.2 \text{ ksi} = 708 \text{ kips}$$

bottom of page—last 2 equations now read . . .

$$\frac{P_u}{\phi_c\,P_n} = \frac{384 \text{ kips}}{708 \text{ kips}} = 0.54 > 0.2 \qquad \text{Use interaction equation H1-1a.}$$

$$\frac{P_u}{\phi_c\,P_n} + \frac{8}{9}\,\frac{M_u}{\phi_b\,M_n} = \frac{384 \text{ kips}}{708 \text{ kips}} + \frac{8}{9}\,\frac{168 \text{ kip-ft}}{499 \text{ kip-ft}} = 0.84 < 1 \quad \ldots o.k.$$

Page 33, 1st equation now reads . . .

$$W_{\text{min}} = \frac{R_y F_y A}{\phi F_t t} = \frac{788 \text{ kips}}{0.9 \times 50 \text{ ksi} \times t} = 17.5 \text{ in}^2/t$$

under first text paragraph, 4th equation now reads . . .

$$W_{\text{min}} = \frac{R_y F_y A}{\phi F_u \times t} + W_{\text{(hole)}} = \frac{788 \text{ kips}}{0.75 \times 65 \text{ ksi} \times 7/8 \text{ in}} + 1.5 \text{ in} = 20 \text{ in}$$

under "Check vertical section of gusset plate," 2nd line of paragraph, change 1 inch to $^7/_8$-inch

Page 34, middle of page, second equation now reads . . .

$$\phi R_n = \phi (b + 5 \text{ k}) F_y t_w = 1.0 \left[13 \text{ in} + 5(1.50 \text{ in})\right] 50 \text{ ksi}(0.550 \text{ in}) = 581 \text{ kips}$$

Page 35, first group of equations, 2nd equation now reads . . .

$$\phi R_n = \phi (a + 5k) F_y t_w = 1.0[13 \text{ in} + 5(1.15 \text{ in})](50 \text{ ksi})0.450 \text{ in} = 422 \text{ kips}$$

under "Check beam web for crippling," third equation now reads . . .

$$N > d/2 = 9.2 \text{ in}$$

fifth equation now reads . . .

$$\phi R_n = 0.75 \left[0.8 (0.450 \text{ in})^2 \left[1 + 3 \frac{13 \text{ in}}{18.35 \text{ in}} \left(\frac{0.450 \text{ in}}{0.750 \text{ in}}\right)^{\frac{3}{2}}\right] \sqrt{\frac{29,000 \text{ ksi}(50 \text{ ksi})(0.750 \text{ in})}{0.450 \text{ in}}}\right] = 251 \text{ kips}$$

Page 38, 1st equation now reads . . .

$$\frac{Kl}{r} = \frac{(1.0)(14.5 \text{ in})}{(7/8 \text{ in})/\sqrt{12}} = 57.4$$

3rd equation now reads . . .

$$F_{cr} = (0.658^{F_y/F_E}) F_y = 39.8 \text{ ksi}$$

4th equation now reads . . .

$$\phi P_n = 0.9 A_g F_{cr} = 0.9[(2)(10.0 \text{ in}) \times {}^7/_8 \text{ in}] \; 39.8 \text{ ksi} = 625 \text{ kips}$$

6th equation now reads . . .

$$\phi R_n = \phi (A_v 0.6 F_y + U_{bs} A_t F_u)$$

Page 39, midpage last equation under "Plates:" now reads . . .

$$A_e = 0.81[12.5 + 4] = 13.4 \geq A_g \quad \ldots o.k.$$

Page 40, 1st equation now reads . . .

$$\phi R_n = 0.75(0.6)(70 \text{ ksi}) \; [{}^5/_{16} \text{ in} \times \frac{\sqrt{2}}{2} (12 \text{ in})] = 84 \text{ kips}$$

Page 42, 2nd paragraph under 8b, 1st line, change 1 inch to $^7/_8$ inch.

bottom of page, 1st and 2nd equations now read . . .

$$V_{\text{con}} = (R_y F_y A_g - P_{\text{max}}) \sin(\gamma) = (788 \text{ kips} - 574 \text{ kips}) \sin(37.6^\circ) = 131 \text{ kips}$$

$$H_{\text{con}} = (R_y F_y A_g + P_{\text{max}}) \cos(\gamma) = (788 \text{ kips} + 574 \text{ kips}) \cos(37.6^\circ) = 1080 \text{ kips}$$

Page 44, first equation now reads . . .

$$e = \frac{M_{\text{con}}}{V_{\text{con}}} = \frac{16,500 \text{ in-kip}}{131 \text{ kips}} = 125 \text{ in}, \quad W = 70 \text{ in}, \quad W_{ef} = \sqrt{4\,e^2 + W^2} - 2\,e = 9.62 \text{ in}$$

midpage 1st equation under "Check tension area" now reads . . .

$$W_{ef} = \sqrt{4\,e^2 + W^2} - 2\,e = \sqrt{4\,(4 \text{ in})^2 + (28 \text{ in})^2} - 2\,(4) \text{ in} = 21 \text{ in}$$

bottom of page, under "Check vertical area in shear," 1st and 2nd equations now read . . .

$$\phi\, V_n = \phi\, 0.6\, F_y\, A_w = 0.9(0.6)(50 \text{ ksi})(30 \text{ in})\,(^7/_8 \text{ in}) = 810 \text{ kips}$$

$$V_u = P_{\max} \times \sin(\gamma) = 574 \text{ kips } \sin(37.6^\circ) = 350 \text{ kips}$$

Page 46, midpage 2nd and 3rd equations now read . . .

$$H_{\text{con}} = (R_y\, F_y\, A_g + 0.3\, F_{cr}\, A_g)\,\cos(\gamma) = (788 \text{ kip} + 135 \text{ kips})\cos(37.6^\circ) = 731 \text{ kips}$$

$$M_{\text{con}} = H_{\text{con}}(t_{\text{slab}} + \frac{d_b}{2}) = 731 \text{ kips } (6.25 \text{ in} + 9 \text{ in}) = 11,200 \text{ in-kip}$$

Page 289, Table 7-5, 2nd line of last column now reads . . . 3.231

Page 290, 8a, equation following text paragraph now reads . . .

$$(1.2 + 0.2S_{DS})D + \rho Q_E + 0.5\,L$$

Page 293, mid-page, under "Per ACI §21.3.2.1," 4th and 5th lines should read . . .

$$= 876 \text{ kip-ft} \geq 747 \text{ kip-ft} \quad \therefore o.k.$$

From the frame analysis, Equation 5, positive moment is 404 kip-ft.

bottom of page, above last text paragraph, should read . . .

$$= 439 \text{ kip-ft} \geq 404 \text{ kip-ft} \quad \therefore o.k.$$

Page 294, 8c, first paragraph, line 2 . . . change $n/2$ to $d/2$

Page 301, 9a, equation and text following text paragraph now reads . . .

$$\Sigma M_{nc} \geq (6/5)\Sigma M_{nb}$$

The controlling girder location occurs at levels 2, 3, 4, and 5. The girders are 24 inches by 36 inches with 5 #10s top, 5 #7s bottom.

Calculation of $-M_{nb}$ (negative, at beam tops)

Last line now reads . . .

$$-M_{nb} = (0.90)(6.35 \text{ in}^2)(60,000)\left(33 \text{ in} - \frac{4.67 \text{ in}}{2}\right)\frac{1}{12,000} = 876 \text{ kip-ft}$$

Page 306, Figure 7-9 title now reads . . .

Figure 7-9. Column P-M diagram for 30-inch x 36-inch interior column