

Errata

**Ductile Design of Steel Structures, 2<sup>nd</sup> edition**

by Bruneau, Uang, and Sabelli

May 4, 2023

Page No.	Section No.	Correction
XX	Preface	Replace “American Institute of Design Construction” by “American Institute of Steel Construction”
17	Figure 2.5d, 2.5e, 2.5f	X-axis labels should be “Temperature, °F”
34	2.4	End of paragraph at top of page: Replace “Chapter 15” by “Chapter 14”
69	Figure 2.31 (cont.)	Replace B’ by E’, so that cycle EHB’ become EHE’
76	2.7.3.2	In Eq. 2.21, replace “ $\Rightarrow a$ ” by “ $\Rightarrow a=$ ”
81	2.7.4.1	In Equations 2.30a to 2.30c, replace “ $\tau_{xy}$ ” by “ $\tau_{xy}^2$ ”
88	2.7.4.1	Line 6: Replace “ $\sigma_y = 3 \tau_y$ ” by “ $\sigma_y = \sqrt{3}\tau_y$ ”
88	2.7.4.1	Line 7: Replace “ $\tau^2=0.58\sigma_y\dots$ ” by “ $\tau=0.58\sigma_y\dots$ ”
95	Figures 2.46c and 2.46g	These are normalized plots, so the actual elastic slopes are dimensionless and should be indicated as “1” and “1/2”. The terms “EA/L” and “EA/2L” shown as slopes should actually be taken as labels indicating to which structural members these slopes correspond, rather than taken as actual slope values.
96	2.8	Equation 2.56 Replace “ $P_1 \cos 45$ ” by “ $2 P_1 \cos 45$ ” .)
103	Problem 2.5h	Replace “ASTM 993” by “ASTM 992”
114	3.1.1	Last sentence before Equation 3.6 Replace “ $\sigma/\sigma_y = \sigma_y y^*$ ” by “ $\sigma/\sigma_y = y/y^*$ ”
112	Equation 3.12	In this equation, replace $bh^2/4S$ by $bd^2/4S$ and replace $\frac{1}{3}\left(\frac{\phi}{\phi_y}\right)^2$ by $\frac{1}{3}\left(\frac{\phi_y}{\phi}\right)^2$
122	Figure 3.4	In the x-y plot of P as a function of $\Delta$ , Replace “ $fP_y$ ” by “ $(1-f)P_y$ ” Replace “ $f\Delta_y$ ” by “ $(1-f)\Delta_y$ ” and In the x-y plot of M as a function of $\phi$ , Replace “ $fM_y$ ” by “ $(1-f)M_y$ ” Replace “ $f\phi_y$ ” by “ $(1-f)\phi_y$ ”
125	Figure 3.6	Strain distribution (lower left part of figure) should be reversed, so that positive strains are applied to

		bottom flange and negative strains applied to top flange.
144	3.4	Equation 3.38 The denominator of the equation after the second equal sign should be “ $2 y_o (16.5)$ ” instead of “ $y_o (16.5)$ ”
144	3.4	Equation 3.40 Replace “ $(305)(25.9)$ ” by “ $(2)(305)(25.9)$ ”
149	Table 3.1	First entry: For $T_p$ , replace “ $7t/6$ ” by “ $t/6$ ” Second entry: In equation before the “ $\approx$ ”, delete the last term of the equation, which is “ $-tw^2$ ”
162	Equation 3.74	Replace “ $2/5$ ” by “ $2/3$ ”
162	Equation 3.74	Replace “ $T$ ” by “ $t$ ”
184	4.22	Equation 4.7 Replace “ $M_p - \left(\frac{b}{L}\right) - (-M_p) \dots$ ” by “ $M_p - \left(\frac{b}{L}\right) (-M_p) \dots$ ”
189	Figure 4.8	Formula for $M(a)$ at the bottom of Figure 4.8 should be: “ $M_a = 3M_p - \frac{4M_p a}{L} > M_p$ ”
202	Figure 4.13	The equation “ $M_{PR}=1.63M_p$ ” (currently in the lower part of the figure) belongs under the sketch of the reinforced section
208	Equation 4.28	On last line of the equation, replace the three occurrences of the letter “ $l$ ” by the number “ $1$ ”
212	Equation 4.34	Replace: “ $\omega L[\theta(L/2)](L/2)$ ” by “ $\omega L[\theta(L/2)](1/2)$ ”
218	Figure 4.20h	“Ground” symbol missing under right support roller
299	4.6.1	On first line, replace: “the simpler pattern considered in Figure 4.25.” by “the simpler pattern considered in Figure 4.25, when neglecting the strength of the negative flexure corner fold.”
239	Problem 4.6	The length of the top horizontal beam should be “ $2L$ ” instead of “ $L$ ”
250	Figure 5.1	The results of the 3 subtractions, should be: Case 1: “ $n=2$ ” instead of $N=2$ Case 2: “ $n=4$ ” instead of $N=4$ Case 3: “ $n=5$ ” instead of $N=5$
252	Figure 5.4	Replace “Veerendel” by “Vierendel”
253	5.1	Line 8: Replace “Veerendel” by “Vierendel”
256	Figure 5.6	The result of the subtraction should be: “ $n=10$ ” instead of $N=10$

		Plastic hinge to be added at node 19 for mechanism XVI
258	Table 5.2	Mechanism II, Plastic hinge 12: Plastic hinge data should be “+1” instead of “-1”
267	Problem 5.2 Case D	Although not an error per say, various approaches commonly used in the literature to symbolize pin connections have been used in Problem 5.2. To clarify, the base of the rightmost column is a pin (not a wheel), similar in behavior to the rightmost column in Case C.
268	Figure for Problem 5.2e	In Figure for Problem 5.2e, Load acting in the right direction should be labeled “P” Load acting in the left direction should be labeled “3P”
291	Table 6.2	First row for Case II, value of $\Delta_3$ : Replace “2.3” by “2.2”
294	Figure 6.12a	Replace “70.7” by “P=70.7”
294	Figure 6.12e	Label for horizontal axis of x-y plot is “ $\Delta$ ”
300	Equation 6.14	Replace: “ $b(d/2)(1/3)$ ” by “ $b(d/2)(1/3)(1/2)$ ” Correspondingly corrected calculation in rest of section give: $M_{sh}=1.02M_p$ , $\Delta_{max}=0.55\phi_y L^2$ , and a displacement ductility of 1.67.
302	Equation 6.18	Replace “ $\Delta_{y,max}$ ” by $\Delta_{W,max}$ ”
302	Equation 6.19	Replace both instances of $(\mu_G + 1)$ by $(\mu_G - 1)$
305		Line 15: Replace “even” by “event”
307	Problem 6.5	Replace “(b) Neglecting...” by “(b) Not neglecting...”
310	7.2	2 <sup>nd</sup> and 4 <sup>th</sup> equations at top of page: Replace “1.6W” by “1.0W” and replace “0.8W” by “0.5W”
310	7.2	Page 310. 2st line of text: Replace “W = wind load, and E = earthquake live load.” By “W = wind load, and E = earthquake live load. Note that L is replaced by 0.5L in the above load combinations for some types of occupancies specified in ASCE 7.”
310	7.2.1	Correct equations are : $\omega = \sqrt{K / M} \quad (7.1a)$ $T = \frac{2\pi}{\omega} = 2\pi\sqrt{M / K} \quad (7.1b)$ Also, in first sentence after these equations, replace “various damping ratio” by “viscous damping ratio.”
318	7.5	Text in the second paragraph of Section 7.5 refer to Eq 7.8b, but it should instead refer to Eq. 7.8.

353	8.3.2	Replace “partial penetration welds” by “partial joint penetration welds” (to be in compliance with AWS terminology)
360	8.4.2	In Equation 8.4, replace “ZF” by “Z <sub>f</sub> ”
360	8.4.2	On 6 <sup>th</sup> line before end of page, replace the two occurrences of “b <sub>cf</sub> ” by “b <sub>bf</sub> ” in each case, and replace “column flange width” by “beam flange width”
373	8.4.4	In Equation 8.15, add “=” between “V/γ” and the opening bracket.
465	8.8.1	Add at the end of Section 8.8.1: “For that office building, live load is 50 psf; as a result, 0.5L can be used in the ASCE load combinations presented in Section 7.2.”
468	8.8.4	In first line of text after Equation 8.46. replace “level I” by “level i”
468	Equation 8.46	Correct Equation should be $\Delta_i = \frac{V_i h_i^2}{12} \left[ \frac{1}{\sum K_c + \sum K_b} \right]$ where $\sum K_c = \sum \frac{EI_{ci}}{h_i}$ and $\sum K_b = \sum \frac{EI_{bi}}{L_i}$
479	8.8.6.3	In second line of Equation 8.73, replace: “1.8(14.0)(1.08)2(50)” by: “1.8(14.0)(1.08) <sup>2</sup> (50)”
479	8.8.6.3	Second line of Equation 8.75 should be: $\geq \frac{d_b - 2t_{bf} + d_c - 2t_{cf}}{90}$
481	8.8.6.4.1	Last line of Equation 8.78: Replace “≤” by “≥” Other lines of Equation 8.78 Replace “≤” by “=”
482	8.8.6.4.1	Last line of Equation 8.79: Replace “≤” by “≥”
511	Figure 9.5	Figures 9.5d and 9.5e should be swapped to horizontally line-up with their corresponding data on page 510.
536	9.3.1.1	First line of Section 9.3.1.1: Replace “Figure 9.2” by “Figure 9.3.”
547	Figure 9.29	Horizontal force: Replace “(T+C)sinθ” by “(T+C)cosθ”
571	Table 9.3	An incorrect value of 1.1 has accidentally been used for R <sub>y</sub> in the third column of Table 9.3 (instead of the value of 1.4 that should have been used for A500 Gr. B steel). Also, in the last column of Table 9.3, the post-buckling compression force was mistakenly calculated using the formula 0.3F <sub>cr</sub> . AISC 341 Section F2.3 calls for 0.3 times the lesser of (F <sub>y</sub> R <sub>y</sub> A <sub>g</sub> and 1.14F <sub>cre</sub> A <sub>g</sub> ) to be used.

		All results presented in the example are consistent with the values of $R_y$ of 1.1 and 0.3 $F_{cr}$ accidentally used. For example, for $F_y=42\text{ksi}$ , and $F_e=25.31\text{ksi}$ , then $F_{cr}=20.97\text{ksi}$ and $0.3F_{cr}A=36.43\text{kips}$ .
573	Equation 9.16	Missing “1/2” in front of “ $(R_y F_y A_{g(2)} + 0.3 F_{cr} A_{g(2)})$ ”
606	Equation 10.12	Replace “ $\Delta_s$ ” by “ $\Delta_p$ ” to match Figure 10.17
618	10.5.3	End of 10 <sup>th</sup> line of second paragraph in Section 10.5.3: Replace “deign” by “design”
618	10.5.3	On 14 <sup>th</sup> line of second paragraph in Section 10.5.3: Replace “ $(1.1/0.8 \times 1.25)$ ” by $(1.1 \times 1.25 / 0.9)$ ”
685	Table 11.10	Values in the last column should all be divided by 10. In other words, these values should be 0.0158 instead of 0.158, 0.0163 instead of 0.163, etc.
708	12.2.2.2	Equation 12.9 Replace “ $\alpha$ ” by “ $2\alpha$ ”
727	Figure 12.31	In uniformly distributed moment for the bottom shear diagram, replace both $\omega_{yb_i}$ by $\omega_{xb_i}$ (as correctly written in equation 12.31). The term $2hf$ should also be deleted.
771	12.6.4	On 3d line text (1 <sup>st</sup> line of second paragraph_ in Section 12.6.4, replace “220 in.” by “228 in.”
773	12.6.5	Replace: $R_y F_y [t_{we} \sin^2(\alpha)]$ By: $\frac{1}{2} R_y F_y [t_{we} \sin 2\alpha]$
774	Equation 12.79	Replace “ $\omega_{yb_{i-1}} - \omega_{yb_i}$ ” by “ $\omega_{yb(i)}$ ” as defined by Equation 12.74 and replace “ $\omega_{xb_{i-1}} - \omega_{xb_i}$ ” by “ $\omega_{xb(i)}$ ” as defined by Equation 12.77 (because both terms already account for the difference between plates above and below)
776	Equation after “The web area is”	Replace “28.3” by “ $(28.3) (.655) = 18.5$ ” And in the following equation Replace “0.54” by “2.75”
778	Equation	After first equation at top of page, add: “Note that at the top of the VBE, $\frac{1}{2}M_{pr}$ would be replaced by $M_{pr}$ since the beam moment is not split between two VBEs but directly applied to a single VBE at that joint.”
781	Problem 12.2	Table A3.1 doesn't include $R_y$ values for ASTM A529 Grade 50 plates. Therefore, for this problem, assume that a value of $R_y$ of 1.3 was determined by testing of plates similar in size and source to the materials to be used (by tests conducted in accordance with the testing requirements per the ASTM specifications for the specified grade of steel).

837	14.1	Last line of second paragraph: Replace “slenderness ratio, $l$ .” by “slenderness ratio, $\lambda$ ”
-----	------	---

Not typos, but clarifications:

- 1) It could be argued that  $M_{prs}$  on page 138 (just before Equation 3.31, and in Equation 3.31) could have been defined as  $M_{prv}$  as done on page 142. However, while they are both plastic moments reduced by the presence of shear, the reduction is accomplished slightly differently for the square cross-section than for the wide-flange shapes, which justifies the use of a different notation.