

PCI DESIGN HANDBOOK

PRECAST AND PRESTRESSED CONCRETE

8TH EDITION ERRATA



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PCI Design Handbook

Precast and Prestressed Concrete,

Eighth Edition Errata

In 2017, the Precast/Prestressed Concrete Institute published the eighth edition of the *PCI Design Handbook: Precast and Prestressed Concrete* (MNL-120-17). The committee devoted significant effort to providing an accurate document; however, some errata have been discovered. The errata published herein are intended to supplement, revise, or clarify the information provided in the handbook. PCI suggests you mark the changes in your copy so that your handbook is as accurate as possible.

As this edition of the handbook is used, additional errata may be discovered. You are urged to notify PCI of any potential errata for committee review. You are also encouraged to send any questions or comments to PCI regarding the material in the handbook and suggested improvements or clarifications. Please direct your comments to PCI at IHBerrata@pci.org.



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Chapter 1

Page 1–3, left column, second paragraph, line 6: Delete “, Section 14.1 of this handbook,”. [*Committee note: The PCI Standard Design Practice for the Building Code Requirements for Structural Concrete (ACI 318-14) and Commentary (ACI 318R-14)*¹ was not completed for publication with the eighth edition handbook. When it is completed, the PCI Standard Design Practice will be published in the PCI Journal and on the PCI website.]

Page 1–9, left column, first paragraph, line 4: Replace “Section 14.4.4.3” with “Section 14.1.4”.

Page 1–26, left column, second paragraph, line 9: Replace “Section 14.4” with “Section 14.1.4”.

Chapter 2

Page 2–25, below “Chapter 8”, item 11: Add “ e = distance from center of gravity of component to top picking point of the rolling block (see Fig. 8.6.2)”.

Chapter 4

Page 4–5, Figure 4.1.1 caption: Replace “reference 2” with “reference 4”.

Page 4–95, Design Aid 4.10.23: Replace “Reference 19” with “Reference 14”.

Page 4–96, Design Aid 4.10.24, in parenthesis after “**Values of k_b** ”: Replace “Design Aid 4.10.25” with “Design Aid 4.10.28”.

Chapter 5

Page 5–48, Example 5.3.1.1, under “Given”: Replace “ $f_y = 65,000$ psi” with “ $f_y = 60,000$ psi for plain WWR” [*committee note: limit is per ACI 318-14*¹ Table 20.2.2.4a for plain WWR]. Replace the results at the bottom of the page with the following:

From Eq. 5-29:

$$A_v = 0.75\sqrt{f'_c} \frac{b_w s}{f_{yt}} = \frac{0.75(\sqrt{5000})(8)(12)}{65,000-60,000} = \del{0.079} 0.084 \text{ in.}^2/\text{ft} \text{ or } \del{0.039} 0.042 \text{ in.}^2/\text{ft} \text{ per layer of WWR}$$

But should not be less than Eq. 5-30:

$$A_v = 50b_w \frac{s}{f_{yt}} = \frac{50(8)(12)}{65,000-60,000} = \del{0.074} 0.080 \text{ in.}^2/\text{ft} \text{ or } \del{0.037} 0.040 \text{ in.}^2/\text{ft} \text{ per layer of WWR}$$

Page 5–49, Example 5.3.1.1, lines 1 and 4: Replace “0.039 in.²/ft” with “0.042 in.²/ft”.

Page 5-52, Example 5.3.3.1, under “Shear reinforcement”: Replace “ $f_{yt} = 65,000$ psi” with “ $f_{yt} = 60,000$ psi for plain WWR” [committee note: limit is per ACI 318-14 Table 20.2.2.4a for plain WWR]. Under “Solution”: Revise calculations as follows:

From Eq. 5-29:

$$A_{v,min} = 0.75 \sqrt{f_c} \frac{b_w s}{f_{yt}}$$

$$A_{v,min} = 0.058 = 0.75 \sqrt{5000} \frac{(9.5)s}{65,000 \cdot 60,000}$$

Solving for s:

$$s = 7.5 \text{ 6.9 in.}$$

From Eq. 5-30:

$$A_{v,min} = 50 \frac{b_w s}{f_{yt}}$$

$$A_{v,min} = 0.058 = 50 \frac{(9.5)s}{60,000}$$

Solving for s:

$$s = 7.3 \text{ in.}$$

From Eq. 5-31:

$$A_{v,min} = \frac{A_{ps} f_{pu} s}{80 f_{yt} d} \sqrt{\frac{d}{b_w}}$$

$$A_{v,min} = 0.058 = \frac{(1.53)(270)s}{(80)(65,000)(21.6)} \sqrt{\frac{21.6}{9.5}}$$

Solving for s:

$$s = 10.5 \text{ 9.7 in.}$$

Use W2.9 wires at a maximum spacing $s = 10.5 \text{ 9.7 in.}$ (rounded to 9.5 in.)

Page 5-52, Example 5.3.3.2, under “Solution”: Replace the results with the following [committee note: limit is per ACI 318-14 Table 20.2.2.4a for plain WWR]:

From Eq. 5-32: with $s = 12$ in.

$$A_v = \frac{\left[\left(\frac{V_u}{\phi} \right) - V_c \right] s}{f_{yt} d}$$

$$A_v = \frac{(10)(12)}{(65,000)(21.6)} = 0.086 \text{ 0.093 in.}^2/\text{ft}$$

Use two rows (one row per stem) of WWR W2.9, vertical wire spacing = 6 in.

$$A_{v,prov.} = (2)(2)(0.029) = 0.116 \text{ in.}^2/\text{ft}$$

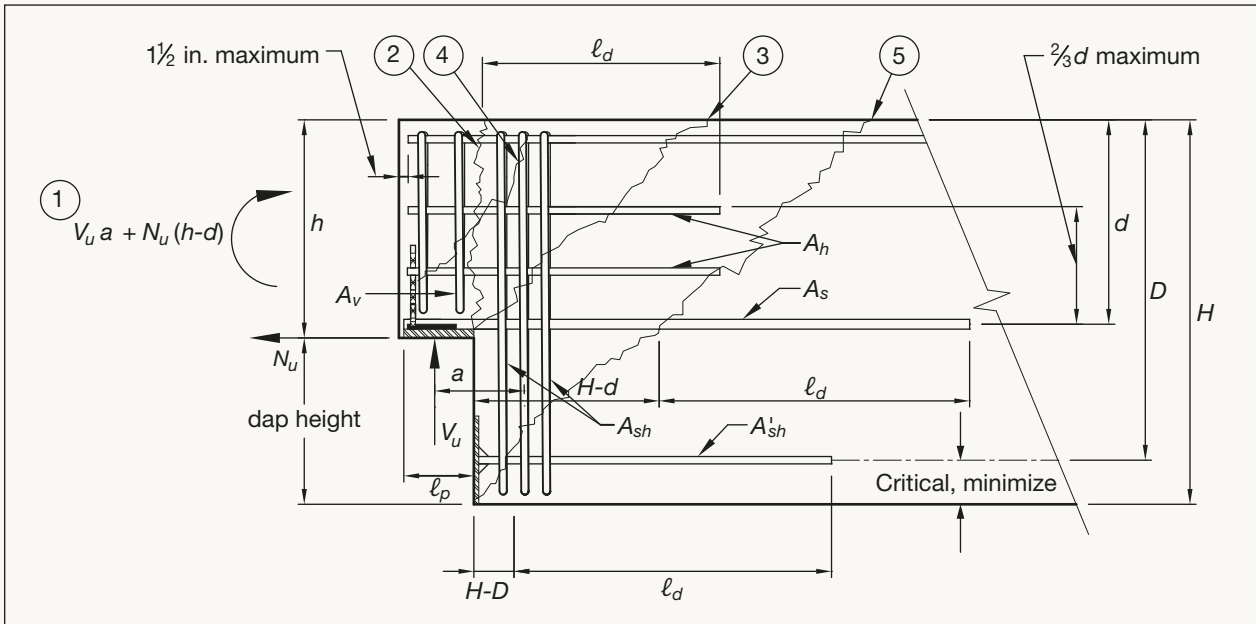
Shear strength provided by reinforcement:

$$V_{s,prov.} = \frac{(0.116)(65,000)(21.6)}{12} = 13.6 \text{ 12.5 kip } \text{ OK}$$

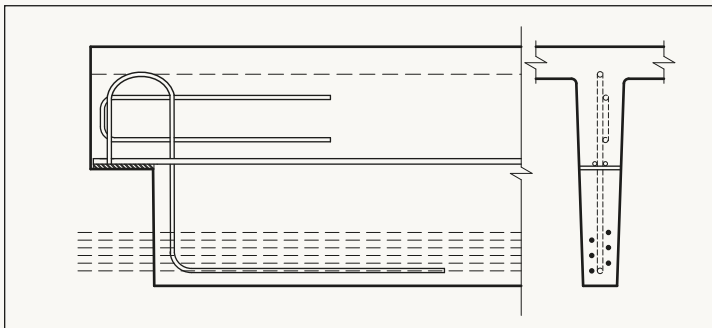
Page 5–55, Example 5.3.4.1, below “Check maximum by Eq. 5-37b”: Replace “Therefore, design by Eq. 5-31a” with “Therefore, design by Eq. 5-37a”.

Page 5–75, right column, item 1 in second numbered list: Replace “Eq. 5-64” with “Eq. 5-63”.

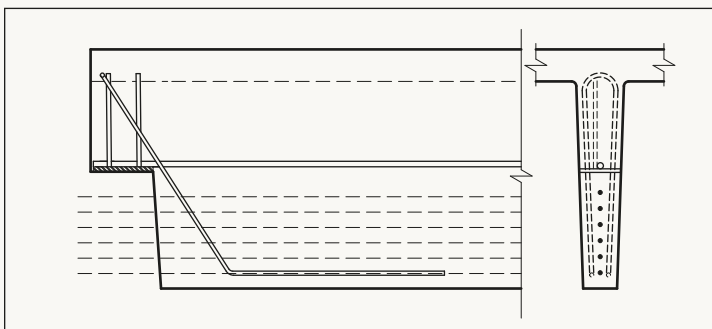
Page 5–76, Figure 5.5.3, top figure: Replace figure with the following to remove “Center of gravity of flexural reinforcement” and associated leader line at bottom of figure and to add “Critical, minimize” and associated dimension lines:



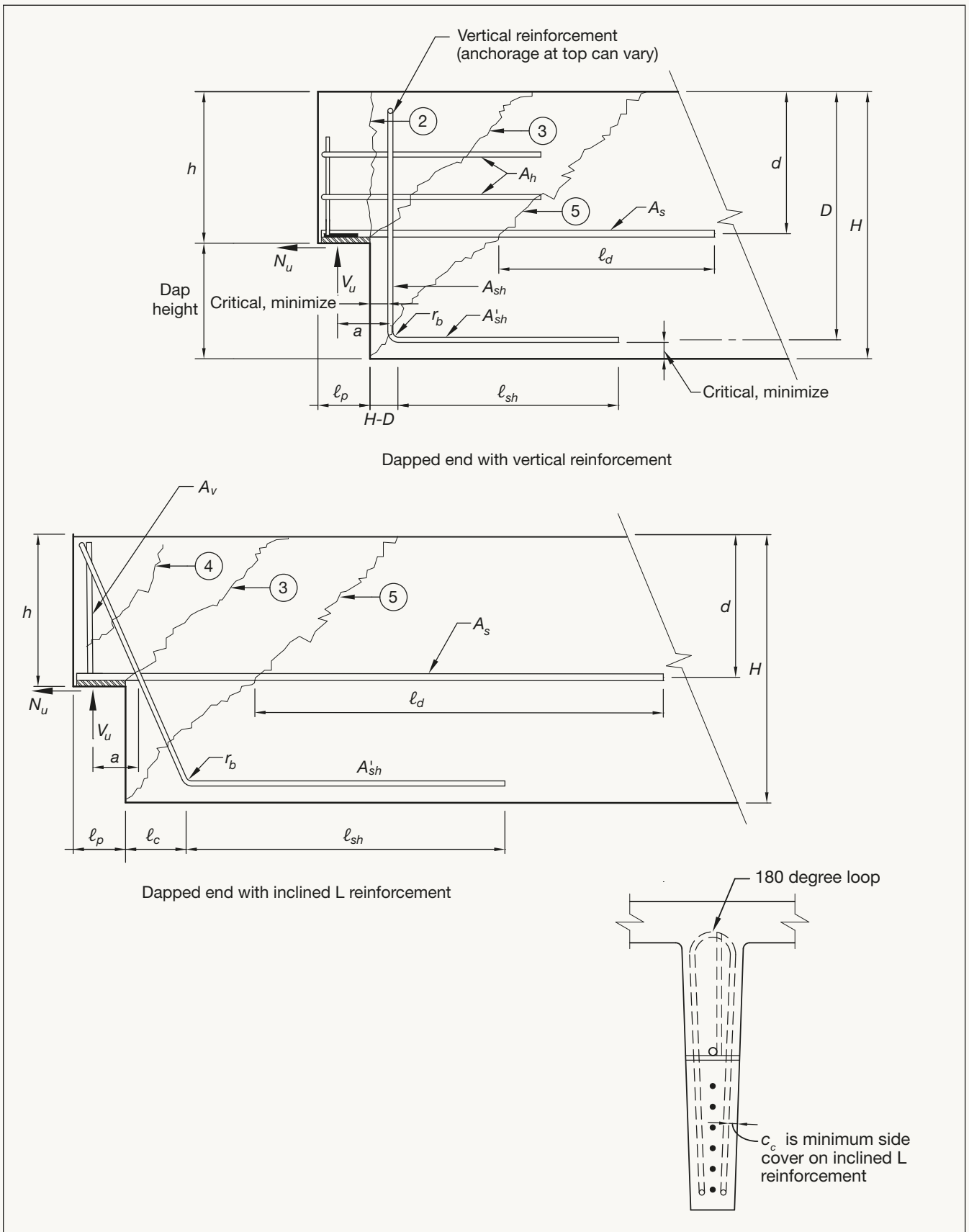
Page 5–77, Figure 5.5.4 (b): Replace figure with the following to delete the dowel bar and vertical plate at the bearing angle:



Page 5–77, Figure 5.5.4 (c): Replace figure with the following to delete the C-shaped A_h reinforcement:



Page 5-78, Figure 5.5.5: Replace figures with the following. Changes include adding the vertical crack 2 on the top and crack numbers on the bottom figure, revising the length of the A_s on the bottom figure, and deleting the $2h$ dimension line and A_h on the section:



Page 5–78, Figure 5.5.5: Add the following note to figure: “Note: See Eq. 5-73, 5-74, and 5-75 for limits on the shear strength for a distance of $2H$ beyond the dap.”

Page 5–79, left column, third paragraph: Replace “(as calculated by Eq. 5-63 or 5-64)” with “(as calculated by Eq. 5-64)”.

Page 5–84, Example 5.5.3.2, step 2, line 3: Replace “Eq. 5-58, 5-59, and 5-60” with “Eq. 5-35, 5-64, and 5-65”.

Page 5–84, Example 5.5.3.2, step 2, line 9: Revise calculation as follows:

$$A_h = 0.5(A_s - A_n) = 0.5(0.325 - 0.196 - 0.078) = 0.124 - 0.059 \text{ in.}^2$$

Page 5–87, right column, Eq. 5-80: Insert λ for lightweight concrete into equation between ϕ and 12.

Page 5–89, left column, Eq. 5-82: Delete ϕ from denominator.

Page 5–90, Example 5.6.1, below “Near midspan (location of third stem)”: Delete “= 12.5 ft” after “ $d_e = 149.5 \text{ in.}$ ”

Page 5–90, Example 5.6.1, below “Additional information”: Replace “ $d = 78 \text{ in.}$ ” with “ $d_p = 78 \text{ in.}$ ” Replace “ $d_t = 10.25 \text{ in.}$ ” with “ $d_t = 9.75 \text{ in.}$ ” [Committee note: The condition on page 5–87 sets a minimum limit for $b_t = 4 \text{ in.}$ The value used is below that limit; however, there would be numerous corresponding changes throughout the example. Committee decided to leave as is.]

Page 5–91, Example 5.6.1, step 1 of “Check at the end of the beam”, below “to calculate V_s ”: Replace “ d ” with “ d_p ”.

Page 5–92, Example 5.6.1, step of “Check near midspan”, below “to calculate V_s ”: Replace “ d ” with “ d_p ”.

Page 5–93, Example 5.6.1, below “Check longitudinal bending of the ledge”: Revise calculation as follows:

$$A_\ell = 200\ell_p \left(\frac{d_\ell}{f_y} \right) = 200(8) \left(\frac{10.25 - 9.75}{60,000} \right) = 0.273 - 0.260 \text{ in.}^2$$

Page 5–93, Example 5.6.1, below “Determine reinforcement for out-of-plane bending near beam end (Section 5.4.3)”: Replace “From Eq. 5-55” with “From Eq. 5-60”.

Page 5–99, left column, second paragraph under “5.7.1 Cantilever Beam Design Method”: Replace “ $(\frac{2}{3})(A_{vf} + A_n)$ ” with “ $(\frac{2}{3}A_{vf} + A_n)$ ”.

Page 5–109, right column, first paragraph under “5.9.1 Initial Camber”: Replace Design Aid 5.15.1” with “Design Aid 5.16.1”.

Page 5–110, Example 5.9.1.1, under “Solution”: Replace “Design Aid 5.15.1” with “Design Aid 5.16.1”.

Page 5–117, Example 5.9.4.1, footnote under the table: Replace “From Example 5.8.1.1” with “From Example 5.9.1.1”.

Page 5–120, Example 5.9.5.2, under “Solution”: Replace “Design Aid 5.15.2” with “Design Aid 5.16.2”.

Page 5–126, right column, last paragraph, line 10: Delete “(Section 14.1)”.

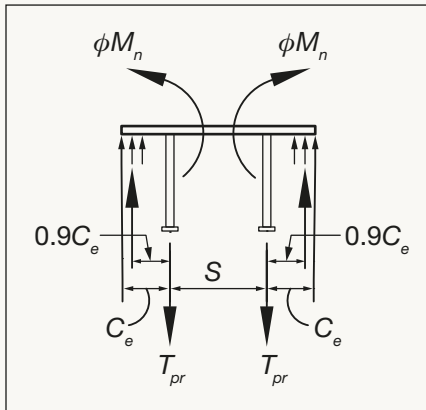
Page 5–132, left column, third paragraph under “5.10.6.2 Strength Design”, line 3: Replace “(MNL-133-12)” with “(MNL-133-11)”.

Page 5–155, reference 39: Replace “MNL-133-12” with “MNL-133-11”. [Note: This only occurs in the print version and not the PDF version.]

Chapter 6

Page 6–19, Example 6.5.2.1, equation to calculate ϕN_p : Replace “ s_1 ” with “ s ”.

Page 6–19, Example 6.5.2.1: Replace figure on the left with the following:



Page 6–19, Example 6.5.2.1, equation to calculate T_{pr} : Replace “ s_1 ” with “ s ”.

Page 6–19, Example 6.5.2.1, equation to calculate $\phi N_{p,f}$: Replace “ s_1 ” with “ s ”.

Page 6–28, Example 6.5.4.1, line 3: Replace “From Eq. 5-29” with “From Eq. 5-35”.

Page 6–28, Example 6.5.4.1, line 5: Replace “From Eq. 5-28b” with “From Eq. 5-34”.

Page 6–34, Example 6.5.5.3, title: Replace “Corner-Failure” with “Side-Failure”.

Page 6–57, right column, Eq. 6-51 and 6-52 variable definitions, in the equation for $M_{u,resultant}$: Replace “ V_{ue} ” with “ V_{ue} ”.

Page 6–64, Example 6.7.3.1, under “Solution”: Replace “(1) Carbon equivalent CE from Eq. 6-59” with “(1) Carbon equivalent CE from Eq. 6-64”.

Page 6–65, Figure 6.7.3: Replace “ $e_x(-)$ ” with “ $e_x(+)$ ” and “ $e_z(-)$ ” with “ $e_z(+)$ ”.

Page 6–78, left column, line 2: Replace “ f_y ” with “ f_{yr} ” and “(Eq. 5-25)” with “(Eq. 5-29)”.

Page 6–78, left column, line 3: Replace “ f_y ” with “ f_{yr} ” and add “(Eq. 5-30)”.

Page 6–78, right column, step 7, line 2: Replace “Section 5.6.1” with “Section 5.5.1”.

Page 6–79, left column, step 11, line 7: Replace “(Eq. 5-29)” with “(Eq. 5-35)”.

Page 6–80, Example 6.9.1, left column under “Check minimum shear reinforcing”: Replace “Eq. 5-25” with “Eq. 5-29” and “ f_y ” with “ f_{yr} ”, and replace “Or” with “Or by Eq. 5-30” and “ f_y ” with “ f_{yr} ”.

Page 6–80, Example 6.9.1, right column under “Design bottom dowel”: Replace “Eq. 5-29” with “Eq. 5-35”.

Page 6–80, Example 6.9.1, right column, under “If anchor reinforcement is not provided, concrete breakout strength must be checked”: Revise example as follows:

$$BED = h = 14.16 \text{ in.}$$

$$SED = \frac{(b_w - b - t_s)}{2} = \frac{(8 - 4 - 0.375)}{2} = 1.81 \text{ in.}$$

$$V_{CO3} = 16.5\lambda\sqrt{f'_c} (BED)^{1.33} = \frac{16.5\sqrt{5000} (14.16)^{1.33}}{1000} = 39.046.6 \text{ kip}$$

$$C_{c3} = 0.7^3 \sqrt{\frac{SED}{BED}} = 0.7^3 \sqrt{\frac{1.81}{14.16}} = 0.350.34$$

$$\phi V_{C3} = \phi V_{CO3} C_{c3} = 0.75 (0.350.34) (39.046.6) = 10.211.8 \text{ kip}$$

$$V_{u,all} = \frac{(10.211.8)}{1.33} = 7.678.9 \text{ kip} < V_u = 36.0 \text{ kip}$$

Page 6–84, Figure 6.10.3: Replace “Shape factor = $\sqrt{5000 / f'_c}$ ” with “Shape factor = $S = \frac{wb}{2(w+b)t}$ ”.

Page 6–90, Example 6.11.2.1, under “Concrete breakout strength (Eq. 6-6)”: Replace “From Eq. 6-4” with “From Eq. 6-7”.

Page 6–100, Example 6.13.3, under “Double-tee deck plate (see previous example)”: Replace “ $\phi V_n = 20.4 \text{ kip}$ ” with “ $\phi V_n = 19.4 \text{ kip}$ ” and correct the corresponding value in the summary table.

Page 6–109, reference 16: Replace “American Institute of Steel Construction (AISC). 2017. *Steel Construction Manual*, 15th ed. Chicago, IL: AISC.” with “American Institute of Steel Construction (AISC). 2011. *Steel Construction Manual*, 14th ed. Chicago, IL: AISC.” [Note: This only occurs in the PDF version and not the print version.]

Page 6–111, Design Aid 6.15.3, footnote d: Replace “Design Aid 15.7.2” with “Design Aid 15.6.2”.

Page 6–112, Design Aid 6.15.4, footnote b: Replace “Design Aid 15.7.2” with “Design Aid 15.6.2”.

Page 6–112, Design Aid 6.15.5, equation for ℓ_w : Replace “ $2\pi\left(d_b + \frac{a}{2}\right)$ ” with “ $\pi\left(d_b + \frac{a}{2}\right)$ ”.

Page 6–112, Design Aid 6.15.5, footnote b, second bullet under “Failure modes include”: Replace “ $[\phi(0.6F_y)]\ell_w(t_{pl})$ ” with “ $[\phi(0.6F_y)][\pi(d_b + 2a)t_{pl}]$ ”.

Page 6–112, Design Aid 6.15.5, footnote b, third bullet under “Failure modes include”: Replace “ $[\phi(0.6F_u)]\ell_w(t_{pl})$ ” with “ $[\phi(0.6F_u)][\pi(d_b + 2a)t_{pl}]$ ”.

Page 6–113, Design Aid 6.15.6, equation for ℓ_w : Replace “ $2\pi\left(d_b + \frac{a}{2}\right)$ ” with “ $\pi\left(d_b + \frac{a}{2}\right)$ ”.

Page 6–113, Design Aid 6.15.6, footnote b, second bullet under “Failure modes include”: Replace “ $[\phi(0.6F_y)]\ell_w(t_{pl})$ ” with “ $[\phi(0.6F_y)][\pi(d_b + 2a)t_{pl}]$ ”.

Page 6–113, Design Aid 6.15.6, footnote b, third bullet under “Failure modes include”: Replace “ $[\phi(0.6F_u)]\ell_w(t_{pl})$ ” with “ $[\phi(0.6F_u)][\pi(d_b + 2a)t_{pl}]$ ”.

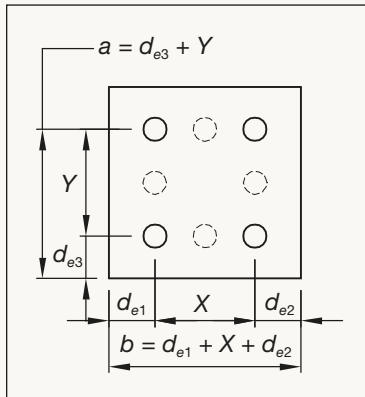
Page 6–114, Design Aid 6.15.7, footnote c: Replace “Design Aid 15.6.3” with “Design Aid 15.5.3”.

Page 6–114, Design Aid 6.15.7, footnote d: Replace “Design Aids 15.6.1 and 15.6.2” with “Design Aids 15.5.1 and 15.5.2”.

Page 6–116, Design Aid 6.15.9, line 8: Replace “Design Aid 6.15.7” with “Design Aid 6.15.8”.

Page 6–120, Design Aid 6.15.11, under Case 4, line 3: Replace “from Table 6.5.4” with “from Table 6.5.3”.

Page 6–122, Design Aid 6.15.11, Case 6: Replace figure with the following:



Chapter 8

Page 8–27, right column, second paragraph under “8.7.2 Responsibilities”, line 2: Replace “Section 14.5” with “Section 14.2”.

Chapter 11

Page 11–7, Table 11.1.3, fourth column: Under “Miscellaneous”, then “Plaster”, then “gypsum, lightweight aggregate”, replace “0.33” with “–”.

Page 11–7, Table 11.1.3, fourth column: Under “Miscellaneous”, then “Roofing, $\frac{3}{8}$ in. built-up”, replace “–” with “0.33”.

Chapter 12

Page 12–11, Figure 12.8.1: Replace “ $\theta > 5$ deg.” with “ $\theta \geq 5$ deg.”

Chapter 13

Page 13–3, right column, under “Drawings”: Replace “Section 14.4.6” with “Section 14.1.6”.

Page 13–4, left column, under “Specially finished structural precast concrete”, line 6: Replace “Section 14.4.4.3” with “Section 14.1.4.3”.

Reference

1. ACI (American Concrete Institute) Committee 318. 2014. *Building Code Requirements for Structural Concrete (ACI 318-14) and Commentary (ACI 318R-14)*. Farmington Hills, MI: ACI.