

PCI DESIGN HANDBOOK

PRECAST AND PRESTRESSED CONCRETE

8TH EDITION ERRATA

Volume 2



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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 2

Page 2–30, below “Appendix B—Design for Structural Integrity and Disproportionate Collapse”: Replace “See end of Appendix for notation used.” with “Not included.”

Page 2–30, below “Appendix C—Precast Concrete Diaphragm Design in Accordance with Alternative Provisions of ASCE 7-16”: Replace “See end of Appendix for notation used.” with “Not included.”

Chapter 4

Page 4–27, Example 4.5.7.1, under “*Solution*,” after “Determine center of rigidity:”: Replace calculation result of “103.9 ft” with “130.9 ft”.

Chapter 5

Page 5–46, Figure 5.3.1: Insert “(if using Eq. 5-24)” after “ $5.0\lambda\sqrt{f'_c}b_wd$ ”. Delete “or Eq. 5-27” after “ V_{ci} (Eq. 5-25)”.

Page 5–63, Example 5.4.1.2, below step 2, after “Determine f_{pc} ”: Replace “Design Aid 15.3.4” with “Design Aid 15.2.4”.

Page 5–75, Example 5.5.2.1, after “Determine ℓ_d ”: Replace “Design Aid 15.3.4” with “Design Aid 15.3.2”.

Page 5-75, right column, second paragraph, revise as follows:

“These criteria indicate that only short, shallow recesses having the minimum amount of main reinforcement or more extending into the nib (the concrete section above the dap) do not require dap reinforcement. Experience and *Development of Rational Design Methodologies for Dapped Ends of Prestressed Concrete Thin-Stemmed Members* have shown that, for short, shallow recesses, the hanger reinforcement A_{sh} and A'_{sh} is not necessary. ~~However, in these cases, it is recommended that confinement reinforcement A_v and flexural reinforcement $A_{vf} + A_n$, in accordance with Section 5.5.2, be provided. See Section 5.5.3.7 for design and detailing requirements for notches not considered to be dapped ends.~~”

Page 5–79, left column, second bullet below step 5: Insert “For thin-stemmed components,” before “ A'_{sh} should extend a distance that is the greater...”.

Page 5-80, right column, after last paragraph, insert new section as follows:

“5.5.3.7 Notches

Design and detailing requirements for dapped ends (Sections 5.5.3.1 through 5.5.3.6) do not apply to notches. Notches are defined as shallow recesses where the depth of the recess is less than the lesser of $0.2H$ and 8 in.

The minimum amount of horizontal reinforcement in a notch should be the greatest of:

$$A_s = \frac{(V_u + N_u)}{(\phi f_y)}$$

$$A_s = \frac{3\sqrt{f'_c}b_wd}{f_y}$$

$$A_s = \frac{200b_wd}{f_y}$$

where

b_w = average web width above the notch

d = depth to A_s as defined for a dap

The amount of required horizontal reinforcement in a notch can be reduced by considering the contribution of the partially developed prestressed reinforcement across the potential 45-degree crack extending upward from the end of the bearing.

Horizontal reinforcement should be anchored at the end of the component by welding to cross bars, plates, or angles, extended into the span the greater of $1.5\ell_t$ or $1.5\ell_d$, and configured such that $\frac{c_c}{d_b}$ is at least 1.5.

For thin-stemmed components, for a distance $2H$ beyond the notch, the concrete contribution to shear strength should be limited to:

$$V_c = 2\lambda\sqrt{f'_c}b_w d$$

where

b_w = average web width above the notch

d = depth to A_s , as defined for a dap”

Page 5–81, Example 5.5.3.1, below “step 3. Diagonal tension at reentrant corner”: Replace “ A_s ” with “ A_{sh} ” after “Use six no. 4 closed stirrups;”. Replace “ A_s ” with “ A'_{sh} ” after “Use five no. 6;”. Add “**Consider OK**” after “2.20 in.²”.

Page 5–85, Example 5.5.3.2, below “Check $A_{v,min}$ per ACI 318-14 Section 9.6.3.3”: Revise calculations as follows:

$$\frac{A_{v,min}}{s} = 50 \frac{b_w}{f_y} = (50) \frac{6.25}{\cancel{65,000} 60,000} = \cancel{0.0048} 0.0052 \text{ in.}^2/\text{in.} = \cancel{0.058} 0.0625 \text{ in.}^2/\text{ft}$$

$$\frac{A_{v,min}}{s} = 0.75\sqrt{f'_c} \frac{b_w}{f_y} = (0.75)\sqrt{6000} \frac{6.25}{\cancel{65,000} 60,000} = \cancel{0.0056} 0.0061 \text{ in.}^2/\text{in.} = \cancel{0.067} 0.0726 \text{ in.}^2/\text{ft}$$

Using WWR ($f_y = 65 \text{ 60 ksi}$):

$$\frac{A_v}{s} \geq \frac{V_s}{f_y d_p} = \frac{12.8}{\cancel{65} 60(24)} = \cancel{0.0082} 0.0089 \text{ in.}^2/\text{in.} = \cancel{0.098} 0.1067 \text{ in.}^2/\text{ft}$$

Therefore, this is the minimum required

From Design Aid 15.4.3, two layers of WWR $12 \times 6 - W1.4 \times \cancel{W2.5} W2.9$

$$A_s = 2(\cancel{0.05} 0.058) = \cancel{0.10} 0.116 \text{ in.}^2/\text{ft} \quad \mathbf{OK}$$

Page 5–99, Figure 5.7.1, Note 1: Replace “Design Aid 15.4.4” with “Design Aid 15.3.2”.

Page 5–118, left column, fourth paragraph, line 6: Replace “Design Aid 5.15.2” with “Design Aid 5.16.2”.

Page 5–118, left column, sixth paragraph, line 5: Replace “Design Aid 5.15.2” with “Design Aid 5.16.2”.

Page 5–118, right column, first paragraph, line 1: Replace “Eq. 5-102” with “Eq. 5-112”.

Page 5–118, right column, first paragraph, lines 1 and 2: Replace “Design Aid 5.15.2” with “Design Aid 5.16.2”.

Page 5-119, Example 5.9.5.1, under “Solution”: Replace “From Eq. 5-110” with “From Eq. 5-112”.

Page 5-119, Example 5.9.5.1: Replace “Design Aid 5.15.2” with “Design Aid 5.16.2” in three places.

Page 5-126, left column, first paragraph: Replace “Design Aids 5.15.3 and 5.15.4” with “Design Aids 5.16.3 and 5.16.4”.

Page 5-126, left column, second paragraph: Replace “Design Aids 5.15.3 and 5.15.4” with “Design Aids 5.16.3 and 5.16.4”.

Page 5-127, Example 5.10.2.1, heading: Replace “Use of Design Aids 5.15.3 and 5.15.4” with “Use of Design Aids 5.16.3 and 5.16.4”.

Page 5-127, Example 5.10.2.1, under “*Problem*”: Replace “Design Aid 5.15.4” with “Design Aid 5.16.4”.

Chapter 6

Page 6-5, left column, second line: Replace “Table 21.2.1[g]” with “Table 21.2.1[h]”.

Page 6-9, Example 6.4.9.1, under “Case 1: For edge perpendicular to load:”: Replace

$$“\psi_{ec,V} = 0.7 + 0.3 \frac{C_{a2}}{1.5C_{a1}} \leq 1.0” \text{ with } “\psi_{ed,V} = 0.7 + 0.3 \frac{C_{a2}}{1.5C_{a1}} \leq 1.0”$$

Page 6-27, Example 6.5.4.1, under “*Solution*”, after “From Fig. 6.5.2, Case 4-3:”: Delete “-3” to change to “From Fig. 6.5.2, Case 4”.

Page 6-27, Example 6.5.4.1, below “From Eq. 6-10:”: Replace “($\phi = 0.70$; see condition B, Section 6.2.1.3)” with “($\phi = 0.70$; see Section 6.5.4.2)”.

Page 6-27, Example 6.5.4.1, after “From Eq. 6-10:”: Replace “ N_{nh} ” with “ N_{ph} ”

Page 6-30, Example 6.5.5.1, after “X-spacing factor”: Insert 3 in denominator before “*BED*” as such:

$$C_{x3} = 0.85 + \frac{X}{3BED}$$

Page 6-33, Example 6.5.5.2, under “*Solution*”: Replace “Check for corner condition by Eq. 6-17” with “Check for corner condition by Eq. 6-20”.

Page 6-33, Example 6.5.5.2, under “*Solution*,” after “Steel strength (same as Example 6.5.5.1):”: Replace “ $\phi V_s = 33.8$ kip” with “ $\phi V_s = 19.3$ kip”.

Page 6-34, Example 6.5.5.3, below “*Solution*”: Replace “Eq. 6-20” with “Eq. 6-24”.

Page 6-34, Example 6.5.5.3, below “*Solution*”: Replace “ $\frac{SED}{BED} \leq 0.2$ ” with “ $\frac{SED}{BED} < 0.2$ ”.

Page 6-34, Example 6.5.5.3, after “Steel strength”: Delete “(same as Example 6.5.5.1)” and replace “ $\phi V_s = 33.8$ kip” with “From Eq. 6-4: $\phi V_s = \phi n A_{se} f_{ut} = 0.65 (4)(0.2)(65) = 33.8$ kip”.

Page 6-59, Example 6.6.6.1, under step 1.2: Replace calculation result of 50.5 with 50.6.

Page 6-59, Example 6.6.6.1, under “From Eq. 6-51:”: Revise equation as follows:

$$V_u \cos \theta / \phi P_n + V_u [e - \cos \theta (b'/2)] / \phi M_n \leq 1.0.$$

Page 6-76, Example 6.8.1: Revise calculation as follows:

$$\phi V_n = \phi(0.6)F_y A_w = 0.9(0.6)(46)[2(6 - 3(0.465))(0.465)] = 106.4 \text{ kip}$$

Page 6-79, Example 6.9.1, under “Design Strap”: Replace “Use $3/8 \times 3\frac{1}{2}$ in. strap” with “Use $3/8 \times 3$ in. strap”.

Page 6-79, Example 6.9.1: Revise calculation as follows: $A_s = 0.375(2)(3.5 - 3.0) = 2.63 - 2.25 \text{ in}^2$.

Page 6-79, Example 6.9.1, under “Check shear”: Revise as follows:

Check shear: [Note: $t_{des} = 0.93t_n$ per AISC 360 Section G5.]

$$F_{actual} = V_u / (Y - 3t)(2t) = 36 / \left(4 - 3 \left(0.93 \left(\frac{5}{16} \right) \right) \right) \left(2 \left(0.93 \left(\frac{5}{16} \right) \right) \right) = 19.8 \text{ ksi}$$

Page 6-80, Example 6.9.1, right column, below “Design Aid 6.15.3 (E70 electrode)”: Replace “ $\ell_w = 3\frac{1}{2}$ in.” with “ $\ell_w = 3$ in.”.

Page 6-103, Example 6.13.5, within “Given”: Add “ $\phi = 0.75$ for DBA based on brackets and corbels”.

Page 6-103, Example 6.13.5, below “Solution” step 1a: Replace “Design Aid 15.2.9” with “Design Aid 15.3.2”.

Page 6-103, Example 6.13.5, after “Solution” step 1b: Replace “(see Section 5.3.5)” with “(see Section 5.3.4)”, and replace “Deriving from Eq. 5-28a” with “Deriving from Eq. 5-33”.

Page 6-103, Example 6.13.5, under “Solution” step 1c: Delete “From Eq. 5-30”.

Page 6-117, Design Aid 6.15.11, Case 1, equation for ϕN_{cb} : Insert “ ϕ ” before “ C_{bs} ”.

Page 6-120, Design Aid 6.15.11, Case 4, Table A heading: Insert “ $d_{e3} +$ ” so the second parenthetical term is “ $(d_{e3} + Y + 1.5h_{ef})$ ”.

Chapter 8

Page 8-6, Figure 8.3.2, under “(b) Eight-point pick-up maximum moments”: Replace “ $+M_y = -M_y = 0.00054wab^2$ ” with “ $+M_y = -M_y = 0.0054wab^2$ ”.

Chapter 10

Page 10-13, Example 10.6.3.1, after “From Eq. 5-1”: Insert “ $f_{ps\theta}$ ” before bracket in equation for “ $f_{ps\theta}$ ” as such:

$$f_{ps\theta} = f_{pu\theta} \left[1 - \frac{\gamma_p A_{ps} f_{pu\theta}}{\beta_1 b d f_c} \right]$$

Page 10-13, Example 10.6.3.1; Revise calculation as follows:

$$a_\theta = \frac{A_{ps} f_{ps\theta}}{0.85 f_c b} = \frac{1.224 (135.6 - 138.7)}{0.85 (5) (12)} = 3.33 \text{ in.}$$

Page 10-14, Example 10.6.3.1, after “From Eq. 5-1”: Replace “ $f_{ps\theta}$ ” on right side of equal sign with “ $f_{pu\theta}$ ”.

Chapter 15

Page 15-34, Design Aid 15.3.2, top table: Insert “with $\Psi_c = 0.7$ ” after “General Use”.

Page 15-34, Design Aid 15.3.2, bottom table: Insert “with $\Psi_c = 0.7$ and $\Psi_r = 0.8$ ” after “Special Confinement”.

Appendix C

Page C-4, left column, Eq. C-9a: Replace “ S_{DS} ” with “ S_{D1} ”.

Page C-4, left column, after Eq. C-9b: Insert “where n = number of stories above the base”.

Page C-5, right column, last paragraph, first line: Replace “Table 12.11.5-1” with “Table 12.10-1”.

Page C-5, right column, last paragraph, third line: Replace “Section 12.11.5” with “Section 12.10.3.5”.