Appendix E-5
Crosswalk Between the 7th and 8th Editions

7th Ed. With 2016 Interim Revisions		8th Ed.		Modifications to the 8th Ed.				
Article or Equation		Article or Equation		Unchanged	Editorial	Updated	New	Removed
5.1	**Scope**	**5.1**	**Scope**			✓		
5.2	**Definitions**	**5.2**	**Definitions**			✓		
5.3	**Notation**	**5.3**	**Notation**			✓		
5.4	**Material Properties**	**5.4**	**Material Properties**	✓				
5.4.1	General	5.4.1	General	✓				
5.4.2	Normal Weight and Structural Lightweight Concrete	5.4.2	Normal Weight and Lightweight Concrete	✓				
5.4.2.1	Compressive Strength	5.4.2.1	Compressive Strength			✓		
5.4.2.2	Coefficient of Thermal Expansion	5.4.2.2	Coefficient of Thermal Expansion	✓				
5.4.2.3	Shrinkage and Creep	5.4.2.3	Creep and Shrinkage		✓			
5.4.2.3.1	General	5.4.2.3.1	General		✓			
5.4.2.3.2	Creep	5.4.2.3.2	Creep	✓				
5.4.2.3.2-1	$\psi(t,t_i) = 1.9 k_s k_{hc} k_f k_{td} t_i^{-0.118}$	5.4.2.3.2-1	$\psi(t,t_i) = 1.9 k_s k_{hc} k_f k_{td} t_i^{-0.118}$	✓				
5.4.2.3.2-2	$k_s = 1.45 - 0.13(V/S) \geq 1.0$	5.4.2.3.2-2	$k_s = 1.45 - 0.13(V/S) \geq 1.0$	✓				
5.4.2.3.2-3	$k_{hc} = 1.56 - 0.008H$	5.4.2.3.2-3	$k_{hc} = 1.56 - 0.008H$	✓				
5.4.2.3.2-4	$k_f = \dfrac{5}{1+f'_{ci}}$	5.4.2.3.2-4	$k_f = \dfrac{5}{1+f'_{ci}}$	✓				
5.4.2.3.2-5	$k_{td} = \dfrac{t}{12\left(\dfrac{100-4f'_{ci}}{f'_{ci}+20}\right)+t}$	5.4.2.3.2-5	$k_{td} = \dfrac{t}{12\left(\dfrac{100-4f'_{ci}}{f'_{ci}+20}\right)+t}$	✓				
C5.4.2.3.2-1	$k_c = \left[\dfrac{\dfrac{t}{26e^{0.36(V/S)}+t}}{\dfrac{t}{45+t}}\right]\left[\dfrac{1.80+1.77e^{-0.54(V/S)}}{2.587}\right]$	C5.4.2.3.2-1	$k_c = \left[\dfrac{\dfrac{t}{26e^{0.36(V/S)}+t}}{\dfrac{t}{45+t}}\right]\left[\dfrac{1.80+1.77e^{-0.54(V/S)}}{2.587}\right]$	✓				
C5.4.2.3.2-2	$k_s = \left[\dfrac{\dfrac{t}{26e^{0.36(V/S)}+t}}{\dfrac{t}{45+t}}\right]\left[\dfrac{1064-94(V/S)}{923}\right]$	C5.4.2.3.2-2	$k_s = \left[\dfrac{\dfrac{t}{26e^{0.36(V/S)}+t}}{\dfrac{t}{45+t}}\right]\left[\dfrac{1064-94(V/S)}{923}\right]$	✓				
5.4.2.3.3	Shrinkage	5.4.2.3.3	Shrinkage	✓				
5.4.2.3.3-1	$\varepsilon_{sh} = k_s k_{hs} k_f k_{td} 0.48 \times 10^{-3}$	5.4.2.3.3-1	$\varepsilon_{sh} = k_s k_{hs} k_f k_{td} 0.48 \times 10^{-3}$	✓				
5.4.2.3.3-2	$k_{hs} = (2.00 - 0.014H)$	5.4.2.3.3-2	$k_{hs} = (2.00 - 0.014H)$	✓				
5.4.2.4	Modulus of Elasticity	5.4.2.4	Modulus of Elasticity		✓			
5.4.2.4-1	$E_c = 120{,}000 K_1 w_c^{2.0} f'^{0.33}_c$	5.4.2.4-1	$E_c = 120{,}000 K_1 w_c^{2.0} f'^{0.33}_c$	✓				
C5.4.2.4-1	$E_c = 2{,}500 f'^{0.33}_c$	C5.4.2.4-1	$E_c = 2{,}500 f'^{0.33}_c$	✓				
C5.4.2.4-2	$E_c = 33{,}000 K_1 w_c^{1.5} \sqrt{f'_c}$	C5.4.2.4-2	$E_c = 33{,}000 K_1 w_c^{1.5} \sqrt{f'_c}$	✓				

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C5.4.2.4-3	$E_c = 1{,}820\sqrt{f'_c}$	C5.4.2.4-3	$E_c = 1{,}820\sqrt{f'_c}$	✓				
5.4.2.5	Poisson's Ratio	5.4.2.5	Poisson's Ratio		✓			
5.4.2.6	Modulus of Rupture	5.4.2.6	Modulus of Rupture		✓			
5.4.2.7	Tensile Strength	5.4.2.7	Tensile Strength	✓				
5.4.2.8	Concrete Density Modification Factors	5.4.2.8	Concrete Density Modification Factors		✓			
5.8.2.2	Modifications for Lightweight Concrete	5.4.2.8	Concrete Density Modification Factor					✓
5.4.2.8-1	$\lambda = 4.7 f_{ct} / \sqrt{f'_c} \leq 1.0$	5.4.2.8-1	$\lambda = 4.7 \dfrac{f_{ct}}{\sqrt{f'_c}} \leq 1.0$	✓				
C5.4.2.8-1	$0.75 \leq \lambda = 7.5\, w_c \leq 1.0$	5.4.2.8-2	$0.75 \leq \lambda = 7.5\, w_c \leq 1.0$	✓				
5.4.3	Reinforcing Steel	5.4.3	Reinforcing Steel	✓				
5.4.3.1	General	5.4.3.1	General		✓			
5.4.3.2	Modulus of Elasticity	5.4.3.2	Modulus of Elasticity	✓				
5.4.3.3	Special Applications	5.4.3.3	Special Applications		✓			
5.4.4	Prestressing Steel	5.4.4	Prestressing Steel	✓				
5.4.4.1	General	5.4.4.1	General		✓			
5.4.4.2	Modulus of Elasticity	5.4.4.2	Modulus of Elasticity	✓				
5.4.5	Post-Tensioning Anchorages and Couplers	5.4.5	Post-Tensioning Anchorages and Couplers	✓				
5.4.6	Ducts	5.4.6	Post-Tensioning Ducts		✓			
5.4.6.1	General	5.4.6.1	General			✓		
5.4.6.2	Size of Ducts	5.4.6.2	Size of Ducts			✓		
5.4.6.3	Ducts at Deviation Saddles	5.4.6.3	Ducts at Deviation Saddles	✓				
5.5	**Limit States**	**5.5**	**Limit States and Design Methodologies**		✓			
5.5.1	General	5.5.1	General	✓				
5.5.1.1	Limit-State Applicability	5.5.1.1	Limit-State Applicability		✓			
5.6.1	General	5.5.1.1	Limit-State Applicability			✓		
5.6.2	Effects of Imposed Deformations	5.5.1.1	Limit-State Applicability		✓			
5.5.1.2	Design Methodologies	5.5.1.2	Design Methodologies	✓				
5.5.1.2.1	General	5.5.1.2.1	General			✓		
5.5.1.2.2	B-Regions	5.5.1.2.2	B-Regions		✓			
5.5.1.2.3	D-Regions	5.5.1.2.3	D-Regions		✓			
5.5.2	Service Limit State	5.5.2	Service Limit State		✓			
5.5.3	Fatigue Limit State	5.5.3	Fatigue Limit State	✓				
5.5.3.1	General	5.5.3.1	General		✓			
5.5.3.1-1	$\gamma(\Delta f) \leq (\Delta F)_{TH}$	5.5.3.1-1	$\gamma(\Delta f) \leq (\Delta F)_{TH}$	✓				
5.5.3.2	Reinforcing Bars	5.5.3.2	Reinforcing Bars and Welded Wire Fabric		✓			
5.5.3.2-1	$(\Delta F)_{TH} = 24 - 20 f_{min} / f_y$	5.5.3.2-1	$(\Delta F)_{TH} = 24 - 20 f_{min} / f_y$	✓				
5.5.3.2-2	$(\Delta F)_{TH} = 16 - 0.33 f_{\min}$	5.5.3.2-2	$(\Delta F)_{TH} = 16 - 0.33 f_{\min}$	✓				
5.5.3.3	Prestressing Tendons	5.5.3.3	Prestressing steel		✓			
5.5.3.4	Welded or Mechanical Splices of Reinforcement	5.5.3.4	Welded or Mechanical Splices of Reinforcement		✓			
5.5.4	Strength Limit State	5.5.4	Strength Limit State	✓				
5.5.4.1	General	5.5.4.1	General	✓				
5.5.4.2	Resistance Factors	5.5.4.2	Resistance Factors			✓		
5.5.4.2.1	Conventional Construction	5.5.4.2	Resistance Factors			✓		

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5.5.4.2.2	Segmental Construction	5.5.4.2	Resistance Factors			✓		
5.5.4.2.1-1	$0.75 \le \phi = 0.75 + \frac{0.25(\varepsilon_t - \varepsilon_{cl})}{(\varepsilon_{tl} - \varepsilon_{cl})} \le 1.0$	5.5.4.2-1	$0.75 \le \phi = 0.75 + \frac{0.25(\varepsilon_t - \varepsilon_{cl})}{(\varepsilon_{tl} - \varepsilon_{cl})} \le 1.0$	✓				
5.5.4.2.1-2	$0.75 \le \phi = 0.75 + \frac{0.15(\varepsilon_t - \varepsilon_{cl})}{(\varepsilon_{tl} - \varepsilon_{cl})} \le 0.9$	5.5.4.2-2	$0.75 \le \phi = 0.75 + \frac{0.15(\varepsilon_t - \varepsilon_{cl})}{(\varepsilon_{tl} - \varepsilon_{cl})} \le 0.9$	✓				
5.5.4.3	Stability	5.5.4.3	Stability	✓				
5.5.5	Extreme Event Limit State	5.5.5	Extreme Event Limit State	✓				
5.5.5	Extreme Event Limit State	5.5.5.1	General		✓			
5.5.4.2.3	Special Requirements for Seismic Zones 2, 3, and 4	5.5.5.2	Special Requirements for Seismic Zones 2, 3, and 4		✓			
5.7	**Design for Flexural and Axial Force Effects**	**5.6**	**Design for Flexural and Axial Force Effects – B Regions**		✓			
5.7.1	Assumptions for Service and Fatigue Limit States	5.6.1	Assumptions for Service and Fatigue Limit States		✓			
5.7.2	Assumptions for Strength and Extreme Event Limit States	5.6.2	Assumptions for Strength and Extreme Event Limit States	✓				
5.7.2.1	General	5.6.2.1	General			✓		
5.7.2.1-1	$\frac{c}{d_s} \le \frac{0.003}{0.003 + \varepsilon_{cl}}$	5.6.2.1-1	$\frac{c}{d_s} \le \frac{0.003}{0.003 + \varepsilon_{cl}}$	✓				
5.7.2.2	Rectangular Stress Distribution	5.6.2.2	Rectangular Stress Distribution		✓			
5.7.3	Flexural Members	5.6.3	Flexural Members			✓		
5.7.3.1	Stress in Prestressing Steel at Nominal Flexural Resistance	5.6.3.1	Stress in Prestressing Steel at Nominal Flexural Resistance	✓				
5.7.3.1.1	Components with Bonded Tendons	5.6.3.1.1	Components with Bonded Tendons	✓				
5.7.3.1.1-1	$f_{ps} = f_{pu}\left(1 - k\frac{c}{d_p}\right)$	5.6.3.1.1-1	$f_{ps} = f_{pu}\left(1 - k\frac{c}{d_p}\right)$	✓				
5.7.3.1.1-2	$k = 2\left(1.04 - \frac{f_{py}}{f_{pu}}\right)$	5.6.3.1.1-2	$k = 2\left(1.04 - \frac{f_{py}}{f_{pu}}\right)$	✓				
5.7.3.1.1-3	$c = \frac{A_{ps}f_{pu} + A_s f_s - A'_s f'_s - \alpha_1 f'_c (b - b_w)h_f}{\alpha_1 f'_c \beta_1 b_w + kA_{ps}\frac{f_{pu}}{d_p}}$	5.6.3.1.1-3	$c = \frac{A_{ps}f_{pu} + A_s f_s - A'_s f'_s - \alpha_1 f'_c (b - b_w)h_f}{\alpha_1 f'_c \beta_1 b_w + kA_{ps}\frac{f_{pu}}{d_p}}$	✓				
5.7.3.1.1-4	$c = \frac{A_{ps}f_{pu} + A_s f_s - A'_s f'_s}{\alpha_1 f'_c \beta_1 b + kA_{ps}\frac{f_{pu}}{d_p}}$	5.6.3.1.1-4	$c = \frac{A_{ps}f_{pu} + A_s f_s - A'_s f'_s}{\alpha_1 f'_c \beta_1 b + kA_{ps}\frac{f_{pu}}{d_p}}$	✓				
5.7.3.1.2	Components with Unbonded Tendons	5.6.3.1.2	Components with Unbonded Tendons	✓				
5.7.3.1.2-1	$f_{ps} = f_{pe} + 900\left(\frac{d_p - c}{\ell_e}\right) \le f_{py}$	5.6.3.1.2-1	$f_{ps} = f_{pe} + 900\left(\frac{d_p - c}{\ell_e}\right) \le f_{py}$	✓				
5.7.3.1.2-2	$\ell_e = \left(\frac{2\ell_i}{2 + N_s}\right)$	5.6.3.1.2-2	$\ell_e = \left(\frac{2\ell_i}{2 + N_s}\right)$	✓				
5.7.3.1.2-3	$c = \frac{A_{ps}f_{ps} + A_s f_s - A'_s f'_s - \alpha_1 f'_c (b - b_w)h_f}{\alpha_1 f'_c \beta_1 b_w}$	5.6.3.1.2-3	$c = \frac{A_{ps}f_{ps} + A_s f_s - A'_s f'_s - \alpha_1 f'_c (b - b_w)h_f}{\alpha_1 f'_c \beta_1 b_w}$	✓				
5.7.3.1.2-4	$c = \frac{A_{ps}f_{ps} + A_s f_s - A'_s f'_s}{\alpha_1 f'_c \beta_1 b}$	5.6.3.1.2-4	$c = \frac{A_{ps}f_{ps} + A_s f_s - A'_s f'_s}{\alpha_1 f'_c \beta_1 b}$	✓				
C5.7.3.1.2-1	$f_{ps} = f_{pe} + 15.0$ (ksi)	C5.6.3.1.2-1	$f_{ps} = f_{pe} + 15.0$ (ksi)	✓				
5.7.3.1.3	Components with Both Bonded and Unbonded Tendons	5.6.3.1.3	Components with Both Bonded and Unbonded Tendons	✓				

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5.7.3.1.3a	Detailed Analysis	5.6.3.1.3a	Detailed Analysis	✓				
5.7.3.1.3b	Simplified Analysis	5.6.3.1.3b	Simplified Analysis	✓				
5.7.3.2	Flexural Resistance	5.6.3.2	Flexural Resistance	✓				
5.7.3.2.1	Factored Flexural Resistance	5.6.3.2.1	Factored Flexural Resistance	✓				
5.7.3.2.1-1	$M_r = \phi M_n$	5.6.3.2.1-1	$M_r = \phi M_n$	✓				
5.7.3.2.2	Flanged Sections	5.6.3.2.2	Flanged Sections	✓				
5.7.3.2.2-1	$M_n = A_{ps} f_{ps}\left(d_p - \frac{a}{2}\right) + A_s f_s \left(d_s - \frac{a}{2}\right) - A'_s f'_s \left(d'_s - \frac{a}{2}\right) + \alpha_1 f'_c (b - b_w) h_f \left(\frac{a}{2} - \frac{h_f}{2}\right)$	5.6.3.2.2-1	$M_n = A_{ps} f_{ps}\left(d_p - \frac{a}{2}\right) + A_s f_s \left(d_s - \frac{a}{2}\right) - A'_s f'_s \left(d'_s - \frac{a}{2}\right) + \alpha_1 f'_c (b - b_w) h_f \left(\frac{a}{2} - \frac{h_f}{2}\right)$	✓				
5.7.3.2.3	Rectangular Sections	5.6.3.2.3	Rectangular Sections	✓				
5.7.3.2.4	Other Cross-Sections	5.6.3.2.4	Other Cross-Sections	✓				
5.7.3.2.5	Strain Compatibility Approach	5.6.3.2.5	Strain Compatibility Approach		✓			
5.7.3.2.6	Composite Girder Section	5.6.3.2.6	Composite Girder Section	✓				
5.7.3.3.2	Minimum Reinforcement	5.6.3.3	Minimum Reinforcement			✓		
5.7.3.3.2-1	$M_{cr} = \gamma_3 \left[(\gamma_1 f_r + \gamma_2 f_{cpe}) S_c - M_{dnc} \left(\frac{S_c}{S_{nc}} - 1 \right) \right]$	5.6.3.3-1	$M_{cr} = \gamma_3 \left[(\gamma_1 f_r + \gamma_2 f_{cpe}) S_c - M_{dnc} \left(\frac{S_c}{S_{nc}} - 1 \right) \right]$	✓				
5.7.3.5	Moment Redistribution	5.6.3.4	Moment Redistribution	✓				
5.7.3.6	Deformations	5.6.3.5	Deformations	✓				
5.7.3.6.1	General	5.6.3.5.1	General	✓				
5.7.3.6.2	Deflection and Camber	5.6.3.5.2	Deflection and Camber		✓			
5.7.3.6.2-1	$I_e = \left(\frac{M_{cr}}{M_a}\right)^3 I_g + \left[1 - \left(\frac{M_{cr}}{M_a}\right)^3\right] I_{cr} \le I_g$	5.6.3.5.2-1	$I_e = \left(\frac{M_{cr}}{M_a}\right)^3 I_g + \left[1 - \left(\frac{M_{cr}}{M_a}\right)^3\right] I_{cr} \le I_g$	✓				
5.7.3.6.2-2	$M_{cr} = f_r \frac{I_g}{y_t}$	5.6.3.5.2-2	$M_{cr} = f_r \frac{I_g}{y_t}$	✓				
5.7.3.6.3	Axial Deformation	5.6.3.5.3	Axial Deformation	✓				
5.7.4	Compression Members	5.6.4	Compression Members	✓				
5.7.4.1	General	5.6.4.1	General	✓				
5.7.4.2	Limits for Reinforcement	5.6.4.2	Limits for Reinforcement		✓			
5.7.4.2-1	$\frac{A_s}{A_g} + \frac{A_{ps} f_{pu}}{A_g f_y} \le 0.08$	5.6.4.2-1	$\frac{A_s}{A_g} + \frac{A_{ps} f_{pu}}{A_g f_y} \le 0.08$	✓				
5.7.4.2-2	$\frac{A_{ps} f_{pe}}{A_g f'_c} \le 0.30$	5.6.4.2-2	$\frac{A_{ps} f_{pe}}{A_g f'_c} \le 0.30$	✓				
5.7.4.2-3	$\frac{A_s}{A_g} + \frac{A_{ps} f_{pu}}{A_g f_y} \ge 0.135 \frac{f'_c}{f_y}$	5.6.4.2-3	$\frac{A_s}{A_g} + \frac{A_{ps} f_{pu}}{A_g f_y} \ge 0.135 \frac{f'_c}{f_y}$	✓				
N/A	but not greater than 0.015	5.6.4.2-4	$\frac{A_s}{A_g} + \frac{A_{ps} f_{pu}}{A_g f_y} \le 0.015$		✓			
5.7.4.3	Approximate Evaluation of Slenderness Effects	5.6.4.3	Approximate Evaluation of Slenderness Effects			✓		
5.7.4.3-1	$EI = \frac{\frac{E_c I_g}{5} + E_s I_s}{1 + \beta_d}$	5.6.4.3-1	$EI = \frac{\frac{E_c I_g}{5} + E_s I_s}{1 + \beta_d}$	✓				

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5.7.4.3-2	$EI = \dfrac{\dfrac{E_c I_g}{2.5}}{1+\beta_d}$	5.6.4.3-2	$EI = \dfrac{\dfrac{E_c I_g}{2.5}}{1+\beta_d}$	✓				
5.7.4.4	Factored Axial Resistance	5.6.4.4	Factored Axial Resistance			✓		
5.7.4.4-1	$P_r = \phi P_n$	5.6.4.4-1	$P_r = \phi P_n$	✓				
5.7.4.4-2	$P_n = 0.85\left[\begin{array}{l} k_c f'_c\left(A_g - A_{st} - A_{ps}\right) + f_y A_{st} \\ -A_{ps}\left(f_{pe} - E_p \varepsilon_{cu}\right)\end{array}\right]$	5.6.4.4-2	$P_n = 0.85\left[\begin{array}{l} k_c f'_c\left(A_g - A_{st} - A_{ps}\right) + f_y A_{st} \\ -A_{ps}\left(f_{pe} - E_p \varepsilon_{cu}\right)\end{array}\right]$	✓				
5.7.4.4-3	$P_n = 0.80\left[\begin{array}{l} k_c f'_c\left(A_g - A_{st} - A_{ps}\right) + f_y A_{st} \\ -A_{ps}\left(f_{pe} - E_p \varepsilon_{cu}\right)\end{array}\right]$	5.6.4.4-3	$P_n = 0.80\left[\begin{array}{l} k_c f'_c\left(A_g - A_{st} - A_{ps}\right) + f_y A_{st} \\ -A_{ps}\left(f_{pe} - E_p \varepsilon_{cu}\right)\end{array}\right]$	✓				
5.7.4.5	Biaxial Flexure	5.6.4.5	Biaxial Flexure	✓				
5.7.4.5-1	$\dfrac{1}{P_{rxy}} = \dfrac{1}{P_{rx}} + \dfrac{1}{P_{ry}} - \dfrac{1}{\phi P_o}$	5.6.4.5-1	$\dfrac{1}{P_{rxy}} = \dfrac{1}{P_{rx}} + \dfrac{1}{P_{ry}} - \dfrac{1}{\phi P_o}$	✓				
5.7.4.5-2	$P_o = k_c f'_c\left(A_g - A_{st} - A_{ps}\right) + f_y A_{st} - A_{ps}\left(f_{pe} - E_p \varepsilon_{cu}\right)$	5.6.4.5-2	$P_o = k_c f'_c\left(A_g - A_{st} - A_{ps}\right) + f_y A_{st} - A_{ps}\left(f_{pe} - E_p \varepsilon_{cu}\right)$	✓				
5.7.4.5-3	$\dfrac{M_{ux}}{M_{rx}} + \dfrac{M_{uy}}{M_{ry}} \leq 1.0$	5.6.4.5-3	$\dfrac{M_{ux}}{M_{rx}} + \dfrac{M_{uy}}{M_{ry}} \leq 1.0$	✓				
5.7.4.6	Spirals and Ties	5.6.4.6	Spirals, Hoops and Ties		✓			
5.7.4.6-1	$\rho_s = 0.45\left(\dfrac{A_g}{A_c} - 1\right)\dfrac{f'_c}{f_{yh}}$	5.6.4.6-1	$\rho_s = 4\dfrac{A_{sp}}{\left(d_c s\right)} \geq 0.45\left(\dfrac{A_g}{A_c} - 1\right)\dfrac{f'_c}{f_{yh}}$			✓		
5.7.4.7	Hollow Rectangular Compression Members	5.6.4.7	Hollow Rectangular Compression Members	✓				
5.7.4.7.1	Wall Slenderness Ratio	5.6.4.7.1	Wall Slenderness Ratio	✓				
5.7.4.7.1-1	$\lambda_w = \dfrac{X_u}{t}$	5.6.4.7.1-1	$\lambda_w = \dfrac{X_u}{t}$	✓				
5.7.4.7.2	Limitations on the Use of the Rectangular Stress Block Method	5.6.4.7.2	Limitations on the Use of the Rectangular Stress Block Method	✓				
5.7.4.7.2a	General	5.6.4.7.2a	General	✓				
5.7.4.7.2b	Refined Method for Adjusting Maximum Usable Strain Limit	5.6.4.7.2b	Refined Method for Adjusting Maximum Usable Strain Limit	✓				
5.7.4.7.2c	Approximate Method for Adjusting Factored Resistance	5.6.4.7.2c	Approximate Method for Adjusting Factored Resistance	✓				
5.7.4.7.2c-1	$\lambda_w \leq 15, \text{ then } \phi_w = 1.0$	5.6.4.7.2c-1	$\lambda_w \leq 15, \text{ then } \phi_w = 1.0$	✓				
5.7.4.7.2c-2	$15 < \lambda_w \leq 25, \text{ then } \phi_w = 1 - 0.025\left(\lambda_w - 15\right)$	5.6.4.7.2c-2	$15 < \lambda_w \leq 25, \text{ then } \phi_w = 1 - 0.025\left(\lambda_w - 15\right)$	✓				
5.7.4.7.2c-3	$25 < \lambda_w \leq 35, \text{ then } \phi_w = 0.75$	5.6.4.7.2c-3	$25 < \lambda_w \leq 35, \text{ then } \phi_w = 0.75$	✓				
5.7.5	Bearing	5.6.5	Bearing			✓		
5.7.5-1	$P_r = \phi P_n$	5.6.5-1	$P_r = \phi P_n$	✓				
5.7.5-2	$P_n = 0.85 f'_c A_1 m$	5.6.5-2	$P_n = 0.85 f'_c A_1 m$	✓				
5.7.5-3	$m = \sqrt{\dfrac{A_2}{A_1}} \leq 2.0$	5.6.5-3	$m = \sqrt{\dfrac{A_2}{A_1}} \leq 2.0$	✓				

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5.7.5-4	$m = 0.75\sqrt{\frac{A_2}{A_1}} \leq 1.50$	5.6.5-4	$m = 0.75\sqrt{\frac{A_2}{A_1}} \leq 1.50$	✓				
5.7.6	Tension Members	5.6.6	Tension Members	✓				
5.7.6.1	Factored Tension Resistance	5.6.6.1	Resistance to Tension		✓			
5.7.6.1-1	$P_r = \phi P_n$	5.6.6.1-1	$P_r = \phi P_n$	✓				
5.7.6.2	Resistance to Combinations of Tension and Flexure	5.6.6.2	Resistance to Combined Tension and Flexure		✓			
5.7.3.4	Control Cracking by Distribution of Reinforcement	5.6.7	Control Cracking by Distribution of Reinforcement			✓		
5.7.3.4-1	$s \leq \frac{700\gamma_e}{\beta_s f_{ss}} - 2d_c$	5.6.7-1	$s \leq \frac{700\gamma_e}{\beta_s f_{ss}} - 2d_c$	✓				
N/A	$\beta_s = 1 + \frac{d_c}{0.7(h - d_c)}$	5.6.7-2	$\beta_s = 1 + \frac{d_c}{0.7(h - d_c)}$	✓				
5.7.3.4-2	$A_{sk} \geq 0.012\ (d_\ell - 30)$	5.6.7-3	$A_{sk} \geq 0.012\ (d_\ell - 30)$					
5.8	**Shear and Torsion**	**5.7**	**Design for Shear and Torsion – B Regions**		✓			
5.8.1	Design Procedures	5.7.1	Design Procedures	✓				
5.8.1.1	Flexural Regions	5.7.1.1	Flexural Regions		✓			
5.8.1.2	Regions Near Discontinuities	5.7.1.2	Regions Near Discontinuities		✓			
5.8.1.3	Interface Regions	5.7.1.3	Interface Regions	✓				
5.8.1.4	Slabs and Footings	5.7.1.4	Slabs and Footings	✓				
5.8.1.5	Webs of Curved Post-Tensioned Box Girder Bridges	5.7.1.5	Webs of Curved Post-Tensioned Box Girder Bridges			✓		
5.8.2	General Requirements	5.7.2	General Requirements	✓				
5.8.2.1	General	5.7.2.1	General			✓		
5.8.6.3	Regions Requiring Consideration of Torsional Effects	5.7.2.1	General			✓		
5.8.2.1-2	$V_r = \phi V_n$	5.7.2.1-1	$V_r = \phi V_n$	✓				
5.8.2.1-1	$T_r = \phi T_n$	5.7.2.1-2	$T_r = \phi T_n$	✓				
5.8.2.1-3	$T_u > 0.25\phi T_{cr}$	5.7.2.1-3	$T_u > 0.25\phi T_{cr}$	✓				
5.8.2.1-4	$T_{cr} = 0.125\lambda\sqrt{f'_c}\frac{A_{cp}^2}{p_c}\sqrt{1 + \frac{f_{pc}}{0.125\lambda\sqrt{f'_c}}}$	5.7.2.1-4	$T_{cr} = 0.125K\lambda\sqrt{f'_c}\frac{A_{cp}^2}{p_c}$		✓			
5.8.6.3-2	$T_{cr} = 0.0632K\lambda\sqrt{f'_c}2A_o b_e$	5.7.2.1-5	$T_{cr} = 0.125K\lambda\sqrt{f'_c}2A_o b_e$			✓		
5.8.6.3-3	$K = \sqrt{1 + \frac{f_{pc}}{0.0632\lambda\sqrt{f'_c}}} \leq 2.0$	5.7.2.1-6	$K = \sqrt{1 + \frac{f_{pc}}{0.125\lambda\sqrt{f'_c}}} \leq 2.0$			✓		
5.8.2.3	Transfer and Development Lengths	5.7.2.2	Transfer and Development Lengths			✓		
5.8.2.4	Regions Requiring Transverse Reinforcement	5.7.2.3	Regions Requiring Transverse Reinforcement			✓		
5.8.2.4-1	$V_u > 0.5\phi\left(V_c + V_p\right)$	5.7.2.3-1	$V_u > 0.5\phi\left(V_c + V_p\right)$	✓				
5.8.2.6	Types of Transverse Reinforcement	5.7.2.4	Types of Transverse Reinforcement			✓		
5.8.2.5	Minimum Transverse Reinforcement	5.7.2.5	Minimum Transverse Reinforcement			✓		

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5.8.2.5-1	$A_v \ge 0.0316\,\lambda\sqrt{f'_c}\,\frac{b_v s}{f_y}$	5.7.2.5-1	$A_v \ge 0.0316\,\lambda\sqrt{f'_c}\,\frac{b_v s}{f_y}$	✓				
5.8.2.7	Maximum Spacing of Transverse Reinforcement	5.7.2.6	Maximum Spacing of Transverse Reinforcement		✓			
5.8.2.7-1	$s_{max} = 0.8d_v \le 24.0$	5.7.2.6-1	$s_{max} = 0.8d_v \le 24.0$	✓				
5.8.6.6-1	$s_{max} = 0.8d_v \le 36.0$ in.	5.7.2.6-1	$s_{max} = 0.8d_v \le 24.0$			✓		
5.8.2.7-2	$s_{max} = 0.4d_v \le 12.0$	5.7.2.6-2	$s_{max} = 0.4d_v \le 12.0$	✓				
5.8.6.6-2	$s_{max} = 0.4d_v \le 18.0$ in.	5.7.2.6-2	$s_{max} = 0.4d_v \le 12.0$			✓		
5.8.2.8	Design and Detailing Requirements	5.7.2.7	Design and Detailing Requirements			✓		
5.8.2.9	Shear Stress on Concrete	5.7.2.8	Shear Stress on Concrete			✓		
5.8.2.9-1	$v_u = \frac{\lvert V_u - \phi V_p \rvert}{\phi b_v d_v}$	5.7.2.8-1	$v_u = \frac{\lvert V_u - \phi V_p \rvert}{\phi b_v d_v}$	✓				
5.8.2.9-2	$d_e = \frac{A_{ps} f_{ps} d_p + A_s f_y d_s}{A_{ps} f_{ps} + A_s f_y}$	5.7.2.8-2	$d_e = \frac{A_{ps} f_{ps} d_p + A_s f_y d_s}{A_{ps} f_{ps} + A_s f_y}$	✓				
C5.8.2.9-1	$d_v = \frac{M_n}{A_s f_y + A_{ps} f_{ps}}$	C5.7.2.8-1	$d_v = \frac{M_n}{A_s f_y + A_{ps} f_{ps}}$	✓				
C5.8.2.9-2	$d_e = \frac{D}{2} + \frac{D_r}{\pi}$	C5.7.2.8-2	$d_e = \frac{D}{2} + \frac{D_r}{\pi}$	✓				
5.8.3	Sectional Design Model	5.7.3	Sectional Design Model	✓				
5.8.3.1	General	5.7.3.1	General			✓		
5.8.3.2	Sections Near Supports	5.7.3.2	Sections Near Supports			✓		
5.8.3.3	Nominal Shear Resistance	5.7.3.3	Nominal Shear Resistance			✓		
5.8.3.3-1	$V_n = V_c + V_s + V_p$	5.7.3.3-1	$V_n = V_c + V_s + V_p$	✓				
5.8.3.3-2	$V_n = 0.25 f'_c b_v d_v + V_p$	5.7.3.3-2	$V_n = 0.25 f'_c b_v d_v + V_p$	✓				
5.8.3.3-3	$V_c = 0.0316\beta\lambda\sqrt{f'_c}\, b_v d_v$	5.7.3.3-3	$V_c = 0.0316\beta\lambda\sqrt{f'_c}\, b_v d_v$	✓				
5.8.3.3-4	$V_s = \frac{A_v f_y d_v (\cot\theta + \cot\alpha)\sin\alpha}{s}$	5.7.3.3-4	$V_s = \frac{A_v f_y d_v (\cot\theta + \cot\alpha)\sin\alpha}{s}$	✓				
5.8.3.3-5	$V_s = A_v f_y \sin\alpha \le 0.095\lambda\sqrt{f'_c} b_v d_v$	5.7.3.3-5	$V_s = A_v f_y \sin\alpha \le 0.095\lambda\sqrt{f'_c} b_v d_v$	✓				
C5.8.3.3-1	$V_s = \frac{A_v f_y d_v \cot\theta}{s}$	C5.7.3.3-1	$V_s = \frac{A_v f_y d_v \cot\theta}{s}$	✓				
5.8.3.4	Procedures for Determining Shear Resistance	5.7.3.4	Procedures for Determining Shear Resistance Parameters β and θ			✓		
5.8.3.4.1	Simplified Procedure for Nonprestressed Sections	5.7.3.4.1	Simplified Procedure for Nonprestressed Sections	✓				
5.8.3.4.2	General Procedure	5.7.3.4.2	General Procedure			✓		
5.8.3.4.2-1	$\beta = \frac{4.8}{(1 + 750\varepsilon_s)}$	5.7.3.4.2-1	$\beta = \frac{4.8}{(1 + 750\varepsilon_s)}$	✓				
5.8.3.4.2-2	$\beta = \frac{4.8}{(1 + 750\varepsilon_s)}\frac{51}{(39 + s_{xe})}$	5.7.3.4.2-2	$\beta = \frac{4.8}{(1 + 750\varepsilon_s)}\frac{51}{(39 + s_{xe})}$	✓				
5.8.3.4.2-3	$\theta = 29 + 3500\varepsilon_s$	5.7.3.4.2-3	$\theta = 29 + 3500\varepsilon_s$	✓				

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5.8.3.4.2-4	$\varepsilon_s = \dfrac{\left(\dfrac{\lvert M_u \rvert}{d_v} + 0.5N_u + \lvert V_u - V_p \rvert - A_{ps} f_{po}\right)}{E_s A_s + E_p A_{ps}}$	5.7.3.4.2-4	$\varepsilon_s = \dfrac{\left(\dfrac{\lvert M_u \rvert}{d_v} + 0.5N_u + \lvert V_u - V_p \rvert - A_{ps} f_{po}\right)}{E_s A_s + E_p A_{ps}}$	✓				
5.8.2.1-6	$\sqrt{V_u^2 + \left(\dfrac{0.9\, p_h\, T_u}{2\, A_o}\right)^2}$	5.7.3.4.2-5	$V_{eff} = \sqrt{V_u^2 + \left(\dfrac{0.9 p_h T_u}{2A_o}\right)^2}$	✓				
5.8.2.1-7	$V_u + \dfrac{T_u\, d_s}{2\, A_o}$	5.7.3.4.2-6	$V_{eff} = V_u + \dfrac{T_u d_s}{2A_o}$	✓				
5.8.3.4.2-5	$s_{xe} = s_x \dfrac{1.38}{a_g + 0.63}$	5.7.3.4.2-7	$s_{xe} = s_x \dfrac{1.38}{a_g + 0.63}$	✓				
5.8.3.5	Longitudinal Reinforcement	5.7.3.5	Longitudinal Reinforcement	✓				
5.8.3.5-1	$A_{ps} f_{ps} + A_s f_y \geq \dfrac{\lvert M_u \rvert}{d_v \phi_f} + 0.5\dfrac{N_u}{\phi_c} + \left(\left\lvert \dfrac{V_u}{\phi_v} - V_p \right\rvert - 0.5V_s\right)\cot\theta$	5.7.3.5-1	$A_{ps} f_{ps} + A_s f_y \geq \dfrac{\lvert M_u \rvert}{d_v \phi_f} + 0.5\dfrac{N_u}{\phi_c} + \left(\left\lvert \dfrac{V_u}{\phi_v} - V_p \right\rvert - 0.5V_s\right)\cot\theta$	✓				
5.8.3.5-2	$A_s f_y + A_{ps} f_{ps} \geq \left(\dfrac{V_u}{\phi_v} - 0.5V_s - V_p\right)\cot\theta$	5.7.3.5-2	$A_s f_y + A_{ps} f_{ps} \geq \left(\dfrac{V_u}{\phi_v} - 0.5V_s - V_p\right)\cot\theta$	✓				
5.8.3.6	Sections Subjected to Combined Shear and Torsion	5.7.3.6	Sections Subjected to Combined Shear and Torsion	✓				
5.8.3.6.1	Transverse Reinforcement	5.7.3.6.1	Transverse Reinforcement	✓				
5.8.3.6.2	Torsional Resistance	5.7.3.6.2	Torsional Resistance		✓			
5.8.3.6.2-1	$T_n = \dfrac{2A_o A_t f_y \cot\theta}{s}$	5.7.3.6.2-1	$T_n = \dfrac{2A_o A_t f_y \cot\theta}{s}$	✓				
5.8.3.6.3	Longitudinal Reinforcement	5.7.3.6.3	Longitudinal Reinforcement		✓			
5.8.3.6.3-1	$A_{ps}\, f_{ps} + A_s\, f_y \geq \dfrac{\lvert M_u \rvert}{\phi\, d_v} + \dfrac{0.5N_u}{\phi} + \cot\theta\sqrt{\left(\left\lvert \dfrac{V_u}{\phi} - V_p \right\rvert - 0.5V_s\right)^2 + \left(\dfrac{0.45 p_h\, T_u}{2A_o\, \phi}\right)^2}$	5.7.3.6.3-1	$A_{ps}\, f_{ps} + A_s\, f_y \geq \dfrac{\lvert M_u \rvert}{\phi\, d_v} + \dfrac{0.5N_u}{\phi} + \cot\theta\sqrt{\left(\left\lvert \dfrac{V_u}{\phi} - V_p \right\rvert - 0.5V_s\right)^2 + \left(\dfrac{0.45 p_h\, T_u}{2A_o\, \phi}\right)^2}$	✓				
5.8.3.6.3-2	$A_\ell = \dfrac{T_n p_h}{2A_o f_y}$	5.7.3.6.3-2	$A_\ell = \dfrac{T_n p_h}{2A_o f_y}$	✓				
5.8.4	Interface Shear Transfer—Shear Friction	5.7.4	Interface Shear Transfer—Shear Friction	✓				
5.8.4.1	General	5.7.4.1	General		✓			
5.8.4.4	Minimum Area of Interface Shear Reinforcement	5.7.4.2	Minimum Area of Interface Shear Reinforcement		✓			
5.8.4.4-1	$A_{vf} \geq \dfrac{0.05A_{cv}}{f_y}$	5.7.4.2-1	$A_{vf} \geq \dfrac{0.05A_{cv}}{f_y}$	✓				
5.8.4.1	General	5.7.4.3	Interface Shear Resistance		✓			
5.8.4.1-1	$V_{ri} = \phi V_{ni}$	5.7.4.3-1	$V_{ri} = \phi V_{ni}$	✓				
5.8.4.1-2	$V_{ri} \geq V_{ui}$	5.7.4.3-2	$V_{ri} \geq V_{ui}$	✓				
5.8.4.1-3	$V_{ni} = cA_{cv} + \mu\,(A_{vf} f_y + P_c)$	5.7.4.3-3	$V_{ni} = cA_{cv} + \mu\,(A_{vf} f_y + P_c)$	✓				
5.8.4.1-4	$V_{ni} \leq K_1 f'_c\, A_{cv},$	5.7.4.3-4	$V_{ni} \leq K_1 f'_c\, A_{cv},$	✓				
5.8.4.1-5	$V_{ni} \leq K_2\, A_{cv}$	5.7.4.3-5	$V_{ni} \leq K_2\, A_{cv}$	✓				

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5.8.4.1-6	$A_{cv} = b_{vi} L_{vi}$	5.7.4.3-6	$A_{cv} = b_{vi} L_{vi}$	✓				
5.8.4.3	Cohesion and Friction Factors	5.7.4.4	Cohesion and Friction Factors		✓			
5.8.4.2	Computation of the Factored Interface Shear Force, Vui, for Girder/Slab Bridges	5.7.4.5	Computation of the Factored Interface Shear Force for Girder/Slab Bridges		✓			
5.8.4.2-1	$v_{ui} = \frac{V_{u1}}{b_{vi} d_v}$	5.7.4.5-1	$v_{ui} = \frac{V_{u1}}{b_{vi} d_v}$	✓				
5.8.4.2-2	$V_{ui} = v_{ui} A_{cv} = v_{ui} 12 b_{vi}$	5.7.4.5-2	$V_{ui} = v_{ui} A_{cv} = v_{ui} 12 b_{vi}$	✓				
5.8.4.2-3	$A_{vpc} = \frac{P_c}{\phi f_y}$	5.7.4.5-3	$A_{vpc} = \frac{P_c}{\phi f_y}$	✓				
C5.8.4.2-1	$M_{u2} = M_1 + V_1 \Delta \ell$	C5.7.4.5-1	$M_{u2} = M_1 + V_1 \Delta \ell$	✓				
C5.8.4.2-2	$C_{u2} = \frac{M_{u2}}{d_v}$	C5.7.4.5-2	$C_{u2} = \frac{M_{u2}}{d_v}$	✓				
C5.8.4.2-3	$C_{u2} = \frac{M_1}{d_v} + \frac{V_1 \Delta \ell}{d_v}$	C5.7.4.5-3	$C_{u2} = \frac{M_1}{d_v} + \frac{V_1 \Delta \ell}{d_v}$	✓				
C5.8.4.2-4	$C_1 = \frac{M_1}{d_v}$	C5.7.4.5-4	$C_1 = \frac{M_1}{d_v}$	✓				
C5.8.4.2-5	$V_h = C_{u2} - C_1$	C5.7.4.5-5	$V_h = C_{u2} - C_1$	✓				
C5.8.4.2-6	$V_h = \frac{V_1 \Delta \ell}{d_v}$	C5.7.4.5-6	$V_h = \frac{V_1 \Delta \ell}{d_v}$	✓				
C5.8.4.2-7	$V_{hi} = \frac{V_1}{d_v}$	C5.7.4.5-7	$V_{hi} = \frac{V_1}{d_v}$	✓				
5.8.4.1	General	5.7.4.6	Interface Shear in Box Girder Bridges				✓	
5.6	**Design Considerations**	**5.8**	**Design of D-Regions**				✓	
N/A		5.8.1	General				✓	
5.6.3	Strut-and-Tie Method	5.8.2	Strut-and-Tie Method (STM)		✓			
5.6.3.1	General	5.8.2.1	General		✓			
5.6.3.2	Structural Modeling	5.8.2.2	Structural Modeling		✓			
C5.6.3.2-1	$V_{cr} = \left[0.2 - 0.1\left(\frac{a}{d}\right)\right]\sqrt{f'_c} b_w d$	C5.8.2.2-1	$V_{cr} = \left[0.2 - 0.1\left(\frac{a}{d}\right)\right]\sqrt{f'_c} b_w d$	✓				
5.6.3.3	Factored Resistance	5.8.2.3	Factored Resistance	✓				
5.6.3.3-1	$P_r = \phi P_n$	5.8.2.3-1	$P_r = \phi P_n$	✓				
5.6.3.4	Proportioning of Ties	5.8.2.4	Proportioning of Ties	✓				
5.6.3.4.1	Strength of Tie	5.8.2.4.1	Strength of Tie		✓			

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5.6.3.4.1-1	$P_n = f_y A_{st} + A_{ps}\left(f_{pe} + f_y\right)$	5.8.2.4.1-1	$P_n = f_y A_{st} + A_{ps}\left[f_{pe} + f_y\right]$		✓			
5.6.3.4.2	Anchorage of Tie	5.8.2.4.2	Anchorage of Tie		✓			
5.6.3.5	Proportioning of Node Regions	5.8.2.5	Proportioning of Node Regions	✓				
5.6.3.5.1	Strength of the Node Face	5.8.2.5	Proportioning of Node Regions		✓			
5.6.3.5.1-1	$P_n = f_{cu} A_{cn}$	5.8.2.5-1	$P_n = f_{cu} A_{cn}$	✓				
5.6.3.5.2	Effective Cross-Sectional Area of Node Face	5.8.2.5.2	Effective Cross-Sectional Area of Node Face		✓			
5.6.3.5.3	Limiting Compressive Stress at the Node Face	5.8.2.5.3	Limiting Compressive Stress at the Node Face	✓				
5.6.3.5.3a	General	5.8.2.5.3a	General		✓			
5.6.3.5.3a-1	$f_{cu} = m\nu f'_c$	5.8.2.5.3a-1	$f_{cu} = m\nu f'_c$	✓				
5.6.3.5.3b	Back Face of a CCT Node	5.8.2.5.3b	Back Face of a CCT Node		✓			
5.6.3.6	Crack Control Reinforcement	5.8.2.6	Crack Control Reinforcement		✓			
5.6.3.6-1	$\frac{A_v}{b_w s_v} \geq 0.003$	5.8.2.6-1	$\frac{A_v}{b_w s_v} \geq 0.003$	✓				
5.6.3.6-2	$\frac{A_h}{b_w s_h} \geq 0.003$	5.8.2.6-2	$\frac{A_h}{b_w s_h} \geq 0.003$	✓				
5.10.9.4	Application of the Strut-and-Tie Model to the Design of the General Zone	5.8.2.7	Application to the Design of the General Zones of Post-Tensioning Anchorages		✓			
5.10.9.4.1	General	5.8.2.7.1	General	✓				
5.10.9.4.2	Nodes	5.8.2.7.2	Nodes	✓				
5.10.9.4.3	Struts	5.8.2.7.3	Struts		✓			
5.10.9.4.4	Ties	5.8.2.7.4	Ties	✓				
5.13.2.2	Diaphragms	5.8.2.8	Application to design of Pier Diaphragms				✓	
5.13.2.4.2	Alternative to Strut-and-Tie Model	5.8.2.9	Application to the Design of Brackets and Corbels			✓		
5.10.9.5	Elastic Stress Analysis	5.8.3	Elastic Stress Analysis		✓			
5.10.9.5	Elastic Stress Analysis	5.8.3.1	General		✓			
5.10.9.5	Elastic Stress Analysis	5.8.3.2	General Zones of Post-Tensioning Anchorages		✓			
5.10.9.6	Approximate Stress Analyses and Design	5.8.4	Approximate Stress Analysis and Design	✓				
5.13.2.3	Detailing Requirements for Deep Beams	5.8.4.1	Deep Beams			✓		
5.13.2.4	Brackets and Corbels	5.8.4.2	Brackets and Corbels	✓				
5.13.2.4.1	General	5.8.4.2.1	General		✓			
5.13.2.4.1-1	$M_u = V_u a_v + N_{uc}(h - d)$	5.8.4.2.1-1	$M_u = V_u a_v + N_{uc}(h - d)$	✓				
5.13.2.4.2	Alternative to Strut-and-Tie Model	5.8.4.2.2	Additional Requirements			✓		
5.13.2.4.2-1	$V_n = 0.2 f'_c b_w d_e$	5.8.4.2.2-1	$V_n = 0.2 f'_c b d_e$			✓		
5.13.2.4.2-2	$V_n = 0.8\, b_w\, d_e$	5.8.4.2.2-2	$V_n = 0.8\, b d_e$			✓		
5.13.2.4.2-3	$V_n = \left(0.2 - 0.07 a_v / d\right) f'_c b_w d_e$	5.8.4.2.2-3	$V_n = \left(0.2 - 0.07 a_v / d\right) f'_c b d_e$			✓		
5.13.2.4.2-4	$V_n = \left(0.8 - 0.28\, a_v / d_e\right) b_w d$	5.8.4.2.2-4	$V_n = \left(0.8 - 0.28\, a_v / d_e\right) bd$			✓		
5.13.2.4.2-5	$A_s \geq \frac{2A_{vf}}{3} + A_n$	5.8.4.2.2-5	$A_s \geq \frac{2A_{vf}}{3} + A_n$	✓				
5.13.2.4.2-6	$A_h \geq 0.5\left(A_s - A_n\right)$	5.8.4.2.2-6	$A_h \geq 0.5\left(A_s - A_n\right)$	✓				

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5.13.2.4.2-7	$A_n \geq N_{uc} / \phi f_y$	5.8.4.2.2-7	$A_n \geq N_{uc} / \phi f_y$	✓				
5.13.2.5	Beam Ledges	5.8.4.3	Beam Ledges	✓				
5.13.2.5.1	General	5.8.4.3.1	General	✓				
5.13.2.5.2	Design for Shear	5.8.4.3.2	Design for Shear		✓			
5.13.2.5.3	Design for Flexure and Horizontal Force	5.8.4.3.3	Design for Flexure and Horizontal Force		✓			
5.13.2.5.4	Design for Punching Shear	5.8.4.3.4	Design for Punching Shear			✓		
N/A		5.8.4.3.4-1	$S > 2d_f + W$				✓	
N/A		5.8.4.3.4-2	$b_w + 2a_v > L + 2d_f$				✓	
5.13.2.5.4-1	$V_n = 0.125\lambda\sqrt{f'_c}\,(W + 2L + 2d_e)\,d_e$	5.8.4.3.4-3	$V_n = 0.125\lambda\sqrt{f'_c}\,b_o d_f$			✓		
5.13.2.5.4-2	$V_n = 0.125\lambda\sqrt{f'_c}\,(W + L + d_e)\,d_e$	5.8.4.3.4-3	$V_n = 0.125\lambda\sqrt{f'_c}\,b_o d_f$			✓		
5.13.2.5.4-3	$V_n = 0.125\lambda\sqrt{f'_c}\left(0.5W + L + d_e + c\right)d_e$	5.8.4.3.4-3	$V_n = 0.125\lambda\sqrt{f'_c}\,b_o d_f$			✓		
N/A		5.8.4.3.4-4	$b_o = W + 2L + 2d_f$				✓	
N/A		5.8.4.3.4-5	$b_o = 0.5W + L + d_f + c \leq W + 2L + 2d_f$				✓	
N/A		5.8.4.3.4-6	$b_o = \frac{\pi}{2}\left(D + d_f\right) + D$				✓	
N/A		5.8.4.3.4-7	$b_o = \frac{\pi}{4}\left(D + d_f\right) + \frac{D}{2} + c \leq \frac{\pi}{2}\left(D + d_f\right) + D$				✓	
5.13.2.5.5	Design of Hanger Reinforcement	5.8.4.3.5	Design of Hanger Reinforcement			✓		
5.13.2.5.5-1	$V_n = \frac{A_{hr}\left(0.5f_y\right)}{s}\left(W + 3a_v\right)$	5.8.4.3.5-1	$V_n = \frac{0.5A_{hr}f_y\left(W + 3a_v\right)}{s}$		✓			
5.13.2.5.5-2	$V_n = \frac{A_{hr}f_y}{s}S$	5.8.4.3.5-2	$V_n = \frac{A_{hr}f_y}{s}S$	✓				
5.13.2.5.5-3	$V_n = \left(0.063\lambda\sqrt{f'_c}\,b_f d_f\right) + \frac{A_{hr}f_y}{s}\left(W + 2d_f\right)$	5.8.4.3.5-3	$V_n = \left(0.063\lambda\sqrt{f'_c}\,b_f d_f\right) + \frac{A_{hr}f_y}{s}\left(W + 2d_f\right)$	✓				
5.13.2.5.6	Design for Bearing	5.8.4.3.6	Design for Bearing	✓				
5.10.9.7	Design of Local Zones	5.8.4.4	Local Zones		✓			
5.10.9.7.1	Dimensions of Local Zone	5.8.4.4.1	Dimensions of Local Zone		✓			
5.10.9.7.2	Bearing Resistance	5.8.4.4.2	Bearing Resistance		✓			
5.10.9.7.2-1	$P_r = \phi f_n A_b$	5.8.4.4.2-1	$P_r = \phi f_n A_b$	✓				
5.10.9.7.2-2	$f_n = 0.7\,f'_{ci}\sqrt{\frac{A}{A_g}}$	5.8.4.4.2-2	$f_n = 0.7\,f'_{ci}\sqrt{\frac{A}{A_g}}$	✓				
5.10.9.7.2-3	$f_n = 2.25\,f'_{ci}$	5.8.4.4.2-3	$f_n = 2.25\,f'_{ci}$	✓				
5.10.9.7.2-4	$n/t \leq 0.08\left(\frac{E_b}{f_b}\right)^{0.33}$	5.8.4.4.2-4	$n/t \leq 0.08\left(\frac{E_b}{f_b}\right)^{0.33}$	✓				
5.10.9.7.3	Special Anchorage Devices	5.8.4.4.3	Special Anchorage Devices		✓			
5.10.9.6	Approximate Stress Analyses and Design	5.8.4.5	General Zones of Post-Tensioning Anchorages		✓			

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5.10.9.6.1	Limitations of Application	5.8.4.5.1	Limitations of Application	✓				
5.10.9.6.2	Compressive Stresses	5.8.4.5.2	Compressive Stresses			✓		
5.10.9.6.2-1	$f_{ca} = \frac{0.6 P_u \kappa}{A_b\left(1+\ell_c\left(\frac{1}{b_{eff}}-\frac{1}{t}\right)\right)}$	5.8.4.5.2-1	$f_{ca} = \frac{0.6 P_u \kappa}{A_b\left(1+\ell_c\left(\frac{1}{b_{eff}}-\frac{1}{t}\right)\right)}$	✓				
5.10.9.6.2-2	$\kappa = 1 + \left(2-\frac{s}{a_{eff}}\right)\left(0.3+\frac{n}{15}\right)$	5.8.4.5.2-2	$\kappa = 1 + \left(2-\frac{s}{a_{eff}}\right)\left(0.3+\frac{n}{15}\right)$	✓				
5.10.9.6.2-3	$\kappa = 1$	5.8.4.5.2-3	$\kappa = 1$	✓				
5.10.9.6.3	Bursting Forces	5.8.4.5.3	Bursting Forces		✓			
5.10.9.6.3-1	$T_{burst} = 0.25\sum P_u\left(1-\frac{a}{h}\right) + 0.5\,\lvert\Sigma(P_u \sin\alpha)\rvert$	5.8.4.5.3-1	$T_{burst} = 0.25\sum P_u\left(1-\frac{a}{h}\right) + 0.5\,\lvert\Sigma(P_u \sin\alpha)\rvert$	✓				
5.10.9.6.3-2	$d_{burst} = 0.5(h-2e)+5e\sin\alpha$	5.8.4.5.3-2	$d_{burst} = 0.5(h-2e)+5e\sin\alpha$	✓				
5.10.9.6.4	Edge Tension Forces	5.8.4.5.4	Edge Tension Forces	✓				
5.10.9.3.6	Multiple Slab Anchorages	5.8.4.5.5	Multiple Slab Anchorages	✓				
5.10.9.3.6-1	$T_1 = 0.10\,P_u\left(1-\frac{a}{s}\right)$	5.8.4.5.5-1	$T_1 = 0.10\,P_u\left(1-\frac{a}{s}\right)$	✓				
5.10.9.3.6-2	$T_2 = 0.20\,P_u\left(1-\frac{a}{s}\right)$	5.8.4.5.5-2	$T_2 = 0.20\,P_u\left(1-\frac{a}{s}\right)$	✓				
5.9	**Prestressed Concrete**	**5.9**	**Prestressing**	✓				
5.9.1	General Design Considerations	5.9.1	General Design Considerations	✓				
5.9.1.1	General	5.9.1.1	General	✓				
5.9.1.2	Specified Concrete Strengths	5.9.1.2	Design Concrete Strengths		✓			
5.9.1.4	Section Properties	5.9.1.3	Section Properties			✓		
5.9.1.5	Crack Control	5.9.1.4	Crack Control		✓			
5.9.1.3	Buckling	5.9.1.5	Buckling	✓				
5.9.1.6	Tendons with Angle Points or Curves	5.9.1.6	Tendons with Angle Points or Curves	✓				
N/A		5.9.2	Stress Limitations				✓	
5.9.2	Stresses Due to Imposed Deformation	5.9.2.1	Stresses Due to Imposed Deformation	✓				
5.9.2-1	$F' = F\left(1-e^{-\psi(t,t_i)}\right)$	5.9.2.1-1	$F' = F\left(1-e^{-\psi(t,t_i)}\right)$	✓				
5.9.2-2	$F' = F\left(1-e^{-\psi(t,t_i)}\right)/\psi(t,t_i)$	5.9.2.1-2	$F' = F\left(1-e^{-\psi(t,t_i)}\right)/\psi(t,t_i)$	✓				
5.9.3	Stress Limitations for Prestressing Tendons	5.9.2.2	Stress Limitations for Prestressing Steel		✓			
5.9.4	Stress Limits for Concrete	5.9.2.3	Stress Limits for Concrete	✓				
5.9.4.1	For Temporary Stresses before Losses	5.9.2.3.1	For Temporary Stresses before Losses	✓				
5.9.4.1.1	Compression Stresses	5.9.2.3.1a	Compressive Stresses		✓			
5.9.4.1.2	Tensile Stresses	5.9.2.3.1b	Tensile Stresses			✓		
5.9.4.2	For Stresses at Service Limit State after Losses	5.9.2.3.2	For Stresses at Service Limit State after Losses	✓				
5.9.4.2.1	Compression Stresses	5.9.2.3.2a	Compressive Stresses		✓			
5.9.4.2.2	Tension Stresses	5.9.2.3.2b	Tensile Stresses			✓		
5.8.5	Principal Tensile Stresses in Webs of Segmental Concrete Bridges	5.9.2.3.3	Principal Tensile Stresses in Webs			✓	✓	

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N/A		5.9.2.3.3-1	$\tau = \frac{VQ_g}{I_g b_w}$				✓	
N/A		5.9.2.3.3-2	$\tau = \frac{VQ_g}{I_g b_w} + \frac{Tp_c}{A_{cp}^2}$				✓	
N/A		5.9.2.3.3-3	$\tau = \frac{VQ_g}{I_g B_w} + \frac{T}{2A_o b_w}$				✓	
N/A		5.9.2.3.3-4	$f_{\min} = \frac{1}{2}\left(\left(f_{pcx} + f_{pcy}\right) - \sqrt{\left(f_{pcx} + f_{pcy}\right)^2 + \left(2\tau\right)^2}\right)$				✓	
N/A		C5.9.2.3.3-1	$f_{\max} = \frac{1}{2}\left(\left(f_{pcx} + f_{pcy}\right) + \sqrt{\left(f_{pcx} + f_{pcy}\right)^2 + \left(2\tau\right)^2}\right)$				✓	
5.9.5	Loss of Prestress	5.9.3	Prestress Loss		✓			
5.9.5.1	Total Loss of Prestress	5.9.3.1	Total Prestress Loss		✓			
5.9.5.1-1	$\Delta f_{pT} = \Delta f_{pES} + \Delta f_{pLT}$	5.9.3.1-1	$\Delta f_{pT} = \Delta f_{pES} + \Delta f_{pLT}$	✓				
5.9.5.1-2	$\Delta f_{pT} = \Delta f_{pF} + \Delta f_{pA} + \Delta f_{pES} + \Delta f_{pLT}$	5.9.3.1-2	$\Delta f_{pT} = \Delta f_{pF} + \Delta f_{pA} + \Delta f_{pES} + \Delta f_{pLT}$	✓				
5.9.5.2	Instantaneous Losses	5.9.3.2	Instantaneous Losses	✓				
5.9.5.2.1	Anchorage Set	5.9.3.2.1	Anchorage Set	✓				
5.9.5.2.2	Friction	5.9.3.2.2	Friction	✓				
5.9.5.2.2a	Pretensioned Construction	5.9.3.2.2a	Pretensioned Members		✓			
5.9.5.2.2b	Post-Tensioned Construction	5.9.3.2.2b	Post-Tensioned Members		✓			
5.9.5.2.2b-1	$\Delta f_{pF} = f_{pj}\left(1 - e^{-(Kx + \mu\alpha)}\right)$	5.9.3.2.2b-1	$\Delta f_{pF} = f_{pj}\left(1 - e^{-(Kx + \mu\alpha)}\right)$	✓				
5.9.5.2.2b-2	$\Delta f_{pF} = f_{pj}\left(1 - e^{-\mu(\alpha + 0.04)}\right)$	5.9.3.2.2b-2	$\Delta f_{pF} = f_{pj}\left(1 - e^{-\mu(\alpha + 0.04)}\right)$	✓				
C5.9.5.2.2b-1	$\alpha = \sqrt{\alpha_v^2 + \alpha_h^2}$	C5.9.3.2.2b-1	$\alpha = \sqrt{\alpha_v^2 + \alpha_h^2}$	✓				
C5.9.5.2.2b-2	$\alpha = \Sigma\Delta\alpha = \Sigma\sqrt{\Delta\alpha_v^2 + \Delta\alpha_h^2}$	C5.9.3.2.2b-2	$\alpha = \Sigma\Delta\alpha = \Sigma\sqrt{\Delta\alpha_v^2 + \Delta\alpha_h^2}$	✓				
5.9.5.2.3	Elastic Shortening	5.9.3.2.3	Elastic Shortening	✓				
5.9.5.2.3a	Pretensioned Members	5.9.3.2.3a	Pretensioned Members	✓				
5.9.5.2.3a-1	$\Delta f_{pES} = \frac{E_p}{E_{ct}} f_{cgp}$	5.9.3.2.3a-1	$\Delta f_{pES} = \frac{E_p}{E_{ct}} f_{cgp}$	✓				
C5.9.5.2.3a-1	$\Delta f_{pES} = \frac{A_{ps} f_{pbt}(I_g + e_m^2 A_g) - e_m M_g A_g}{A_{ps}(I_g + e_m^2 A_g) + \frac{A_g I_g E_{ci}}{E_p}}$	C5.9.3.2.3a-1	$\Delta f_{pES} = \frac{A_{ps} f_{pbt}(I_g + e_m^2 A_g) - e_m M_g A_g}{A_{ps}(I_g + e_m^2 A_g) + \frac{A_g I_g E_{ci}}{E_p}}$	✓				
5.9.5.2.3b	Post-Tensioned Members	5.9.3.2.3b	Post-Tensioned Members	✓				
5.9.5.2.3b-1	$\Delta f_{pES} = \frac{N-1}{2N} \frac{E_p}{E_{ci}} f_{cgp}$	5.9.3.2.3b-1	$\Delta f_{pES} = \frac{N-1}{2N} \frac{E_p}{E_{ci}} f_{cgp}$	✓				

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C5.9.5.2.3b-1	$\Delta f_{pES} = \frac{N-1}{2N} \frac{A_{ps} f_{pbt} (I_g + e_m^2 A_g) - e_m M_g A_g}{A_{ps} (I_g + e_m^2 A_g) + \frac{A_g I_g E_{ci}}{E_p}}$	C5.9.3.2.3b-1	$\Delta f_{pES} = \frac{N-1}{2N} \frac{A_{ps} f_{pbt} (I_g + e_m^2 A_g) - e_m M_g A_g}{A_{ps} (I_g + e_m^2 A_g) + \frac{A_g I_g E_{ci}}{E_p}}$	✓				
C5.9.5.2.3b-2	$N = N_1 + N_2 \frac{A_{sp2}}{A_{sp1}}$	C5.9.3.2.3b-2	$N = N_1 + N_2 \frac{A_{sp2}}{A_{sp1}}$	✓				
5.9.5.2.3c	Combined Pretensioning and Post-Tensioning	5.9.3.2.3c	Combined Pretensioning and Post-Tensioning	✓				
5.9.5.3	Approximate Estimate of Time Dependent Losses	5.9.3.3	Approximate Estimate of Time Dependent Losses	✓				
5.9.5.3-1	$\Delta f_{pLT} = 10.0 \frac{f_{pi} A_{ps}}{A_g} \gamma_h \gamma_{st} + 12.0 \gamma_h \gamma_{st} + \Delta f_{pR}$	5.9.3.3-1	$\Delta f_{pLT} = 10.0 \frac{f_{pi} A_{ps}}{A_g} \gamma_h \gamma_{st} + 12.0 \gamma_h \gamma_{st} + \Delta f_{pR}$	✓				
5.9.5.3-2	$\gamma_h = 1.7 - 0.01H$	5.9.3.3-2	$\gamma_h = 1.7 - 0.01H$	✓				
5.9.5.3-3	$\gamma_{st} = \frac{5}{(1 + f'_{ci})}$	5.9.3.3-3	$\gamma_{st} = \frac{5}{(1 + f'_{ci})}$	✓				
5.9.5.4	Refined Estimates of Time-Dependent Losses	5.9.3.4	Refined Estimates of Time-Dependent Losses	✓				
5.9.5.4.1	General	5.9.3.4.1	General			✓		
5.9.5.4.1-1	$\Delta f_{pLT} = (\Delta f_{pSR} + \Delta f_{pCR} + \Delta f_{pR1})_{id} + (\Delta f_{pSD} + \Delta f_{pCD} + \Delta f_{pR2} - \Delta f_{pSS})_{df}$	5.9.3.4.1-1	$\Delta f_{pLT} = (\Delta f_{pSR} + \Delta f_{pCR} + \Delta f_{pR1})_{id} + (\Delta f_{pSD} + \Delta f_{pCD} + \Delta f_{pR2} - \Delta f_{pSS})_{df}$	✓				
5.9.5.4.2	Losses: Time of Transfer to Time of Deck Placement	5.9.3.4.2	Losses: Time of Transfer to Time of Deck Placement	✓				
5.9.5.4.2a	Shrinkage of Girder Concrete	5.9.3.4.2a	Shrinkage of Girder Concrete	✓				
5.9.5.4.2a-1	$\Delta f_{pSR} = \varepsilon_{bid} E_p K_{id}$	5.9.3.4.2a-1	$\Delta f_{pSR} = \varepsilon_{bid} E_p K_{id}$	✓				
5.9.5.4.2a-2	$K_{id} = \frac{1}{1 + \frac{E_p}{E_{ci}} \frac{A_{ps}}{A_g} \left(1 + \frac{A_g e_{pg}^2}{I_g}\right) \left[1 + 0.7\psi_b \left(t_f, t_i\right)\right]}$	5.9.3.4.2a-2	$K_{id} = \frac{1}{1 + \frac{E_p}{E_{ci}} \frac{A_{ps}}{A_g} \left(1 + \frac{A_g e_{pg}^2}{I_g}\right) \left[1 + 0.7\psi_b \left(t_f, t_i\right)\right]}$	✓				
5.9.5.4.2b	Creep of Girder Concrete	5.9.3.4.2b	Creep of Girder Concrete	✓				
5.9.5.4.2b-1	$\Delta f_{pCR} = \frac{E_p}{E_{ci}} f_{cgp} \psi_b \left(t_d, t_i\right) K_{id}$	5.9.3.4.2b-1	$\Delta f_{pCR} = \frac{E_p}{E_{ci}} f_{cgp} \psi_b \left(t_d, t_i\right) K_{id}$	✓				
5.9.5.4.2c	Relaxation of Prestressing Strands	5.9.3.4.2c	Relaxation of Prestressing Strands			✓		
5.9.5.4.2c-1	$\Delta f_{pR1} = \frac{f_{pt}}{K_L} \left(\frac{f_{pt}}{f_{py}} - 0.55\right)$	5.9.3.4.2c-1	$\Delta f_{pR1} = \frac{f_{pt}}{K_L} \left(\frac{f_{pt}}{f_{py}} - 0.55\right)$	✓				
C5.9.5.4.2c-1	$\Delta f_{pR1} = \left[\frac{f_{pt}}{K'_L} \frac{\log\ (24t)}{\log(24t_i)} \left(\frac{f_{pt}}{f_{py}} - 0.55\right)\right] \left[1 - \frac{3(\Delta f_{pSR} + \Delta f_{pCR})}{f_{pt}}\right] K_{id}$	C5.9.3.4.2c-1	$\Delta f_{pR1} = \left[\frac{f_{pt}}{K'_L} \frac{\log(t)}{\log(t_i)} \left(\frac{f_{pt}}{f_{py}} - 0.55\right)\right] \left[1 - \frac{3(\Delta f_{pSR} + \Delta f_{pCR})}{f_{pt}}\right] K_{id}$			✓		
5.9.5.4.3	Losses: Time of Deck Placement to Final Time	5.9.3.4.3	Losses: Time of Deck Placement to Final Time	✓				
5.9.5.4.3a	Shrinkage of Girder Concrete	5.9.3.4.3a	Shrinkage of Girder Concrete	✓				
5.9.5.4.3a-1	$\Delta f_{pSD} = \varepsilon_{bdf} E_p K_{df}$	5.9.3.4.3a-1	$\Delta f_{pSD} = \varepsilon_{bdf} E_p K_{df}$	✓				
5.9.5.4.3a-2	$K_{df} = \frac{1}{1 + \frac{E_p}{E_{ci}} \frac{A_{ps}}{A_c} \left(1 + \frac{A_c e_{pc}^2}{I_c}\right) \left[1 + 0.7\psi_b \left(t_f, t_i\right)\right]}$	5.9.3.4.3a-2	$K_{df} = \frac{1}{1 + \frac{E_p}{E_{ci}} \frac{A_{ps}}{A_c} \left(1 + \frac{A_c e_{pc}^2}{I_c}\right) \left[1 + 0.7\psi_b \left(t_f, t_i\right)\right]}$	✓				
5.9.5.4.3b	Creep of Girder Concrete	5.9.3.4.3b	Creep of Girder Concrete	✓				

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5.9.5.4.3b-1	$\Delta f_{pCD} = \frac{E_p}{E_{ci}} f_{cgp}\left[\psi_b(t_f,t_i)-\psi_b(t_d,t_i)\right]K_{df} + \frac{E_p}{E_c}\Delta f_{cd}\psi_b(t_f,t_d)K_{df}$	5.9.3.4.3b-1	$\Delta f_{pCD} = \frac{E_p}{E_{ci}} f_{cgp}\left[\psi_b(t_f,t_i)-\psi_b(t_d,t_i)\right]K_{df} + \frac{E_p}{E_c}\Delta f_{cd}\psi_b(t_f,t_d)K_{df}$	✓				
5.9.5.4.3c	Relaxation of Prestressing Strands	5.9.3.4.3c	Relaxation of Prestressing Strands	✓				
5.9.5.4.3c-1	$\Delta f_{pR2} = \Delta f_{pR1}$	5.9.3.4.3c-1	$\Delta f_{pR2} = \Delta f_{pR1}$	✓				
5.9.5.4.3d	Shrinkage of Deck Concrete	5.9.3.4.3d	Shrinkage of Deck Concrete	✓				
5.9.5.4.3d-1	$\Delta f_{pSS} = \frac{E_p}{E_c}\Delta f_{cdf}K_{df}\left[1+0.7\psi_b(t_f,t_d)\right]$	5.9.3.4.3d-1	$\Delta f_{pSS} = \frac{E_p}{E_c}\Delta f_{cdf}K_{df}\left[1+0.7\psi_b(t_f,t_d)\right]$	✓				
5.9.5.4.3d-2	$\Delta f_{cdf} = \frac{\varepsilon_{ddf}A_d E_{c\,deck}}{\left[1+0.7\psi_d(t_f,t_d)\right]}\left(\frac{1}{A_c}-\frac{e_{pc}e_d}{I_c}\right)$	5.9.3.4.3d-2	$\Delta f_{cdf} = \frac{\varepsilon_{ddf}A_d E_{c\,deck}}{\left[1+0.7\psi_d(t_f,t_d)\right]}\left(\frac{1}{A_c}-\frac{e_{pc}e_d}{I_c}\right)$	✓				
5.9.5.4.4	Precast Pretensioned Girders without Composite Topping	5.9.3.4.4	Precast Pretensioned Girders without Composite Topping	✓				
5.9.5.4.5	Post-Tensioned Nonsegmental Girders	5.9.3.4.5	Post-Tensioned Nonsegmental Girders	✓				
N/A		5.9.3.5	Losses in Multi-Stage Prestressing				✓	
5.9.5.5	Losses for Deflection Calculations	5.9.3.6	Losses for Deflection Calculations	✓				
N/A		5.9.4	Details for Pretensioning				✓	
5.10.3.3	Minimum Spacing of Prestressing Tendons and Ducts	5.9.4.1	Minimum Spacing of Pretensioning Strand		✓			
5.10.3.3.1	Prestensioning Strand	5.9.4.1	Minimum Spacing of Pretensioning Strand		✓			
5.10.3.4	Maximum Spacing of Prestressing Tendons and Ducts in Slabs	5.9.4.2	Maximum Spacing of Pretensioning Strand in Slabs		✓			
5.11.4	Development of Prestressing Strand	5.9.4.3	Development of Pretensioning Strand		✓			
5.11.4.1	General	5.9.4.3.1	General	✓				
5.11.4.2	Bonded Strand	5.9.4.3.2	Bonded Strand	✓				
5.11.4.2-1	$\ell_d \geq \kappa\left(f_{ps}-\frac{2}{3}f_{pe}\right)d_b$	5.9.4.3.2-1	$\ell_d \geq \kappa\left(f_{ps}-\frac{2}{3}f_{pe}\right)d_b$	✓				
5.11.4.2-2	$f_{px} = \frac{f_{pe}\ell_{px}}{60d_b}$	5.9.4.3.2-2	$f_{px} = \frac{f_{pe}\ell_{px}}{60d_b}$	✓				
5.11.4.2-3	$f_{px} = f_{pe} + \frac{\ell_{px}-60d_b}{(\ell_d-60d_b)}\left(f_{ps}-f_{pe}\right)$	5.9.4.3.2-3	$f_{px} = f_{pe} + \frac{\ell_{px}-60d_b}{(\ell_d-60d_b)}\left(f_{ps}-f_{pe}\right)$	✓				
5.11.4.3	Partially Debonded Strands	5.9.4.3.3	Debonded Strands		✓			
5.10.10	Pretensioned Anchorage Zones	5.9.4.4	Pretensioned Anchorage Zones	✓				
5.10.10.1	Splitting Resistance	5.9.4.4.1	Splitting Resistance		✓			
5.10.10.1-1	$P_r = f_s A_s$	5.9.4.4.1-1	$P_r = f_s A_s$	✓				
5.10.10.2	Confinement Reinforcement	5.9.4.4.2	Confinement Reinforcement	✓				
N/A		5.9.5	Details for Post-Tensioning				✓	
N/A		5.9.5.1	Minimum Spacing of Post-Tensioning Tendons and Ducts				✓	
5.10.3.3.2	Post-Tensioning Ducts—Girders Straight in Plan	5.9.5.1.1	Post-Tensioning Ducts—Girders Straight in Plan			✓		
5.10.3.3.3	Post-Tensioning Ducts—Girders Curved in Plan	5.9.5.1.2	Post-Tensioning Ducts—Girders Curved in Plan	✓				
5.10.3.4	Maximum Spacing of Prestressing Tendons and Ducts in Slabs	5.9.5.2	Maximum Spacing of Post-Tensioning Tendons and Ducts in Slabs		✓			
5.10.3.5	Couplers in Post-Tensioning Tendons	5.9.5.3	Couplers in Post-Tensioning Tendons		✓			
5.10.4	Tendon Confinement	5.9.5.4	Tendon Confinement	✓				
5.10.4.1	General	5.9.5.4.1	General			✓		
5.10.4.2	Wobble Effect in Slabs	5.9.5.4.2	Wobble Effect in Slabs		✓			

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5.10.4.3	Effects of Curved Tendons	5.9.5.4.3	Effects of Curved Tendons		✓			
5.10.4.3.1	Design for In-Plane Force Effects	5.9.5.4.4	Design for In-Plane Force Effects	✓				
5.10.4.3.1a	In-Plane Force Effects	5.9.5.4.4a	In-Plane Force Effects		✓			
5.10.4.3.1a-1	$F_{u-in} = \frac{P_u}{R}$	5.9.5.4.4a-1	$F_{u-in} = \frac{P_u}{R}$	✓				
5.10.4.3.1b	Shear Resistance to Pull-out	5.9.5.4.4b	Shear Resistance to Pull-out			✓		
5.10.4.3.1b-1	$V_r = \phi V_n$	5.9.5.4.4b-1	$V_r = \phi V_n$	✓				
5.10.4.3.1b-2	$V_n = 0.15 d_{eff} \lambda \sqrt{f'_{ci}}$	5.9.5.4.4b-2	$V_n = 0.15 d_{eff} \lambda \sqrt{f'_{ci}}$	✓				
5.10.4.3.1b-3	$d_{eff} = d_c + \frac{d_{duct}}{4}$	5.9.5.4.4b-3	$d_{eff} = d_c + \frac{d_{duct}}{4}$	✓				
5.10.4.3.1b-4	$d_{eff} = t_w - \frac{d_{duct}}{2}$	5.9.5.4.4b-4	$d_{eff} = t_w - \frac{d_{duct}}{2}$	✓				
5.10.4.3.1b-5	$d_{eff} = d_c + \frac{d_{duct}}{4} + \frac{\sum s_{duct}}{2}$	5.9.5.4.4b-5	$d_{eff} = d_c + \frac{d_{duct}}{4} + \frac{\sum s_{duct}}{2}$	✓				
5.10.4.3.1c	Cracking of Cover Concrete	5.9.5.4.4c	Cracking of Cover Concrete			✓		
5.10.4.3.1c-1	$M_{end} = \frac{\left(\Sigma F_{u-in}/h_{ds}\right) h_{ds}^2}{12}$	5.9.5.4.4c-1	$M_{end} = \frac{\left(\Sigma F_{u-in}/h_{ds}\right) h_{ds}^2}{12}$	✓				
5.10.4.3.1c-2	$M_{mid} = \frac{\left(\Sigma F_{u-in}/h_{ds}\right) h_{ds}^2}{24}$	5.9.5.4.4c-2	$M_{mid} = \frac{\left(\Sigma F_{u-in}/h_{ds}\right) h_{ds}^2}{24}$	✓				
5.10.4.3.1c-3	$f_{cr} = \phi f_r$	5.9.5.4.4c-3	$f_{cr} = \phi f_r$	✓				
5.10.4.3.1d	Regional Bending	5.9.5.4.4d	Regional Bending	✓				
5.10.4.3.1d-1	$M_u = \frac{\phi_{cont} \Sigma F_{u-in} h_c}{4}$	5.9.5.4.4d-1	$M_u = \frac{\phi_{cont} \Sigma F_{u-in} h_c}{4}$	✓				
5.10.4.3.2	Out-of-Plane Force Effects	5.9.5.4.5	Out-of-Plane Force Effects		✓			
5.10.4.3.2-1	$F_{u-out} = \frac{P_u}{\pi R}$	5.9.5.4.5-1	$F_{u-out} = \frac{P_u}{\pi R}$	✓				
5.10.5	External Tendon Supports	5.9.5.5	External Tendon Supports	✓				
5.10.9	Post-Tensioned Anchorage Zones	5.9.5.6	Post-Tensioned Anchorage Zones	✓				
5.10.9.1	General	5.9.5.6.1	General	✓				
5.10.9.2	General Zone and Local Zone	5.9.5.6.1	General	✓				
5.10.9.2.1	General	5.9.5.6.1	General	✓				
5.10.9.2.2	General Zone	5.9.5.6.2	General Zone	✓				
5.10.9.2.3	Local Zone	5.9.5.6.3	Local Zone	✓				
5.10.9.2.4	Responsibilities	5.9.5.6.4	Responsibilities			✓		
5.10.9.3	Design of the General Zone	5.9.5.6.5	Design of the General Zone	✓				
5.10.9.3.1	Design Methods	5.9.5.6.5a	Design Methods	✓				
5.10.9.3.2	Design Principles	5.9.5.6.5b	Design Principles		✓			
5.10.9.3.3	Special Anchorage Devices	5.9.5.6.6	Special Anchorage Devices	✓				
5.10.9.3.4	Intermediate Anchorages	5.9.5.6.7	Intermediate Anchorages	✓				
5.10.9.3.4a	General	5.9.5.6.7a	General			✓		
5.10.9.3.4b	Crack Control Behind Intermediate Anchors	5.9.5.6.7b	Crack Control Behind Intermediate Anchors		✓			
5.10.9.3.4b-1	$T_{ia} = 0.25 P_s - f_{cb} A_{cb}$	5.9.5.6.7b-1	$T_{ia} = 0.25 P_s - f_{cb} A_{cb}$	✓				

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5.10.9.3.4c	Blister and Rib Reinforcement	5.9.5.6.7c	Blister and Rib Reinforcement	✓				
5.10.9.3.5	Diaphragms	5.9.5.6.8	Diaphragms	✓				
5.10.9.3.7	Deviation Saddles	5.9.5.6.9	Deviation Saddles	✓				
5.10	**Details of Reinforcement**	**5.10**	**Reinforcement**		✓			
5.10.1	Concrete Cover	5.10.1	Concrete Cover			✓		
5.12.3	Concrete Cover	5.10.1	Concrete Cover			✓		
5.10.2	Hooks and Bends	5.10.2	Hooks and Bends	✓				
5.10.2.1	Standard Hooks	5.10.2.1	Standard Hooks	✓				
5.10.2.2	Seismic Hooks	5.10.2.2	Seismic Hooks		✓			
5.10.2.3	Minimum Bend Diameters	5.10.2.3	Minimum Bend Diameters	✓				
5.10.3	Spacing of Reinforcement	5.10.3	Spacing of Reinforcement	✓				
5.10.3.1	Minimum Spacing of Reinforcing Bars	5.10.3.1	Minimum Spacing of Reinforcing Bars	✓				
5.10.3.1.1	Cast-in-Place Concrete	5.10.3.1.1	Cast-in-Place Concrete		✓			
5.10.3.1.2	Precast Concrete	5.10.3.1.2	Precast Concrete		✓			
5.10.3.1.3	Multilayers	5.10.3.1.3	Multilayers	✓				
5.10.3.1.4	Splices	5.10.3.1.4	Splices	✓				
5.10.3.1.5	Bundled Bars	5.10.3.1.5	Bundled Bars	✓				
5.10.3.2	Maximum Spacing of Reinforcing Bars	5.10.3.2	Maximum Spacing of Reinforcing Bars		✓			
5.10.6	Transverse Reinforcement for Compression Members	5.10.4	Transverse Reinforcement for Compression Members	✓				
5.10.6.1	General	5.10.4.1	General	✓				
5.10.6.2	Spirals	5.10.4.2	Spirals		✓			
5.10.6.3	Ties	5.10.4.3	Ties			✓		
5.10.7	Transverse Reinforcement for Flexural Members	5.10.5	Transverse Reinforcement for Flexural Members	✓				
5.10.8	Shrinkage and Temperature Reinforcement	5.10.6	Shrinkage and Temperature Reinforcement		✓			
5.10.8-1	$A_s \geq \frac{1.30bh}{2(b+h)f_y}$	5.10.6-1	$A_s \geq \frac{1.30bh}{2(b+h)f_y}$	✓				
5.10.8-2	$0.11 \leq A_s \leq 0.60$	5.10.6-2	$0.11 \leq A_s \leq 0.60$	✓				
C5.10.8-1	$A_s \geq \frac{1.3A_g}{Perimeter(f_y)}$	C5.10.6-1	$A_s \geq \frac{1.3A_g}{Perimeter(f_y)}$	✓				
5.10.12	Reinforcement for Hollow Rectangular Compression Members	5.10.7	Reinforcement for Hollow Rectangular Compression Members	✓				
5.10.12.1	General	5.10.7.1	General	✓				
5.10.12.2	Spacing of Reinforcement	5.10.7.2	Spacing of Reinforcement	✓				
5.10.12.3	Ties	5.10.7.3	Ties			✓		
5.10.12.4	Splices	5.10.7.4	Splices	✓				
5.10.12.5	Hoops	5.10.7.5	Hoops	✓				
5.11	**Development and Splices of Reinforcement**	5.10.8	Development and Splices of Reinforcement	✓				
5.11.1	General	5.10.8.1	General		✓			
5.11.1.1	Basic Requirements	5.10.8.1.1	Basic Requirements		✓			
5.11.1.2	Flexural Reinforcement	5.10.8.1.2	Flexural Reinforcement	✓				
5.11.1.2.1	General	5.10.8.1.2a	General		✓			
5.11.1.2.2	Positive Moment Reinforcement	5.10.8.1.2b	Positive Moment Reinforcement	✓				
C5.11.1.2.2-1	$\ell_d \leq \frac{M_n}{V_u} + \ell_a$	C5.10.8.1.2b-1	$\ell_d \leq \frac{M_n}{V_u} + \ell_a$	✓				
5.11.1.2.3	Negative Moment Reinforcement	5.10.8.1.2c	Negative Moment Reinforcement		✓			
5.11.1.2.4	Moment Resisting Joints	5.10.8.1.2d	Moment Resisting Joints	✓				

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5.11.2	Development of Reinforcement	5.10.8.2	Development of Reinforcement		✓			
5.11.2.1	Deformed Bars and Deformed Wire in Tension	5.10.8.2.1	Deformed Bars and Deformed Wire in Tension			✓		
5.11.2.1.1	Tension Development Length	5.10.8.2.1a	Tension Development Length		✓			
5.11.2.1.1-1	$\ell_d = \ell_{db} \times \left(\frac{\lambda_{rl} \times \lambda_{cf} \times \lambda_{rc} \times \lambda_{er}}{\lambda} \right)$	5.10.8.2.1a-1	$\ell_d = \ell_{db} \times \left(\frac{\lambda_{rl} \times \lambda_{cf} \times \lambda_{rc} \times \lambda_{er}}{\lambda} \right)$	✓				
5.11.2.1.1-2	$\ell_{db} = 2.4 d_b \frac{f_y}{\sqrt{f'_c}}$	5.10.8.2.1a-2	$\ell_{db} = 2.4 d_b \frac{f_y}{\sqrt{f'_c}}$	✓				
5.11.2.1.2	Modification Factors which Increase ℓd	5.10.8.2.1b	Modification Factors which Increase ℓd		✓			
5.11.2.1.3	Modification Factors which Decrease ℓd	5.10.8.2.1c	Modification Factors which Decrease ℓd		✓			
5.11.2.1.3-1	$0.4 \le \lambda_{rc} = \frac{d_b}{c_b + k_{tr}} \le 1.0$	5.10.8.2.1c-1	$0.4 \le \lambda_{rc} \le 1.0$		✓			
5.11.2.1.3-1	$0.4 \le \lambda_{rc} = \frac{d_b}{c_b + k_{tr}} \le 1.0$	5.10.8.2.1c-2	$\lambda_{rc} = \frac{d_b}{c_b + k_{tr}}$		✓			
5.11.2.1.3-2	$k_{tr} = 40 A_{tr} / (sn)$	5.10.8.2.1c-3	$k_{tr} = 40 A_{tr} / (sn)$	✓				
5.11.2.1.3-3	$\lambda_{er} = \frac{(A_s\ required)}{(A_s\ provided)}$	5.10.8.2.1c-4	$\lambda_{er} = \frac{(A_s\ required)}{(A_s\ provided)}$	✓				
5.11.2.2	Deformed Bars in Compression	5.10.8.2.2	Deformed Bars in Compression	✓				
5.11.2.2.1	Compressive Development Length	5.10.8.2.2a	Compressive Development Length		✓			
N/A		5.10.8.2.2a-1	$\ell_d = \ell_{db} \lambda_{er} \lambda_{rc}$				✓	
5.11.2.2.1-1	$\ell_{db} \ge \frac{0.63\, d_b f_y}{\sqrt{f'_c}}$	5.10.8.2.2a-2	$\ell_{db} \ge \frac{0.63\, d_b f_y}{\sqrt{f'_c}}$	✓				
5.11.2.2.1-2	$\ell_{db} \ge 0.3\, d_b f_y$	5.10.8.2.2a-3	$\ell_{db} \ge 0.3\, d_b f_y$	✓				
5.11.2.2.2	Modification Factors	5.10.8.2.2b	Modification Factors		✓			
5.11.2.3	Bundled Bars	5.10.8.2.3	Bundled Bars	✓				
5.11.2.4	Standard Hooks in Tension	5.10.8.2.4	Standard Hooks in Tension		✓			
5.11.2.4.1	Basic Hook Development Length	5.10.8.2.4a	Basic Hook Development Length			✓		
N/A		5.10.8.2.4a-1	$\ell_{dh} = \ell_{hb} \times \left(\frac{\lambda_{rc} \lambda_{cw} \lambda_{er}}{\lambda} \right)$				✓	
5.11.2.4.1-1	$\ell_{hb} = \frac{38.0 d_b}{60.0} \left(\frac{f_y}{\lambda \sqrt{f'_c}} \right)$	5.10.8.2.4a-2	$l_{hb} = \frac{38.0 d_b}{60.0} \left(\frac{f_y}{\sqrt{f'_c}} \right)$			✓		
5.11.2.4.2	Modification Factors	5.10.8.2.4b	Modification Factors			✓		
5.11.2.4.3	Hooked-Bar Tie Requirements	5.10.8.2.4c	Hooked-Bar Tie Requirements	✓				
5.11.2.5	Welded Wire Fabric	5.10.8.2.5	Welded Wire Fabric	✓				
5.11.2.5.1	Deformed Wire Fabric	5.10.8.2.5a	Deformed Wire Fabric		✓			
5.11.2.5.1-1	$\ell_{hd} \ge 0.95 d_b \frac{f_y - 20.0}{\lambda \sqrt{f'_c}}$	5.10.8.2.5a-1	$\ell_{hd} \ge 0.95 d_b \frac{f_y - 20.0}{\lambda \sqrt{f'_c}}$	✓				

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5.11.2.5.1-2	$\ell_{hd} \geq 6.30 \dfrac{A_w f_y}{s_w \lambda \sqrt{f'_c}}$	5.10.8.2.5a-2	$\ell_{hd} \geq 6.30 \dfrac{A_w f_y}{s_w \lambda \sqrt{f'_c}}$	✓				
5.11.2.5.2	Plain Wire Fabric	5.10.8.2.5b	Plain Wire Fabric		✓			
5.11.2.5.2-1	$\ell_d = 8.50 \dfrac{A_w f_y}{s_w \lambda \sqrt{f'_c}}$	5.10.8.2.5b-1	$\ell_d = 8.50 \dfrac{A_w f_y}{s_w \lambda \sqrt{f'_c}}$	✓				
5.11.2.6	Shear Reinforcement	5.10.8.2.6	Shear Reinforcement	✓				
5.11.2.6.1	General	5.10.8.2.6a	General	✓				
5.11.2.6.2	Anchorage of Deformed Reinforcement	5.10.8.2.6b	Anchorage of Deformed Reinforcement			✓		
5.11.2.6.2-1	$\ell_e \geq \dfrac{0.44\, d_b\, f_y}{\lambda \sqrt{f'_c}}$	5.10.8.2.6b-1	$\ell_e \geq \dfrac{0.44\, d_b\, f_y}{\lambda \sqrt{f'_c}}$	✓				
5.11.2.6.3	Anchorage of Wire Fabric Reinforcement	5.10.8.2.6c	Anchorage of Wire Fabric Reinforcement	✓				
5.11.2.6.4	Closed Stirrups	5.10.8.2.6d	Closed Stirrups			✓		
5.11.3	Development by Mechanical Anchorages	5.10.8.3	Development by Mechanical Anchorages	✓				
5.11.5	Splices of Bar Reinforcement	5.10.8.4	Splices of Bar Reinforcement		✓			
5.11.5.1	Detailing	5.10.8.4.1	Detailing	✓				
5.11.5.2	General Requirements	5.10.8.4.2	General Requirements	✓				
5.11.5.2.1	Lap Splices	5.10.8.4.2a	Lap Splices		✓			
5.11.5.2.1-1	$S_{max} = \dfrac{2\pi A_{sp} f_{ytr} \ell_s}{k A_\ell f_{u\ell}}$	5.10.8.4.2a-1	$S_{\max} = \dfrac{2\pi A_{sh} f_{ytr} \ell_s}{k A_\ell f_{u\ell}}$		✓			
5.11.5.2.2	Mechanical Connections	5.10.8.4.2b	Mechanical Connections	✓				
5.11.5.2.3	Welded Splices	5.10.8.4.2c	Welded Splices	✓				
5.11.5.3	Splices of Reinforcement in Tension	5.10.8.4.3	Splices of Reinforcement in Tension		✓			
5.11.5.3.1	Lap Splices in Tension	5.10.8.4.3a	Lap Splices in Tension		✓			
5.11.5.3.2	Mechanical Connections or Welded Splices in Tension	5.10.8.4.3b	Mechanical Connections or Welded Splices in Tension	✓				
5.11.5.4	Splices in Tension Tie Members	5.10.8.4.4	Splices in Tie Members		✓			
5.11.5.5	Splices of Bars in Compression	5.10.8.4.5	Splices of Bars in Compression	✓				
5.11.5.5.1	Lap Splices in Compression	5.10.8.4.5a	Lap Splices in Compression		✓			
5.11.5.5.1-1	$\ell_c = 0.5 m f_y d_b$	5.10.8.4.5a-1	$\ell_c = 0.5 m f_y d_b$	✓				
5.11.5.5.1-2	$\ell_c = m\left(0.9 f_y - 24.0\right) d_b$	5.10.8.4.5a-2	$\ell_c = m\left(0.9 f_y - 24.0\right) d_b$	✓				
5.11.5.5.2	Mechanical Connections or Welded Splices in Compression	5.10.8.4.5b	Mechanical Connections or Welded Splices in Compression	✓				
5.11.5.5.3	End-Bearing Splices	5.10.8.4.5c	End-Bearing Splices	✓				
5.11.6	Splices of Welded Wire Fabric	5.10.8.5	Splices of Welded Wire Fabric	✓				
5.11.6.1	Splices of Welded Deformed Wire Fabric in Tension	5.10.8.5.1	Splices of Welded Deformed Wire Fabric in Tension		✓			
5.11.6.2	Splices of Welded Smooth Wire Fabric in Tension	5.10.8.5.2	Splices of Welded Smooth Wire Fabric in Tension		✓			
5.10.11	Provisions for Seismic Design	**5.11**	**Seismic Design and Details**		✓			
5.13.4.6	Seismic Requirements	5.11	Seismic Design and Details					
5.10.11.1	General	5.11.1	General			✓		
5.10.11.2	Seismic Zone 1	5.11.2	Seismic Zone 1	✓				
5.10.11.3	Seismic Zone 2	5.11.3	Seismic Zone 2	✓				
5.10.11.3	General	5.11.3.1	General	✓				
5.13.4.6.2	Zone 2	5.11.3.2	Concrete Piles					
5.13.4.6.2a	General	5.11.3.2.1	General	✓				

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5.13.4.6.2b	Cast in Place Piles	5.11.3.2.2	Cast in Place Piles		✓			
5.13.4.6.2c	Precast Reinforced Piles	5.11.3.2.3	Precast Reinforced Piles	✓				
5.13.4.6.2d	Precast Prestressed Piles	5.11.3.2.4	Precast Prestressed Piles	✓				
5.10.11.4	Seismic Zones 3 and 4	5.11.4	Seismic Zones 3 and 4	✓				
5.10.11.4.1	Column Requirements	5.11.4.1	Column Requirements	✓				
5.10.11.4.1a	Longitudinal Reinforcement	5.11.4.1.1	Longitudinal Reinforcement	✓				
5.10.11.4.1b	Flexural Resistance	5.11.4.1.2	Flexural Resistance		✓			
5.10.11.4.1c	Column Shear and Transverse Reinforcement	5.11.4.1.3	Column Shear and Transverse Reinforcement		✓			
5.10.2.2	Seismic Hooks	5.11.4.1.4	Transverse Reinforcement for Confinement of Plastic Hinges			✓		
5.10.11.4.1d	Transverse Reinforcement for Confinement at Plastic Hinges	5.11.4.1.4	Transverse Reinforcement for Confinement at Plastic Hinges			✓		
5.10.11.4.1d-1	$\rho_s \geq 0.12 \frac{f'_c}{f_y}$	5.11.4.1.4-1	$\rho_s = \frac{4A_{sp}}{(d_c s)} \geq 0.12 \frac{f'_c}{f_y}$			✓		
5.10.11.4.1d-2	$A_{sh} \geq 0.30\, sh_c \frac{f'_c}{f_y}\left[\frac{A_g}{A_c} - 1\right]$	5.11.4.1.4-2	$A_{sh} \geq 0.30\, sh_c \frac{f'_c}{f_y}\left[\frac{A_g}{A_c} - 1\right]$	✓				
5.10.11.4.1d-3	$A_{sh} \geq 0.12 sh_c \frac{f'_c}{f_y}$	5.11.4.1.4-3	$A_{sh} \geq 0.12 sh_c \frac{f'_c}{f_y}$	✓				
5.10.11.4.1e	Spacing of Transverse Reinforcement for Confinement	5.11.4.1.5	Spacing of Transverse Reinforcement for Confinement			✓		
5.10.11.4.1f	Splices	5.11.4.1.6	Splices		✓			
5.10.11.4.2	Requirements for Wall-Type Piers	5.11.4.2	Requirements for Wall-Type Piers		✓			
5.10.11.4.2-1	$V_r = 0.253\lambda\sqrt{f'_c}bd,$	5.11.4.2-1	$V_r = 0.253\lambda\sqrt{f'_c}bd,$	✓				
5.10.11.4.2-2	$V_r = \phi V_n$	5.11.4.2-2	$V_r = \phi V_n$	✓				
5.10.11.4.2-3	$V_n = \left[0.063\lambda\sqrt{f'_c} + \rho_h f_y\right]bd$	5.11.4.2-3	$V_n = \left[0.063\lambda\sqrt{f'_c} + \rho_h f_y\right]bd$	✓				
5.10.11.4.3	Column Connections	5.11.4.3	Column Connections		✓			
5.10.11.4.3-1	$V_n \leq 0.380\, bd\lambda\sqrt{f'_c}$	5.11.4.3-1	$V_n \leq 0.380\, bd\lambda\sqrt{f'_c}$	✓				
5.10.11.4.3-1	$V_n \leq 0.380\, bd\lambda\sqrt{f'_c}$	5.11.4.3-1	$V_n \leq 0.380\, bd\lambda\sqrt{f'_c}$	✓				
5.10.11.4.4	Construction Joints in Piers and Columns	5.11.4.4	Construction Joints in Piers and Columns	✓				
5.10.11.4.4-1	$V_n = \left(A_{vf} f_y + 0.75P_u\right)$	5.11.4.4-1	$V_n = \left(A_{vf} f_y + 0.75P_u\right)$	✓				
5.13.4.6.3	Zones 3 and 4	5.11.4.5	Concrete Piles					
5.13.4.6.3a	General	5.11.4.5.1	General	✓				
5.13.4.6.3b	Confinement Length	5.11.4.5.2	Confinement Length	✓				
5.13.4.6.3c	Volumetric Ratio for Confinement	5.11.4.5.3	Volumetric Ratio for Confinement	✓				
5.13.4.6.3d	Cast in Place Piles	5.11.4.5.4	Cast in Place Piles	✓				
5.13.4.6.3e	Precast Piles	5.11.4.5.5	Precast Piles		✓			
5.13	**Specific Members**	**5.12**	**Provisions for Structure, Components and Types**		✓			
5.14	**Provisions for Structure Types**	**5.12**	**Provisions for Structure Components and Types**		✓			
5.13.1	Deck Slabs	5.12.1	Deck Slabs	✓				
5.14.4	Slab Superstructures	5.12.2	Slab Superstructures	✓				
5.14.4.1	Cast-in-Place Solid Slab Superstructures	5.12.2.1	Cast-in-Place Solid Slab Superstructures	✓				

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5.14.4.1-1	$\frac{100}{\sqrt{L}} \le 50\%$	5.12.2.1-1	$\frac{100}{\sqrt{L}} \le 50\%$	✓				
5.14.4.1-2	$\frac{100}{\sqrt{L}}\frac{f_{pe}}{60} \le 50\%$	5.12.2.1-2	$\frac{100}{\sqrt{L}}\frac{f_{pe}}{60} \le 50\%$	✓				
5.14.4.2	Cast-in-Place Voided Slab Superstructures	5.12.2.2	Cast-in-Place Voided Slab Superstructures	✓				
5.14.4.2.1	Cross-Section Dimensions	5.12.2.2.1	Cross-Section Dimensions	✓				
5.14.4.2.2	Minimum Number of Bearings	5.12.2.2.2	Minimum Number of Bearings	✓				
5.14.4.2.3	Solid End Sections	5.12.2.2.3	Solid End Sections	✓				
5.14.4.2.4	General Design Requirements	5.12.2.2.4	General Design Requirements	✓				
5.14.4.2.5	Compressive Zones in Negative Moment Area	5.12.2.2.5	Compressive Zones in Negative Moment Area	✓				
5.14.4.2.6	Drainage of Voids	5.12.2.2.6	Drainage of Voids	✓				
5.14.4.3	Precast Deck Bridges	5.12.2.3	Precast Deck Bridges	✓				
5.14.4.3.1	General	5.12.2.3.1	General	✓				
5.14.4.3.2	Shear Transfer Joints	5.12.2.3.2	Shear Transfer Joints	✓				
5.14.4.3.3	Shear-Flexure Transfer Joints	5.12.2.3.3	Shear-Flexure Transfer Joints	✓				
5.14.4.3.3a	General	5.12.2.3.3a	General	✓				
5.14.4.3.3b	Design	5.12.2.3.3b	Design	✓				
5.14.4.3.3c	Post-Tensioning	5.12.2.3.3c	Post-Tensioning	✓				
5.14.4.3.3d	Longitudinal Construction Joints	5.12.2.3.3d	Longitudinal Construction Joints	✓				
5.14.4.3.3e	Cast-in-Place Closure Joint	5.12.2.3.3e	Cast-in-Place Closure Joints	✓				
5.14.4.3.3f	Structural Overlay	5.12.2.3.3f	Structural Overlay	✓				
5.14.1	Beams and Girders	5.12.3	Beams and Girders	✓				
5.14.1.1	General	5.12.3.1	General	✓				
5.14.1.2	Precast Beams	5.12.3.2	Precast Beams	✓				
5.14.1.2.1	Preservice Conditions	5.12.3.2.1	Preservice Conditions	✓				
5.14.1.2.2	Extreme Dimensions	5.12.3.2.2	Extreme Dimensions	✓				
5.14.1.2.3	Lifting Devices	5.12.3.2.3	Lifting Devices		✓			
5.14.1.2.4	Detail Design	5.12.3.2.4	Detail Design	✓				
5.14.1.2.5	Concrete Strength	5.12.3.2.5	Concrete Strength		✓			
5.14.1.4	Bridges Composed of Simple Span Precast Girders Made Continuous	5.12.3.3	Bridges Composed of Simple Span Precast Girders Made Continuous	✓				
5.14.1.4.1	General	5.12.3.3.1	General		✓			
5.14.1.4.2	Restraint Moments	5.12.3.3.2	Restraint Moments		✓			
5.14.1.4.3	Material Properties	5.12.3.3.3	Material Properties		✓			
C5.14.1.4.3-1	$\varepsilon_{effective} = \varepsilon_{sh}\left(\frac{A_c}{A_{tr}}\right)$	C5.12.3.3.3-1	$\varepsilon_{effective} = \varepsilon_{sh}\left(\frac{A_c}{A_{tr}}\right)$	✓				
5.14.1.4.4	Age of Girder When Continuity Is Established	5.12.3.3.4	Age of Girder When Continuity Is Established	✓				
5.14.1.4.5	Degree of Continuity at Various Limit States	5.12.3.3.5	Degree of Continuity at Various Limit States	✓				
5.14.1.4.6	Service Limit State	5.12.3.3.6	Service Limit State	✓				
5.14.1.4.7	Strength Limit State	5.12.3.3.7	Strength Limit State	✓				
5.14.1.4.8	Negative Moment Connections	5.12.3.3.8	Negative Moment Connections	✓				
5.14.1.4.9	Positive Moment Connections	5.12.3.3.9	Positive Moment Connections	✓				
5.14.1.4.9a	General	5.12.3.3.9a	General		✓			
5.14.1.4.9b	Positive Moment Connection Using Mild Reinforcement	5.12.3.3.9b	Positive Moment Connection Using Nonprestressed Reinforcement		✓			
5.14.1.4.9c	Positive Moment Connection Using Prestressing Strand	5.12.3.3.9c	Positive Moment Connection Using Prestressing Strand	✓				
5.14.1.4.9c-1	$f_{psl} = \frac{(\ell_{dsh} - 8)}{0.228}$	5.12.3.3.9c-1	$f_{psl} = \frac{(\ell_{dsh} - 8)}{0.228}$	✓				
5.14.1.4.9c-2	$f_{pul} = \frac{(\ell_{dsh} - 8)}{0.163}$	5.12.3.3.9c-2	$f_{pul} = \frac{(\ell_{dsh} - 8)}{0.163}$	✓				

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5.14.1.4.9d	Details of Positive Moment Connection	5.12.3.3.9d	Details of Positive Moment Connection	✓				
5.14.1.4.10	Continuity Diaphragms	5.12.3.3.10	Continuity Diaphragms	✓				
5.14.1.3	Spliced Precast Girders	5.12.3.4	Spliced Precast Girders	✓				
5.14.1.3.1	General	5.12.3.4.1	General	✓				
5.14.1.3.2	Joints between Segments	5.12.3.4.2	Joints between Spliced Girders		✓			
5.14.1.3.2a	General	5.12.3.4.2a	General	✓				
5.14.1.3.2b	Details of Closure Joints	5.12.3.4.2b	Details of Closure Joints	✓				
5.14.1.3.2c	Details of Match-Cast Joints	5.12.3.4.2c	Details of Match-Cast Joints	✓				
5.14.1.3.2d	Joint Design	5.12.3.4.2d	Joint Design	✓				
5.14.1.3.3	Girder Segment Design	5.12.3.4.3	Girder Segment Design	✓				
5.14.1.3.4	Post-Tensioning	5.12.3.4.4	Post-Tensioning		✓			
5.14.1.5	Cast-in-Place Girders and Box and T-Beams	5.12.3.5	Cast-in-Place Girders and Box and T-Beams	✓				
5.14.1.5.1	Flange and Web Thickness	5.12.3.5.1	Flange and Web Thickness	✓				
5.14.1.5.1a	Top Flange	5.12.3.5.1a	Top Flange		✓			
5.14.1.5.1b	Bottom Flange	5.12.3.5.1b	Bottom Flange		✓			
5.14.1.5.1c	Web	5.12.3.5.1c	Web		✓			
5.14.1.5.2	Reinforcement	5.12.3.5.2	Reinforcement	✓				
5.14.1.5.2a	Deck Slab Reinforcement Cast-in-Place in T-Beams and Box Girders	5.12.3.5.2a	Deck Slab Reinforcement Cast-in-Place in T-Beams and Box Girders	✓				
5.14.1.5.2b	Bottom Slab Reinforcement in Cast-in-Place Box Girders	5.12.3.5.2b	Bottom Slab Reinforcement in Cast-in-Place Box Girders	✓				
5.13.2.2	Diaphragms	5.12.4	Diaphragms			✓		
5.14.2	Segmental Construction	5.12.5	Segmental Concrete Bridges		✓			
5.14.2.1	General	5.12.5.1	General			✓		
5.14.2.2	Analysis of Segmental Bridges	5.12.5.2	Analysis of Segmental Bridges	✓				
5.14.2.2.1	General	5.12.5.2.1	General	✓				
5.14.2.2.2	Construction Analysis	5.12.5.2.2	Construction Analysis	✓				
5.14.2.2.3	Analysis of the Final Structural System	5.12.5.2.3	Analysis of the Final Structural System		✓			
5.14.2.3	Design	5.12.5.3	Design	✓				
5.14.2.3.1	Loads	5.12.5.3.1	Loads	✓				
5.14.2.3.2	Construction Loads	5.12.5.3.2	Construction Loads		✓			
5.14.2.3.3	Construction Load Combinations at the Service Limit State	5.12.5.3.3	Construction Load Combinations at the Service Limit State			✓		
5.14.2.3.4	Construction Load Combinations at Strength Limit States	5.12.5.3.4	Construction Load Combinations at Strength Limit States	✓				
5.14.2.3.4a	Superstructures	5.12.5.3.4a	Superstructure Load Effects and Structural Stability	✓				
5.14.2.3.4a-1	$\Sigma\gamma Q = 1.1(DC + DIFF) + 1.3(CEQ + CLL) + A + AI$	5.12.5.3.4a-1	$\Sigma\gamma Q = 1.1(DC + DIFF) + 1.3(CEQ + CLL) + A + AI$	✓				
5.14.2.3.4a-2	$\Sigma\gamma Q = DC + CEQ + A + AI$	5.12.5.3.4a-2	$\Sigma\gamma Q = DC + CEQ + A + AI$	✓				
5.14.2.3.4b	Substructures	5.12.5.3.4b	Substructures		✓			
5.14.2.3.5	Thermal Effects During Construction	5.12.5.3.5	Thermal Effects During Construction	✓				
5.14.2.3.6	Creep and Shrinkage	5.12.5.3.6	Creep and Shrinkage	✓				
C5.14.2.3.6-1	$E_{eff} = \dfrac{E_c}{\psi(t,t_i) + 1}$	C5.12.5.3.6-1	$E_{eff} = \dfrac{E_c}{\psi(t,t_i) + 1}$	✓				
5.14.2.3.7	Prestress Losses	5.12.5.3.7	Prestress Losses	✓				
5.8.6	Shear and Torsion for Segmental Box Girder Bridges	5.12.5.3.8	Alternative Shear Design Procedure		✓			
5.8.6.1	General	5.12.5.3.8a	General			✓		
5.8.6.2	Loading	5.12.5.3.8b	Loading			✓		
5.8.6.5	Nominal Shear Resistance	5.12.5.3.8c	Nominal Shear Resistance			✓		
5.8.6.5-1	$V_n = V_c + V_s$	5.12.5.3.8c-1	$V_n = V_c + V_s$	✓				

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5.8.6.5-2	$V_n = 0.379\lambda\sqrt{f'_c}\ b_v d_v$	5.12.5.3.8c-2	$V_n = 0.379\lambda\sqrt{f'_c}\ b_v d_v$	✓				
5.8.6.5-3	$V_c = 0.0632K\lambda\sqrt{f'_c}\ b_v d_v$	5.12.5.3.8c-3	$V_c = 0.0632K\lambda\sqrt{f'_c}\ b_v d_v$	✓				
5.8.6.5-4	$V_s = \frac{A_v f_y d_v}{s}$	5.12.5.3.8c-4	$V_s = \frac{A_v f_y d_v}{s}$	✓				
5.8.6.3-3	$K = \sqrt{1 + \frac{f_{pc}}{0.0632\lambda\sqrt{f'_c}}} \leq 2.0$	5.12.5.3.8c-5	$K = \sqrt{1 + \frac{f_{pc}}{0.0632\lambda\sqrt{f'_c}}} \leq 2.0$	✓				
5.8.6.5-5	$\left(\frac{V_u}{b_v d_v}\right) + \left(\frac{T_u}{2A_o b_e}\right) \leq 0.474\lambda\sqrt{f'_c}$	5.12.5.3.8c-6	$\left(\frac{V_u}{b_v d_v}\right) + \left(\frac{T_u}{2A_o b_e}\right) \leq 0.474\lambda\sqrt{f'_c}$	✓				
5.8.6.4	Torsional Reinforcement	5.12.5.3.8d	Torsional Reinforcement			✓		
5.8.6.4-1	$T_u \leq \phi T_n$	5.12.5.3.8d-1	$T_u \leq \phi T_n$	✓				
5.8.6.4-2	$T_n = \frac{2A_o A_t f_y}{s}$	5.12.5.3.8d-2	$T_n = \frac{2A_o A_t f_y}{s}$	✓				
5.8.6.4-3	$A_\ell \geq \frac{T_u p_h}{2\phi A_o f_y}$	5.12.5.3.8d-3	$A_\ell \geq \frac{T_u p_h}{2\phi A_o f_y}$	✓				
5.8.6.4-4	$\frac{M_u}{(0.9 d_e f_y)}$	5.12.5.3.8d-4	$\frac{M_u}{(0.9 d_e f_y)}$	✓				
5.8.6.6	Reinforcement Details	5.12.5.3.8e	Reinforcement Details			✓		
5.14.2.3.8	Provisional Post-Tensioning Ducts and Anchorages	5.12.5.3.9	Provisional Post-Tensioning Ducts and Anchorages	✓				
5.14.2.3.8a	General	5.12.5.3.9a	General	✓				
5.14.2.3.8b	Bridges with Internal Ducts	5.12.5.3.9b	Bridges with Internal Ducts	✓				
5.14.2.3.8c	Provision for Future Dead Load or Deflection Adjustment	5.12.5.3.9c	Provision for Future Dead Load or Deflection Adjustment	✓				
5.14.2.3.9	Plan Presentation	5.12.5.3.10	Plan Presentation	✓				
5.14.2.3.10	Box Girder Cross-Section Dimensions and Details	5.12.5.3.11	Box Girder Cross-Section Dimensions and Details	✓				
5.14.2.3.10a	Minimum Flange Thickness	5.12.5.3.11a	Minimum Flange Thickness			✓		
5.14.2.3.10b	Minimum Web Thickness	5.12.5.3.11b	Minimum Web Thickness	✓				
5.14.2.3.10c	Length of Top Flange Cantilever	5.12.5.3.11c	Length of Top Flange Cantilever	✓				
5.14.2.3.10d	Overall Cross-Section Dimensions	5.12.5.3.11d	Overall Cross-Section Dimensions	✓				
5.14.2.3.11	Seismic Design	5.12.5.3.12	Seismic Design	✓				
5.14.2.4	Types of Segmental Bridges	5.12.5.4	Types of Segmental Bridges	✓				
5.14.2.4.1	General	5.12.5.4.1	General	✓				
5.14.2.4.2	Details for Precast Construction	5.12.5.4.2	Details for Precast Construction	✓				
5.14.2.4.3	Details for Cast-in-Place Construction	5.12.5.4.3	Details for Cast-in-Place Construction	✓				
5.14.2.4.4	Cantilever Construction	5.12.5.4.4	Cantilever Construction			✓		
5.14.2.4.5	Span-by-Span Construction	5.12.5.4.5	Span-by-Span Construction	✓				
5.14.2.4.6	Incrementally Launched Construction	5.12.5.4.6	Incrementally Launched Construction	✓				
5.14.2.4.6a	General	5.12.5.4.6a	General	✓				
5.14.2.4.6b	Force Effects Due to Construction Tolerances	5.12.5.4.6b	Force Effects Due to Construction Tolerances	✓				
5.14.2.4.6c	Design Details	5.12.5.4.6c	Design Details	✓				
5.14.2.4.6d	Design of Construction Equipment	5.12.5.4.6d	Design of Construction Equipment	✓				
5.14.2.5	Use of Alternative Construction Methods	5.12.5.5	Use of Alternative Construction Methods	✓				

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Article or Equation		Article or Equation		Unchanged	Editorial	Updated	New	Removed
5.14.2.6	Segmentally Constructed Bridge Substructures	5.12.5.6	Segmentally Constructed Bridge Substructures	✓				
5.14.2.6.1	General	5.12.5.6.1	General	✓				
5.14.2.6.2	Construction Load Combinations	5.12.5.6.2	Construction Load Combinations	✓				
5.14.2.6.3	Longitudinal Reinforcement of Hollow, Rectangular Precast Segmental Piers	5.12.5.6.3	Longitudinal Reinforcement of Hollow, Rectangular Precast Segmental Piers	✓				
5.14.3	Arches	5.12.6	Arches	✓				
5.14.3.1	General	5.12.6.1	General	✓				
5.14.3.2	Arch Ribs	5.12.6.2	Arch Ribs	✓				
5.14.5	Additional Provisions for Culverts	5.12.7	Culverts		✓			
5.14.5.1	General	5.12.7.1	General	✓				
5.14.5.2	Design for Flexure	5.12.7.2	Design for Flexure	✓				
5.14.5.3	Design for Shear in Slabs of Box Culverts	5.12.7.3	Design for Shear in Slabs of Box Culverts		✓			
5.14.5.3-1	$V_c = \left(0.0676\lambda\sqrt{f'_c} + 4.6\frac{A_s}{bd_e}\frac{V_u d_e}{M_u}\right)bd_e$	5.12.7.3-1	$V_c = \left(0.0676\lambda\sqrt{f'_c} + 4.6\frac{A_s}{bd_e}\frac{V_u d_e}{M_u}\right)bd_e$	✓				
N/A		5.12.7.3-2	$V_c \le 0.126\lambda\sqrt{f'_c}\,bd_e$				✓	
5.13.3	Footings	5.12.8	Footings	✓				
5.13.3.1	General	5.12.8.1	General	✓				
5.13.3.2	Loads and Reactions	5.12.8.2	Loads and Reactions	✓				
5.13.3.3	Resistance Factors	5.12.8.3	Resistance Factors			✓		
5.13.3.4	Moment in Footings	5.12.8.4	Moment in Footings	✓				
5.13.3.5	Distribution of Moment Reinforcement	5.12.8.5	Distribution of Moment Reinforcement	✓				
5.13.3.5-1	$A_{s\text{-}BW} = A_{s\text{-}SD}\left(\frac{2}{\beta + 1}\right)$	5.12.8.5-1	$A_{s\text{-}BW} = A_{s\text{-}SD}\left(\frac{2}{\beta + 1}\right)$	✓				
5.13.3.6	Shear in Slabs and Footings	5.12.8.6	Shear in Slabs and Footings	✓				
5.13.3.6.1	Critical Sections for Shear	5.12.8.6.1	Critical Sections for Shear	✓				
5.13.3.6.2	One-Way Action	5.12.8.6.2	One-Way Action	✓				
5.13.3.6.3	Two-Way Action	5.12.8.6.3	Two-Way Action		✓			
5.13.3.6.3-1	$V_n = \left(0.063 + \frac{0.126}{\beta_c}\right)\lambda\sqrt{f'_c}\,b_o d_v \le 0.126\lambda\sqrt{f'_c}\,b_o d_v$	5.12.8.6.3-1	$V_n = \left(0.063 + \frac{0.126}{\beta_c}\right)\lambda\sqrt{f'_c}\,b_o d_v \le 0.126\lambda\sqrt{f'_c}\,b_o d_v$	✓				
5.13.3.6.3-2	$V_n = V_c + V_s \le 0.192\lambda\sqrt{f'_c}\,b_o d_v$	5.12.8.6.3-2	$V_n = V_c + V_s \le 0.192\lambda\sqrt{f'_c}\,b_o d_v$	✓				
5.13.3.6.3-3	$V_c = 0.0632\lambda\sqrt{f'_c}\,b_o d_v$	5.12.8.6.3-3	$V_c = 0.0632\lambda\sqrt{f'_c}\,b_o d_v$	✓				
5.13.3.6.3-4	$V_s = \frac{A_v f_y d_v}{s}$	5.12.8.6.3-4	$V_s = \frac{A_v f_y d_v}{s}$	✓				
5.13.3.7	Development of Reinforcement	5.12.8.7	Development of Reinforcement	✓				
5.13.3.8	Transfer of Force at Base of Column	5.12.8.8	Transfer of Force at Base of Column	✓				
5.13.4	Concrete Piles	5.12.9	Concrete Piles	✓				
5.13.4.1	General	5.12.9.1	General	✓				
5.13.4.2	Splices	5.12.9.2	Splices	✓				
5.13.4.3	Precast Reinforced Piles	5.12.9.3	Precast Reinforced Piles	✓				
5.13.4.3.1	Pile Dimensions	5.12.9.3.1	Pile Dimensions	✓				
5.13.4.3.2	Reinforcing Steel	5.12.9.3.2	Reinforcement		✓			
5.13.4.4	Precast Prestressed Piles	5.12.9.4	Precast Prestressed Piles	✓				
5.13.4.4.1	Pile Dimensions	5.12.9.4.1	Pile Dimensions	✓				
5.13.4.4.2	Concrete Quality	5.12.9.4.2	Concrete Quality	✓				

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Article or Equation		**Article or Equation**		**Unchanged**	**Editorial**	**Updated**	**New**	**Removed**
5.13.4.4.3	Reinforcement	5.12.9.4.3	Reinforcement	✓				
5.13.4.5	Cast-in-Place Piles	5.12.9.5	Cast-in-Place Piles	✓				
5.13.4.5.1	Pile Dimensions	5.12.9.5.1	Pile Dimensions	✓				
5.13.4.5.2	Reinforcing Steel	5.12.9.5.2	Reinforcement		✓			
N/A		**5.13**	**Anchors**				✓	
N/A		5.13.1	General				✓	
N/A		5.13.2	General Strength Requirements				✓	
N/A		5.13.2.1	Failure Modes to be Considered				✓	
N/A		5.13.2.2	Resistance Factors				✓	
N/A		5.13.2.3	Determination of Anchor Resistance				✓	
N/A		5.13.3	Seismic Design Requirements				✓	
N/A		5.13.4	Installation				✓	
5.12	**Durability**	**5.14**	**Durability**	✓				
5.12.1	General	5.14.1	Design Concepts			✓		
N/A		5.14.2	Major Chemical and Mechanical Factors Affecting Durability				✓	
N/A		5.14.2.1	General				✓	
N/A		5.14.2.2	Corrosion Resistance				✓	
N/A		5.14.2.3	Freeze-Thaw Resistance				✓	
N/A		5.14.2.4	External Sulfate Attack				✓	
N/A		5.14.2.5	Delayed Ettringite Formation				✓	
5.12.2	Alkali-Silica Reactive Aggregates	5.14.2.6	Alkali-Silica Reactive Aggregates	✓				
N/A		5.14.2.7	Alkali-Carbonate reactive Aggregates				✓	
5.10.1	Concrete Cover	5.14.3	Concrete Cover			✓		
5.10.1	Concrete Cover	5.14.3	Concrete Cover			✓		
5.12.4	Protective Coatings	5.14.4	Protective Coatings			✓		
5.14.2.3.10e	Overlays	5.14.5	Deck Protection Systems			✓		
5.12.5	Protection of Prestressing Tendons	5.14.6	Protection of Prestressing Tendons	✓				
5.15	**References**	**5.15**	**References**			✓		
Appendix A5	**Basic Steps for Concrete Bridges**	**Appendix A5**	**Basic Steps for Concrete Bridges**	✓				
A5.1	General	A5.1	General	✓				
A5.2	General Considerations	A5.2	General Considerations	✓				
A5.3	Beam and Girder Superstructure Design	A5.3	Beam and Girder Superstructure Design	✓				
A5.4	Slab Bridges	A5.4	Slab Bridges	✓				
A5.5	Substructure Design	A5.5	Substructure Design	✓				
Appendix B5	**General Procedure for Shear Design with Tables**	**Appendix B5**	**General Procedure for Shear Design with Tables**	✓				
B5.1	Background	B5.1	Background	✓				
B5.2	Sectional Design Model—General Procedure	B5.2	Sectional Design Model—General Procedure			✓		
5.8.2.1-6	$\sqrt{V_u^2+\left(\frac{0.9\, p_h\, T_u}{2\, A_o}\right)^2}$	B5.2-1	$V_{eff}=\sqrt{V_u^2+\left(\frac{0.9 p_h T_u}{2 A_o}\right)^2}$				✓	
5.8.2.1-7	$V_u+\frac{T_u\, d_s}{2\, A_o}$	B5.2-2	$V_{eff}=V_u+\frac{T_u d_s}{2 A_o}$				✓	

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B5.2-1	$\varepsilon_x = \dfrac{\left(\dfrac{\lvert M_u\rvert}{d_v} + 0.5N_u + 0.5\lvert V_u - V_p\rvert \cot\theta - A_{ps}f_{po}\right)}{2(E_sA_s + E_pA_{ps})}$	B5.2-3	$\varepsilon_x = \dfrac{\left(\dfrac{\lvert M_u\rvert}{d_v} + 0.5N_u + 0.5\lvert V_u - V_p\rvert \cot\theta - A_{ps}f_{po}\right)}{2(E_sA_s + E_pA_{ps})}$	✓				
B5.2-2	$\varepsilon_x = \dfrac{\left(\dfrac{\lvert M_u\rvert}{d_v} + 0.5N_u + 0.5\lvert V_u - V_p\rvert \cot\theta - A_{ps}f_{po}\right)}{E_sA_s + E_pA_{ps}}$	B5.2-4	$\varepsilon_x = \dfrac{\left(\dfrac{\lvert M_u\rvert}{d_v} + 0.5N_u + 0.5\lvert V_u - V_p\rvert \cot\theta - A_{ps}f_{po}\right)}{E_sA_s + E_pA_{ps}}$	✓				
B5.2-3	$\varepsilon_x = \dfrac{\left(\dfrac{\lvert M_u\rvert}{d_v} + 0.5N_u + 0.5\lvert V_u - V_p\rvert \cot\theta - A_{ps}f_{po}\right)}{2\left(E_cA_c + E_sA_s + E_pA_{ps}\right)}$	B5.2-5	$\varepsilon_x = \dfrac{\left(\dfrac{\lvert M_u\rvert}{d_v} + 0.5N_u + 0.5\lvert V_u - V_p\rvert \cot\theta - A_{ps}f_{po}\right)}{2\left(E_cA_c + E_sA_s + E_pA_{ps}\right)}$	✓				
B5.2-4	$s_{xe} = s_x \dfrac{1.38}{a_g + 0.63} \le 80 \text{ in.}$	B5.2-6	$s_{xe} = s_x \dfrac{1.38}{a_g + 0.63} \le 80 \text{ in.}$	✓				
CB5.2-1	$\varepsilon_x = \dfrac{\varepsilon_t + \varepsilon_c}{2}$	CB5.2-1	$\varepsilon_x = \dfrac{\varepsilon_t + \varepsilon_c}{2}$	✓				
Appendix C5	**Upper Limits for Articles Affected by Concrete Compressive Strength**	**Appendix C5**	**Upper Limits for Articles Affected by Concrete Compressive Strength**					
Appendix D5	**Articles Modified to Allow the Use of Reinforcement with a Specified Minimum Yield Strength Up to 100 ksi**	**Appendix D5**	**Articles Modified to Allow the Use of Reinforcement with a Specified Minimum Yield Strength Up to 100 ksi**					