



$I_s, S_s$ : Non-composite moment of inertia and section modulus of the steel section used for computing  $f_s$  (Total-Strength I, and Service II) due to non-composite dead loads (in.4 and in.3).

$I_c(n), S_c(n)$ : Composite moment of inertia and section modulus of the steel and deck based upon the modular ratio, "n", used for computing  $f_s$  (Total-Strength I, and Service II) in uncracked sections due to short-term composite live loads (in.4 and in.3).

$I_c(3n), S_c(3n)$ : Composite moment of inertia and section modulus of the steel and deck based upon 3 times the modular ratio, "3n", used for computing  $f_s$  (Total-Strength I, and Service II) in uncracked sections, due to long-term composite (superimposed) dead loads (in.4 and in.3).

$I_c(cr), S_c(cr)$ : Composite moment of inertia and section modulus of the steel and longitudinal deck reinforcement, used for computing  $f_s$  (Total-Strength I and Service II) in cracked sections, due to both short-term composite live loads and long-term composite (superimposed) dead loads (in.4 and in.3).

DC1: Un-factored non-composite dead load (kip-ft.).

MDC1: Un-factored moment due to non-composite dead load (kip-ft.).

DC2: Un-factored long-term composite (superimposed excluding future wearing surface) dead load (kip-ft.).

MDC2: Un-factored moment due to long-term composite (superimposed excluding future wearing surface) dead load (kip-ft.).

DW: Un-factored long-term composite (superimposed future wearing surface only) dead load (kip-ft.).

M<sub>DW</sub>: Un-factored moment due to long-term composite (superimposed future wearing surface only) dead load (kip-ft.).

M<sub>ℓ + IM</sub>: Un-factored live load moment plus dynamic load allowance (impact) (kip-ft.).

M<sub>u</sub> (Strength I): Factored design moment (kip-ft.).

$1.25 (M_{DC1} + M_{DC2}) + 1.5 M_{DW} + 1.75 M_{ℓ + IM}$

$\phi_r M_n$ : Compact composite positive moment capacity computed according to Article 6.10.7.1 or non-slender negative moment capacity according to Article A6.1.1 or A6.1.2 (kip-ft.).

$f_s$  DC1: Un-factored stress at edge of flange for controlling steel flange due to vertical non-composite dead loads as calculated below (ksi).

$\Delta$   $f_s$  DC2: Un-factored stress at edge of flange for controlling steel flange due to vertical composite dead loads as calculated below (ksi).

$M_{DC2} / S_c(3n)$  or  $M_{DC2} / S_c(cr)$  as applicable.

$f_s$  DW: Un-factored stress at edge of flange for controlling steel flange due to vertical composite future wearing surface loads as calculated below (ksi).

$M_{DW} / S_c(3n)$  or  $M_{DW} / S_c(cr)$  as applicable.

$f_s$  ( $\ell + IM$ ): Un-factored stress at edge of flange for controlling steel flange due to vertical composite live load plus impact loads as calculated below (ksi).

$\Delta$   $f_s$  (Service II): Sum of stresses as computed below (ksi).

$f_{SDC1} + f_{SDC2} + f_{SDW} + 1.3 f_s (\ell + IM)$

$0.95 R_n F_y F$ : Composite stress capacity for Service II loading according to Article 6.10.4.2 (ksi).

$f_s$  (Total)(Strength I): Sum of stresses as computed below on non-compact section (ksi).

$1.25 (f_{SDC1} + f_{SDC2}) + 1.5 f_{SDW} + 1.75 f_s (\ell + IM)$

$\phi_r F_n$ : Non-Compact composite positive or negative stress capacity for Strength I loading according to Article 6.10.7 or 6.10.8 (ksi).

V<sub>r</sub>: Maximum factored shear range in span computed according to Article 6.10.10.

	0.4 Sp. 1	Pier	0.6 Sp. 2
$I_s$ (in <sup>4</sup> )	61,574	82,330	61,574
$I_c(n)$ (in <sup>4</sup> )	106,081	-	106,081
$I_c(3n)$ (in <sup>4</sup> )	80,858	-	80,858
$I_c(cr)$ (in <sup>4</sup> )	-	87,346	-
$S_s$ (in <sup>3</sup> )	2,492	3,107	2,492
$S_c(n)$ (in <sup>3</sup> )	2,945	-	2,945
$S_c(3n)$ (in <sup>3</sup> )	2,730	-	2,730
$S_c(cr)$ (in <sup>3</sup> )	-	3,433	-
DC1 (k/')	1.22	1.30	1.22
MDC1 (k)	2,281	3,652	1,104
DC2 (k/')	0.57	0.57	0.57
MDC2 (k)	1,093	1,670	526
DW (k/')	0.27	0.27	0.27
M <sub>DW</sub> (k)	522	796	250
M <sub>ℓ + IM</sub> (k)	1,851	1,923	1,512
M <sub>u</sub> (Strength I) (k)	8,240	11,212	5,059
$\phi_r M_n$ (k)	11,325	-	11,514
$f_s$ DC1 (ksi)	10.98	14.10	5.32
$f_s$ DC2 (ksi)	4.80	5.84	2.31
$f_s$ DW (ksi)	2.29	2.78	1.10
$f_s$ ( $\ell + IM$ ) (ksi)	7.54	6.72	6.16
$f_s$ (Service II) (ksi)	27.89	31.46	16.74
$0.95 R_n F_y F$ (ksi)	47.50	47.50	47.50
$f_s$ (Total)(Strength I) (ksi)	36.38	40.86	21.97
$\phi_r F_n$ (ksi)	-	50.00	-
V <sub>r</sub> (k)	22.40	24.10	22.10

	0.4 Sp. 1	Pier	0.6 Sp. 2
$I_s$ (in <sup>4</sup> )	61,574	82,330	61,574
$I_c(n)$ (in <sup>4</sup> )	104,358	-	104,358
$I_c(3n)$ (in <sup>4</sup> )	79,900	-	79,900
$I_c(cr)$ (in <sup>4</sup> )	-	87,065	-
$S_s$ (in <sup>3</sup> )	2,492	3,107	2,492
$S_c(n)$ (in <sup>3</sup> )	2,932	-	2,932
$S_c(3n)$ (in <sup>3</sup> )	2,720	-	2,720
$S_c(cr)$ (in <sup>3</sup> )	-	3,414	-
DC1 (k/')	1.18	1.26	1.18
MDC1 (k)	2,235	3,612	1,170
DC2 (k/')	0.57	0.57	0.57
MDC2 (k)	1,082	1,682	563
DW (k/')	0.27	0.27	0.27
M <sub>DW</sub> (k)	516	802	268
M <sub>ℓ + IM</sub> (k)	2,102	2,257	1,753
M <sub>u</sub> (Strength I) (k)	8,599	11,770	5,636
$\phi_r M_n$ (k)	11,348	-	11,514
$f_s$ DC1 (ksi)	10.76	13.95	5.63
$f_s$ DC2 (ksi)	4.77	5.91	2.48
$f_s$ DW (ksi)	2.28	2.82	1.18
$f_s$ ( $\ell + IM$ ) (ksi)	8.60	7.93	7.17
$f_s$ (Service II) (ksi)	29.00	32.99	18.63
$0.95 R_n F_y F$ (ksi)	47.50	47.50	47.50
$f_s$ (Total)(Strength I) (ksi)	37.89	42.94	24.48
$\phi_r F_n$ (ksi)	-	50.00	-
V <sub>r</sub> (k)	23.00	26.70	24.10

	0.4 Sp. 1	Pier	0.6 Sp. 2
$I_s$ (in <sup>4</sup> )	61,574	82,330	61,574
$I_c(n)$ (in <sup>4</sup> )	106,081	-	106,081
$I_c(3n)$ (in <sup>4</sup> )	80,858	-	80,858
$I_c(cr)$ (in <sup>4</sup> )	-	87,346	-
$S_s$ (in <sup>3</sup> )	2,492	3,107	2,492
$S_c(n)$ (in <sup>3</sup> )	2,945	-	2,945
$S_c(3n)$ (in <sup>3</sup> )	2,730	-	2,730
$S_c(cr)$ (in <sup>3</sup> )	-	3,433	-
DC1 (k/')	1.22	1.30	1.22
MDC1 (k)	2,409	3,322	302
DC2 (k/')	0.62	0.62	0.62
MDC2 (k)	1,224	1,622	161
DW (k/')	0.27	0.27	0.27
M <sub>DW</sub> (k)	548	723	70
M <sub>ℓ + IM</sub> (k)	2,284	2,327	1,459
M <sub>u</sub> (Strength I) (k)	9,360	11,337	3,237
$\phi_r M_n$ (k)	11,380	-	11,779
$f_s$ DC1 (ksi)	11.60	12.83	1.45
$f_s$ DC2 (ksi)	5.38	5.67	0.71
$f_s$ DW (ksi)	2.41	2.53	0.31
$f_s$ ( $\ell + IM$ ) (ksi)	9.31	8.13	5.94
$f_s$ (Service II) (ksi)	31.49	31.60	10.20
$0.95 R_n F_y F$ (ksi)	47.50	47.50	47.50
$f_s$ (Total)(Strength I) (ksi)	41.13	41.15	13.57
$\phi_r F_n$ (ksi)	-	50.00	-
V <sub>r</sub> (k)	21.40	22.60	21.60

	W. Abut.	Pier	E. Abut.
R <sub>DC1</sub> (k)	76	234	54
R <sub>DC2</sub> (k)	36	107	25
R <sub>DW</sub> (k)	17	51	12
R <sub>ℓ + IM</sub> (k)	66	127	63
R <sub>Total</sub> (k)	195	519	154

	W. Abut.	Pier	E. Abut.
R <sub>DC1</sub> (k)	74	228	55
R <sub>DC2</sub> (k)	35	107	26
R <sub>DW</sub> (k)	17	51	12
R <sub>ℓ + IM</sub> (k)	67	144	65
R <sub>Total</sub> (k)	193	530	158

	W. Abut.	Pier	E. Abut.
R <sub>DC1</sub> (k)	78	219	34
R <sub>DC2</sub> (k)	39	108	17
R <sub>DW</sub> (k)	17	48	7
R <sub>ℓ + IM</sub> (k)	93	177	78
R <sub>Total</sub> (k)	227	552	136

\*\*\* For Girders 2 and 3, the load due to ComEd ductbank is 43 pounds per linear foot per girder.  
For Girders 4 and 5, the load due to City of Chicago ductbank is 53 pounds per linear foot per girder.

- NOTES:**
- All structural steel shall be AASHTO M270 Grade 50 - galvanized.
  - All diaphragms shall be installed as steel is erected and secured with erection pins and bolts except as otherwise noted. Individual diaphragms at supports may be temporarily disconnected to install bearing anchor rods.
  - Two hardened washers required for each set of oversized holes.

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