

INTERIOR GIRDER MOMENT TABLE - S.N. 082-0322 - UNIT 3*

		0.4 Sp. 7	Pier 7	0.5 Sp. 8	Pier 8	0.5 Sp. 9	Pier 9	0.6 Sp. 10
I_s	(in ⁴)	70,766	194,828	88,281	237,351	88,281	194,828	70,766
$I_c(n)$	(in ⁴)	170,709	213,860	210,175	256,079	210,175	213,860	170,709
$I_c(3n)$	(in ⁴)	123,734	213,860	150,586	256,079	150,586	213,860	123,734
S_s	(in ³)	1,839	4,446	2,456	5,757	2,456	4,446	1,839
$S_c(n)$	(in ³)	2,614	5,171	3,354	5,906	3,354	5,171	2,614
$S_c(3n)$	(in ³)	2,347	5,171	3,035	5,906	3,035	5,171	2,347
S_{xt}	(in ³)	2,430	4,897	3,088	5,849	3,092	4,897	2,430
DC1	(k/')	1.19	1.47	1.23	1.55	1.23	1.47	1.19
M _{DC1}	(k)	1,253	5,597	2,077	7,289	2,044	5,594	1,251
DC2	(k/')	0.26	0.26	0.26	0.26	0.26	0.26	0.26
M _{DC2}	(k)	195	766	316	988	317	766	195
DW	(k/')	0.39	0.39	0.39	0.39	0.39	0.39	0.39
M _{DW}	(k)	456	1,674	741	2,168	742	1,674	456
M _{ℓ + IM}	(k)	2,788	4,248	3,295	4,701	3,296	4,212	2,789
M _u (Strength I)	(k)	7,373	17,899	9,869	21,825	9,832	17,832	7,372
M _{bl}	(k)	4	42	53	123	52	42	5
f _s DC1	(ksi)	8.2	15.1	10.1	15.2	10.0	15.1	8.2
f _s DC2	(ksi)	1.0	1.8	1.2	2.0	1.3	1.8	1.0
f _s DW	(ksi)	2.3	3.9	2.9	4.4	2.9	3.9	2.3
f _s 1.3(ℓ+IM)	(ksi)	16.6	12.8	15.3	12.4	15.3	12.7	16.6
f _t	(ksi)	1.3	2.8	8.7	5.0	8.7	2.8	1.3
f _s (Service II)	(ksi)	28.1	33.6	29.7	34.0	29.5	33.5	28.1
f _s (Total)(Strength I)	(ksi)	37.4	44.2	39.3	44.8	39.1	44.0	37.4
F _{cr} (Service II)	(ksi)	47.5	47.5	47.5	47.5	47.5	47.5	47.5
V _r	(k)	59.4	65.3		69.2		66.3	59.3
F _{cr}	(ksi)	50.0	50.0	50.0	50.0	50.0	50.0	50.0

INTERIOR GIRDER MOMENT TABLE - S.N. 082-0322 - UNIT 4*

		0.4 Sp. 11	Pier 11	0.5 Sp. 12	Pier 12	0.5 Sp. 13	Pier 13	0.6 Sp. 14
I_s	(in ⁴)	72,207	95,723	60,901	75,544	69,526	90,685	90,595
$I_c(n)$	(in ⁴)	172,592	111,990	141,022	92,490	156,488	107,761	183,501
$I_c(3n)$	(in ⁴)	125,188	111,990	104,293	92,490	115,759	107,761	138,095
S_s	(in ³)	1,940	2,411	1,495	1,983	1,740	2,354	2,227
$S_c(n)$	(in ³)	2,706	2,587	2,129	2,174	2,401	2,548	2,866
$S_c(3n)$	(in ³)	2,442	2,587	1,911	2,174	2,168	2,548	2,623
S_{xt}	(in ³)	2,586	2,531	1,948	2,125	2,383	2,490	2,647
DC1	(k/')	1.20	1.27	1.17	1.20	1.19	1.26	1.23
M _{DC1}	(k)	877	2,567	1,227	1,717	131	2,346	2,166
DC2	(k/')	0.26	0.26	0.26	0.26	0.26	0.26	0.26
M _{DC2}	(k)	126	379	194	269	20	356	310
DW	(k/')	0.39	0.39	0.39	0.39	0.39	0.39	0.39
M _{DW}	(k)	310	824	444	587	51	768	710
M _{ℓ + IM}	(k)	1,786	2,218	1,860	2,061	1,635	2,218	2,357
M _u (Strength I)	(k)	4,844	8,800	5,697	6,970	3,127	8,411	8,285
M _{bl}	(k)	27	45	13	35	9	51	20
f _s DC1	(ksi)	5.4	12.8	9.9	10.4	0.9	12.0	11.7
f _s DC2	(ksi)	0.6	1.8	1.2	1.5	0.1	1.7	1.4
f _s DW	(ksi)	1.5	3.8	2.8	3.2	0.3	3.6	3.2
f _s 1.3(ℓ+IM)	(ksi)	10.3	13.4	13.6	14.8	10.6	13.6	12.8
f _t	(ksi)	6.8	9.0	6.5	7.9	2.9	10.2	4.6
f _s (Service II)	(ksi)	17.9	31.7	27.5	29.9	11.9	30.8	29.2
f _s (Total)(Strength I)	(ksi)	23.7	41.9	36.4	39.6	16.0	40.8	38.5
F _{cr} (Service II)	(ksi)	47.5	47.5	47.5	47.5	47.5	47.5	47.5
V _r	(k)	58.3	62.8		64.9		63.0	57.1
F _{cr}	(ksi)	50.0	50.0	50.0	50.0	50.0	50.0	50.0

INTERIOR GIRDER REACTION TABLE - S.N. 082-0322-UNIT 3*

		Pier 6	Pier 7	Pier 8	Pier 9	Pier 10
R _{DC1}	(k)	58.8	298.9	347.4	299.7	58.7
R _{DC2}	(k)	9.5	44.1	49.9	44.1	9.5
R _{DW}	(k)	19.7	89.3	101.7	89.3	19.7
R _{ℓ + IM}	(k)	108.2	231.7	240.0	229.8	108.2
R _{Total}	(k)	196.1	664.0	739.1	662.8	196.0

INTERIOR GIRDER REACTION TABLE - S.N. 082-0322-UNIT 4*

		Pier 10	Pier 11	Pier 12	Pier 13	E. Abut.
R _{DC1}	(k)	47.5	194.2	152.5	189.2	75.5
R _{DC2}	(k)	7.7	32.0	26.3	31.5	11.4
R _{DW}	(k)	15.8	63.6	52.1	61.9	24.0
R _{ℓ + IM}	(k)	97.1	183.8	177.3	190.2	104.9
R _{Total}	(k)	168.0	473.6	408.2	472.8	215.8

INTERIOR GIRDER MOMENT TABLE - S.N. 082-0324*

		0.4 Sp. 1	Pier 2	0.5 Sp. 2	Pier 3	0.5 Sp. 3	Pier 4	0.5 Sp. 4	Pier 5	0.5 Sp. 5	Pier 6	0.6 Sp. 6
I_s	(in ⁴)	69,373	85,663	63,295	123,880	75,147	147,018	75,147	147,963	70,328	136,065	72,132
$I_c(n)$	(in ⁴)	165,491	102,281	148,820	140,212	182,294	163,852	182,294	164,917	164,585	152,377	165,946
$I_c(3n)$	(in ⁴)	118,992	102,281	108,052	140,212	129,712	163,852	129,712	164,917	118,904	152,377	120,319
S_s	(in ³)	1,822	1,947	1,586	3,104	2,076	3,679	2,076	3,707	1,827	3,368	1,854
$S_c(n)$	(in ³)	2,590	2,551	2,281	3,273	2,921	3,844	2,921	3,873	2,574	3,531	2,591
$S_c(3n)$	(in ³)	2,314	2,551	2,031	3,273	2,617	3,844	2,617	3,873	2,303	3,531	2,321
S_{xt}	(in ³)	2,421	2,355	2,159	3,219	2,709	3,791	2,756	3,822	2,383	3,477	2,407
DC1	(k/')	1.10	1.13	1.09	1.23	1.11	1.28	1.11	1.28	1.10	1.26	1.11
M _{DC1}	(k)	1,149	2,101	784	3,275	1,478	3,976	1,146	3,846	1,320	3,671	1,314
DC2	(k/')	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
M _{DC2}	(k)	215	395	172	584	299	694	238	677	272	645	263
DW	(k/')	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
M _{DW}	(k)	370	655	285	967	501	1,147	401	1,122	455	1,073	437
M _{ℓ + IM}	(k)	1,867	2,240	1,964	2,899	2,474	3,250	2,457	3,201	2,322	2,838	2,196
M _u (Strength I)	(k)	5,527	8,023	5,060	11,348	7,302	13,246	6,631	12,939	6,736	11,971	6,470
M _{bl}	(k)	29	14	11	54	36	64	33	41	0	0	0
f _s DC1	(ksi)	7.6	12.9	5.9	12.7	8.5	13.0	6.6	12.4	8.7	13.1	8.5
f _s DC2	(ksi)	1.1	1.9	1.0	2.1	1.4	2.2	1.1	2.1	1.4	2.2	1.4
f _s DW	(ksi)	1.9	3.1	1.7	3.5	2.3	3.6	1.8	3.5	2.4	3.6	2.3
f _s 1.3(ℓ+IM)	(ksi)	11.2	13.7	13.4	13.8	13.2	13.2	13.1	12.9	14.1	12.5	13.2
f _t	(ksi)	8.1	4.5	4.2	6.4	7.1	6.1	6.5	4.1	0.0	0.0	0.0
f _s (Service II)	(ksi)	21.8	31.6	22.1	32.2	25.4	31.9	22.7	30.9	26.5	31.5	25.3
f _s (Total)(Strength I)	(ksi)	28.9	41.6	29.3	42.4	33.6	42.0	30.1	40.8	N/A	N/A	N/A
F _{cr} (Service II)	(ksi)	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5
V _r	(k)	54.9	59.7		64.1		65.6		65.2		58.5	52.8
F _{cr}	(ksi)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

INTERIOR GIRDER REACTION TABLE - S.N. 082-0324*

		Pier 1	Pier 2	Pier 3	Pier 4	Pier 5	Pier 6	E. Abut.
R _{DC1}	(k)	51.5	169.7	211.9	237.2	227.7	218.7	55.5
R _{DC2}	(k)	10.0	34.0	39.6	43.2	41.4	40.1	10.9
R _{DW}	(k)	16.0	53.8	63.3	69.1	66.5	64.6	17.5
R _{ℓ + IM}	(k)	85.9	176.7	192.7	198.8	192.2	180.3	90.3
R _{Total}	(k)	163.3	434.2	507.5	548.3	527.9	503.7	174.3

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 (in⁴ and in³).

$I_c(n), S_c(n)$: 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) due to short-term composite live loads (in⁴ and in³).

$I_c(3n), S_c(3n)$: 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) due to long-term composite (superimposed) dead loads (in⁴ and in³).

S_{xt} : Section modulus about the major axis of section to the controlling flange, tension or compression, taken as yield moment with respect to the controlling flange over the yield strength of the controlling flange (in³).

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

M_{DC1}: Un-factored moment due to non-composite dead load (kip-ft.).

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

M_{DC2}: 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 (kips/ft.).

M_{DW}: Un-factored moment due to long-term composite (superimposed future wearing surface only) dead load (kip-ft.).

M_{ℓ + IM}: Un-factored live load moment plus dynamic load allowance (impact)(kip-ft.).

M_u (Strength I): Factored design moment (kip-ft.).
1.25 (M_{DC1} + M_{DC2}) + 1.5 M_{DW} + 1.75 M_{ℓ + IM}

M_{bl}: Factored lateral bending moment for controlling flange plate (kip-ft.).

f_t: Factored calculated normal stress at edge of flange for controlling flange plate due to lateral bending (kip-ft.).

f_s (Service II): Sum of stresses as computed from the moments below (ksi).
M_{DC1} + M_{DC2} + M_{DW} + 1.3 M_{ℓ + IM}

f_s (Total)(Strength I): Sum of stresses as computed from the moments below on non-compact section (ksi).
1.25 (M_{DC1} + M_{DC2}) + 1.5 M_{DW} + 1.75 M_{ℓ + IM}

F_{cr} (Service II): Critical flange stress at Service II computed according to Article 6.10.4.2 (ksi).

F_{cr}: Critical flange stress computed according to Article 6.10.7 or 6.10.8 (ksi).

V_r: Maximum factored shear range computed according to Article 6.10.10.

* The moments & reactions given are the maximum for interior girders. Forces are typically larger for an exterior girder. Structural design is based on maximum girder forces.

Note:
M_ℓ and R_ℓ include the effects of centrifugal force and superelevation.



USER NAME =	DESIGNED - PUL	REVISED -
	DRAWN - BRD	REVISED -
PLOT SCALE = 0.25000' 1" / IN.	CHECKED - CHY	REVISED -
PLOT DATE = 6/30/2011	DATE - 07-01-11	REVISED -

**STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION**

**MOMENT AND REACTION TABLES - II
I-70E OVER I-55, CSX & KCS RAILROADS**

SCALE: SHEET S-126 OF S-234 SHEETS STA. TO STA.

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
70	82-1-B-2	ST. CLAIR	399	253
S.N. 082-0322 & S.N. 082-0324		CONTRACT NO. 76C76		
FED. ROAD DIST. NO.		ILLINOIS FED. AID PROJECT		