ROUTE NO.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
FAU 2505	94-P4008-01-BR	KANE	81	48
FED. ROAD DIST. NO. 7	ILLINOIS	FED. AID PROJECT-		

SHEET NO. S-24

S-42 SHEETS

Contract #83984

BEAM MOMENT TABLE

		0.4 Sp. 1		Pier 9		0.5 Sp. 2		Pier 10		0.6 Sp. 3	
		Bm. 5.1	Bm. 5.2	Bm. 5.1	Bm. 5.2	Bm. 5.1	Bm. 5.2	Bm. 5.1	Bm. 5.2	Bm. 5.1	Bm. 5.2
I_s	(in^4)	6680		6680		6680		6680		6680	
$I_{c(n)}$	(in^4)	15924		8419		15924		8419		15924	
$I_{c(3n)}$	(in^4)	11574		8419		11574		8419		11574	
S_s	(in^3)	436		436		436		436		436	
$S_{c(n)}$	(in^3)	609		633		609		633		609	
$S_{c(3n)}$	(in^3)	548		633		548		633		548	
S_f	(in^3)	21.7		21.7		21.7		21.7		21.7	
$\mathcal{D}$	(k/')	0.771		0.771		0.771		0.771		0.771	
$M\mathcal{D}$	('k)	315	113	485	348	200	174	363	470	107	321
$s\mathcal{D}$	(k/')	0.07		0.07		0.07		0.07		0.07	
$M_s\mathcal{D}$	('k)	26	13	42	33	18	17	34	41	13	26
$M\mathcal{L}$	('k)	228	126	256	252	202	188	260	248	127	227
M_{Imp}	('k)	---		---		---		---		---	
$\frac{5}{3}[M\mathcal{L} + M_{Imp}]$	('k)	380	210	427	420	337	313	433	413	212	378
M_a	('k)	937	437	1240	1041	722	655	1079	1201	432	943
M_{bf}	('k)	1.8	0.56	2.29	1.58	0.00	0.00	1.44	1.93	1.76	3.35
$f_s\mathcal{D}$ (non-comp)	(ksi)	8.67	3.1	13.36	9.57	5.50	4.79	9.99	12.94	2.95	8.83
$f_s\mathcal{D}$ (comp)	(ksi)	0.58	0.28	0.80	0.62	0.40	0.36	0.64	0.78	0.28	0.58
$f_s \frac{5}{3}[M\mathcal{L} + M_{Imp}]$	(ksi)	7.56	4.1	8.18	7.96	6.62	6.17	8.22	7.93	4.12	7.53
f_f	(ksi)	1.00	0.31	1.27	0.87	0.00	0.00	0.79	1.07	0.00	0.00
f_s (Overload)	(ksi)	16.81	7.48	22.34	18.15	12.52	11.32	18.85	21.65	7.35	16.94
f_s (Total)	(ksi)	21.85	9.72	29.04	23.60	16.28	14.72	24.51	28.15	9.56	22.02
F_{cr} (Overload)	(ksi)	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5
VR	(k)	18.5	10.5	36.7	32.5	21.62	23.6	33.4	36.6	22.3	23.8
F_{cr}	(ksi)	49.6	49.9	50.0	50.0	50.0	50.0	50.0	50.0	49.7	49.3

BEAM REACTION TABLE

		Pier 8(E)	Pier 9	Pier 10	E. Abut.
$R\mathcal{D}$	(k)	13.8	69.8	63.1	27.7
$R\mathcal{L}$	(k)	8.8	40.5	33.2	18.1
Imp.	(k)	---	---	---	---
R_{Total}	(k)	22.6	110.3	96.3	45.8

I_s, S_s: Non-composite moment of inertia and section modulus of the steel section used for computing f_s (Total and Overload) 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 and Overload) 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 and Overload) due to long-term composite (superimposed) dead loads (in.^{4} and in.^{3}).

S_f: Section modulus of one flange plate for lateral flange bending (in.^{3}).

$\mathcal{D}$: Un-factored non-composite dead load (kips/ft.).

$M\mathcal{D}$: Un-factored moment due to non-composite dead load (kip-ft).

$s\mathcal{D}$: Un-factored long-term composite (superimposed) dead load (kips/ft.).

$M_s\mathcal{D}$: Un-factored moment due to long-term composite (superimposed) dead load (kip-ft.).

$M\mathcal{L}$: Un-factored live load moment (kip-ft.).

M_{Imp}: Un-factored moment due to impact (kip-ft).

M_a: Factored design moment (kip-ft.).
$1.3\,[M\mathcal{D} + M_s\mathcal{D} + \frac{5}{3}(M\mathcal{L} + M_{Imp})]$

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

f_f: Factored calculated normal stress at the edge of flange due to lateral bending (ksi).

f_s (Overload): Sum of stresses as computed from the moments below (ksi).
$M\mathcal{D} + M_s\mathcal{D} + \frac{5}{3}(M\mathcal{L} + M_{Imp})$

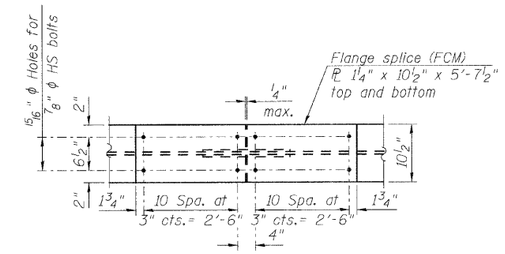
f_s (Total): Sum of stresses as computed from the moments below (ksi).
$1.3\,[M\mathcal{D} + M_s\mathcal{D} + \frac{5}{3}(M\mathcal{L} + M_{Imp})]$

F_{cr} (Overload): Critical average flange stress at overload computed according to the 2003 AASHTO Guide Specifications for Horizontally Curved Steel Girder Highway Bridges Section 9.5 (ksi.).

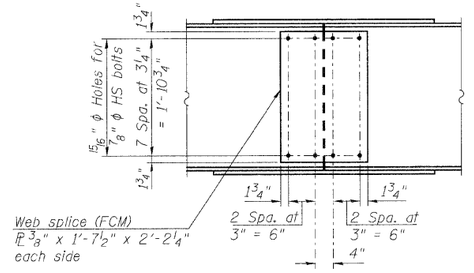
F_{cr}: Critical average flange stress (smaller of F_{cr1} or F_{cr2} for partially braced flanges and F_y for continuously braced flanges) computed according to the 2003 AASHTO Guide Specifications for Horizontally Curved Steel Girder Highway Bridges (Sections 5.2, 5.3 and 5.4) (ksi).

VR: Maximum$\mathcal{L}$ + impact horizontal shear range within span for stud shear connector design (kips).

Note:
$M\mathcal{L}$ and $R\mathcal{L}$ include the effects of centrifugal force and superelevation.



PLAN

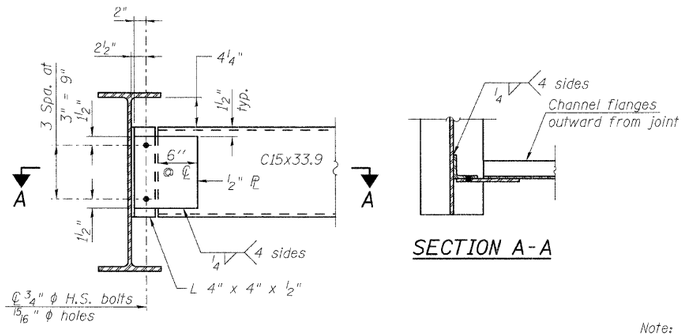


ELEVATION

FIELD SPLICE DETAIL

TOP OF BEAM ELEVATIONS (For Fabrication Only) - UNIT 5

Beam	℄ E. Brg. Pier 8	℄ Field Splice 5-1	℄ Brg. Pier 9	℄ Field Splice 5-2	℄ Field Splice 5-3	℄ Brg. Pier 10	℄ Field Splice 5-4	℄ Brg. E. Abut.
5.1	833.06	830.40	829.76	829.12	826.45	825.81	825.17	822.71
5.2	833.06	830.40	829.76	829.12	826.45	825.81	825.17	822.71

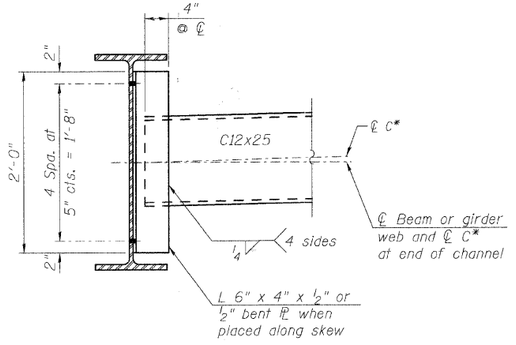


SECTION A-A

DIAPHRAGM D6

(4 Required)

Note:
Two hardened washers required for each set of oversized holes.



Note:
Two hardened washers required for each set of oversized holes.

* Alternate channelsare permitted to facilitate material acquisition. Calculated weight of structural steel is based on the lighter section.
** ¾" ϕ HS bolts, 15/16" ϕ holes

DIAPHRAGM D7

(23 Required)

NOTES:

1. All Structural Steel shall be AASHTO M 270 Grade 50W.
2. Beam elevations are measured along the web centerline.

DESIGNED	MJD
CHECKED	AEU
DRAWN	MJD
CHECKED	AEU

RHA&A

Robert H. Anderson & Associates, Inc.
Consulting Engineers
License No. 184-005281

STRUCTURAL STEEL DETAILS
UNIT 5
PEDESTRIAN BRIDGE OVER RANDALL ROAD
AT SILVER GLEN ROAD
FAU 2505, SECTION 94-P4008-01-BR
KANE COUNTY
STRUCTURE NO. 045-9000
DATE: OCTOBER 31, 2008