

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

GIRDER MOMENT TABLE - RAMP 1 FLARE

	Girder 1.1			Girder 1.2			Girder 1.3 to 1.7			Girder 1.8			Girder 1.9 to 1.10A & 1.13 to 1.15	Girder 1.11 & 1.16 to 1.18	Girder 1.19 & 1.20	Crosshead Girder	
	0.4 Sp. R1-1	Pier	0.6 Sp. R1-2	0.4 Sp. R1-1	Pier	0.6 Sp. R1-2	0.4 Sp. R1-1	Pier	0.6 Sp. R1-2	0.4 Sp. R1-1	Pier	0.6 Sp. R1-2	0.5 Sp.	0.5 Sp.	0.5 Sp.	Bearing 1	0.5 Sp.
I_s	(in ⁴)	30,764	30,764	30,764	30,764	30,764	30,764	30,764	30,764	53,461	53,461	53,461	9,040	15,000	40,988	138,181	138,181
I_c (n)	(in ⁴)	63,774		63,774	63,774		63,774		63,774			97,867		97,867	31,861	93,600	
I_c (3n)	(in ⁴)	47,892		47,892	47,892		47,892		47,892			74,166		74,166	23,421	66,730	
S_s	(in ³)	1,099	1,099	1,099	1,099	1,099	1,099	1,099	1,099	1,711	1,711	1,711	504	837	1,788	4,268	4,268
S_c (n)	(in ³)	1,408		1,408	1,408		1,408		1,408			2,109		2,109	1,096	2,271	
S_c (3n)	(in ³)	1,294		1,294	1,294		1,294		1,294			1,935		1,935	995	2,092	
Z	(in ³)												943				
\bar{Q}	(k/')	1.27	1.32	0.93	1.12	1.32	0.93	0.93	1.32	0.93	0.94	1.3	2.2	1.57	1.10	1.14	
$M \bar{Q}$	(k)	132.1	1066.3	643.6	801.9	1585.2	436.8	743.6	1431.8	414.1	676.1	1773.5	890.1	251.7	736.0	1286.5	6453.0
$s \bar{Q}$	(k/')	0.43		0.39	0.51		0.39	0.39		0.39	0.36		0.8		0.44	0.45	
$M_s \bar{Q}$	(k)	65.9		286.4	410.8		205.4	339.9		199.0	274.9		228.6		296.2	503.8	
$M \bar{L}$	(k)	446.9	394.0	680.2	917.7	524.2	674.0	786.3	496.7	648.3	770.4	481.2	531.0	215.0	588.3	842.5	866.0
M (Imp)	(k)	120.7	98.0	156.8	201.3	118.4	157.0	172.4	112.9	152.8	169.1	112.7	133.2	64.5	176.5	191.6	203.0
M_3 [M + M(Imp)]	(k)	946.0	820.0	1395.0	1865.0	1071.0	1385.0	1597.8	1016.0	1335.2	1565.8	989.8	1107.0	465.8	1274.7	1723.5	1781.7
M_a	(k)	1487.2	2452.2	3022.5	4001.0	3453.1	2635.4	3485.7	3182.1	2532.8	3271.9	3592.3	2893.4	932.8	2998.9	4567.9	10705.1
M_u	(k)	7179.0		7179.0	7179.0		7179.0		7179.0		10291.0		10291.0	3929.0	5068.0	9994.0	
$f_s \bar{Q}$ (non-comp)	(ksi)	1.4	11.6	7.0	8.8	17.3	4.8	8.1	15.6	4.5	4.7	12.4	6.2	6.0	10.6	8.6	18.1
$f_s \bar{Q}$ (comp)	(ksi)	0.6		2.7	3.8		1.9	3.2		1.8	1.7		1.4		3.6	2.9	
f_s \bar{L} + Imp)	(ksi)	8.1	9.0	11.9	15.9	11.7	11.8	13.6	11.1	11.4	8.9	6.9	6.3	11.1	14.0	9.1	5.0
f_s (Overload)	(ksi)	10.1	20.6	21.6	28.5	29.0	18.5	24.9	26.7	17.7	15.4	19.4	14.0	17.1	28.1	20.6	23.2
f_s (Total)	(ksi)		26.8			37.7			34.7			25.2				30.1	17.6
VR	(k)	59.3		54.6	58.6		57.2	55.5		56.7	49.4		52.1	46.7	52.6	53.0	

GIRDER REACTION TABLE - RAMP 1 FLARE

	Girder 1.1			Girder 1.2			Girder 1.3 to 1.7			Girder 1.8			Girder 1.9 to 1.10A & 1.13 to 1.15	Girder 1.11 & 1.16 to 1.18	Girder 1.19 & 1.20	Crosshead Girder	
	FB 1.12	Pier	Carrier Girder	R1 Abut.	Pier	Carrier Girder	R1 Abut.	Pier	Carrier Girder	R1 Abut.	Pier	Carrier Girder				Bearing 1	Bearing 2
$R \bar{Q}$	(k)	23.1	134.8	50.6	61.8	163.4	42.5	53.9	154.0	41.1	50.8	196.4	69.6	26.1	63.5	100.3	1201.6
$R \bar{L}$	(k)	40.0	53.4	41.5	44.5	59.9	41.8	42.4	58.5	41.7	37.8	56.5	36.2	35.9	40.0	42.8	163.0
Imp.	(k)	10.8	9.6	9.6	9.7	9.4	9.7	9.3	9.3	9.8	8.3	9.3	9.1	10.8	12.0	9.7	38.1
R (Total)	(k)	73.9	197.8	101.7	116.0	232.7	94.0	105.6	221.8	92.6	96.9	262.2	114.9	72.8	115.5	152.8	1402.7

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 (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 and Overload) 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 and Overload) due to long-term composite (superimposed) dead loads (in⁴ and in³).
Z: Plastic Section Modulus of the steel section in non-composite areas (in³).
 \bar{Q} : Un-factored non-composite dead load (kips/ft.).
 $M \bar{Q}$: Un-factored moment due to non-composite dead load (kip-ft.).
 $s \bar{Q}$: Un-factored long-term composite (superimposed) dead load (kips/ft.).
 $M_s \bar{Q}$: Un-factored moment due to long-term composite (superimposed) dead load (kip-ft.).
 $M \bar{L}$: Un-factored live load moment (kip-ft.).

M_I : Un-factored moment due to impact (kip-ft.).
 M_a : Factored design moment (kip-ft.).
 $1.3 [M \bar{Q} + M_s \bar{Q} + \frac{5}{3} (M \bar{L} + M_I)]$
 M_u : Compact composite moment capacity according to AASHTO LFD 10.50.1.1 or compact non-composite moment capacity according to AASHTO LFD 10.48.1 (kip-ft.).
 f_s (Overload): Sum of stresses as computed from the moments below (ksi).
 $M \bar{Q} + M_s \bar{Q} + \frac{5}{3} (M \bar{L} + M_I)$
 f_s (Total): Sum of stresses as computed from the moments below on non-compact section (ksi).
 $1.3 [M \bar{Q} + M_s \bar{Q} + \frac{5}{3} (M \bar{L} + M_I)]$
VR: Maximum \bar{L} + impact shear range within the composite portion of the span for stud shear connector design (kips).

MOMENT TABLE 1
RAMP 1 FLARE
STRUCTURE NO. 016-0724

TYLIN INTERNATIONAL	DESIGNED - EKH, JMA	REVISIONS		SHEET NO. 110	F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
	CHECKED - AMD,	NAME	DATE		55	0711.2R & 1011.1BR	COOK	741	434
	DRAWN - EKH, JMA				239 SHEETS	CONTRACT NO. 60999			
	CHECKED - AMD,				FED. ROAD DIST. NO. 1 ILLINOIS FED. AID PROJECT				
	DATE - 03/25/2011								