

STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION

GIRDER MOMENT TABLE - RAMP 4 FLARE

	Girder 4.1			Girder 4.2			Girder 4.3 to 4.7			Girder 4.8			Girder 4.9 to 4.10A & 4.13 to 4.15	Girder 4.11 & 4.16 to 4.18	Girder 4.19 & 4.20	Crosshead Girder			
	0.4 Sp. R4-1	Pier	0.6 Sp. R4-2	0.4 Sp. R4-1	Pier	0.6 Sp. R4-2	0.4 Sp. R4-1	Pier	0.6 Sp. R4-2	0.4 Sp. R4-1	Pier	0.6 Sp. R4-2	0.5 Sp.	0.5 Sp.	0.5 Sp.	Bearing 1	0.5 Sp.		
$I_s$	(in <sup>4</sup> )	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		
$I_c$	(in <sup>4</sup> )	63,774		63,774	63,774		63,774		63,774	97,867		97,867		31,861	93,600				
$I_c$	(3n)	(in <sup>4</sup> )	47,892	47,892	47,892		47,892		47,892	74,166		74,166		23,421	66,730				
$S_s$	(in <sup>3</sup> )	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 <sup>3</sup> )	1,408		1,408	1,408		1,408	1,408	2,109		2,109		1,096	2,271				
$S_c$	(3n)	(in <sup>3</sup> )	1,294		1,294	1,294		1,294	1,294	1,935		1,935		995	2,092				
Z	(in <sup>3</sup> )												943						
$\bar{\rho}$	(k/')	0.93	1.32	1.27	0.93	1.32	1.12	0.93	1.32	0.93	2.2	1.3	0.94	1.57	1.10	1.14			
$M \bar{\rho}$	(k)	643.6	1066.3	132.1	436.8	1585.2	801.9	414.1	1431.8	743.6	890.1	1773.5	676.1	251.7	736.0	1286.5	6453.0	2361.0	
$s \bar{\rho}$	(k/')	0.39		0.43	0.39		0.51	0.39		0.39	0.8		0.36		0.44	0.45			
$M_s \bar{\rho}$	(k)	286.4		65.9	205.4		410.8	199.0		339.9	228.6		274.9		296.2	503.8			
$M \bar{\rho}$	(k)	680.2	394.0	446.9	674.0	524.2	917.7	648.3	496.7	786.3	531.0	481.2	770.4	215.0	588.3	842.5	866.0	1188.2	
$M$	(Imp)	(k)	156.8	98.0	120.7	157.0	118.4	201.3	152.8	112.9	172.4	133.2	112.7	169.1	64.5	176.5	191.6	203.0	278.0
$S_3[M \bar{\rho} + M(Imp)]$	(k)	1395.0	820.0	946.0	1385.0	1071.0	1865.0	1335.2	1016.0	1597.8	1107.0	989.8	1565.8	465.8	1274.7	1723.5	1781.7	2443.7	
$M_a$	(k)	3022.5	2452.2	1487.2	2635.4	3453.1	4001.0	2532.8	3182.1	3485.7	2893.4	3592.3	3271.9	932.8	2998.9	4567.9	10705.1	6246.1	
$M_u$	(k)	7179.0		7179.0	7179.0		7179.0		7179.0	10291.0		10291.0	3929.0	5068.0	9994.0				
$f_s \bar{\rho}$	(non-comp)	(ksi)	7.0	11.6	1.4	4.8	17.3	8.8	4.5	15.6	8.1	6.2	12.4	4.7	6.0	10.6	8.6	18.1	6.6
$f_s \bar{\rho}$	(comp)	(ksi)	2.7		0.6	1.9		3.8	1.8		3.2	1.4		1.7		3.6	2.9		
$f_s S_3(\bar{\rho} + Imp)$	(ksi)	11.9	9.0	8.1	11.8	11.7	15.9	11.4	11.1	13.6	6.3	6.9	8.9	11.1	14.0	9.1	5.0	6.9	
$f_s$	(Overload)	(ksi)	21.6	20.6	10.1	18.5	29.0	28.5	17.7	26.7	24.9	14.0	19.4	15.4	17.1	28.1	20.6	23.2	13.5
$f_s$	(Total)	(ksi)		26.8			37.7			34.7			25.2		22.2		30.1	17.6	
VR	(k)	54.6		59.3	57.2		58.6	56.7		55.5	52.1		49.4	46.7	52.6	53.0			

GIRDER REACTION TABLE - RAMP 4 FLARE

	Girder 4.1			Girder 4.2			Girder 4.3 to 4.7			Girder 4.8			Girder 4.9 to 4.10A & 4.13 to 4.15	Girder 4.11 & 4.16 to 4.18	Girder 4.19 & 4.20	Crosshead Girder		
	Carrier Girder	Pier	FB 4.12	Carrier Girder	Pier	R4 Abut.	Carrier Girder	Pier	R4 Abut.	Carrier Girder	Pier	R4 Abut.				Bearing 1	Bearing 2	
$R \bar{\rho}$	(k)	50.6	134.8	23.1	42.5	163.4	61.8	41.1	154.0	53.9	69.6	196.4	50.8	26.1	63.5	100.3	1201.6	573.1
$R \bar{\rho}$	(k)	41.5	53.4	40.0	41.8	59.9	44.5	41.7	58.5	42.4	36.2	56.5	37.8	35.9	40.0	42.8	163.0	120.9
Imp.	(k)	9.6	9.6	10.8	9.7	9.4	9.7	9.8	9.3	9.3	9.1	9.3	8.3	10.8	12.0	9.7	38.1	28.3
$R$	(Total)	(k)	101.7	197.8	73.9	94.0	232.7	116.0	92.6	221.8	105.6	114.9	262.2	96.9	72.8	115.5	1402.7	722.3

$I_s, S_s$ : 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<sup>4</sup> and in<sup>3</sup>).  
 $I_c(n), S_c(n)$ : 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<sup>4</sup> and in<sup>3</sup>).  
 $I_c(3n), S_c(3n)$ : 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<sup>4</sup> and in<sup>3</sup>).  
Z: Plastic Section Modulus of the steel section in non-composite areas (in<sup>3</sup>).  
 $\bar{\rho}$ : Un-factored non-composite dead load (kips/ft.).  
 $M \bar{\rho}$ : Un-factored moment due to non-composite dead load (kip-ft.).  
 $s \bar{\rho}$ : Un-factored long-term composite (superimposed) dead load (kips/ft.).  
 $M_s \bar{\rho}$ : Un-factored moment due to long-term composite (superimposed) dead load (kip-ft.).  
 $M \bar{\rho}$ : Un-factored live load moment (kip-ft.).

$M_1$ : Un-factored moment due to impact (kip-ft.).  
 $M_a$ : Factored design moment (kip-ft.).  
 $1.3 [M \bar{\rho} + M_s \bar{\rho} + \frac{1}{3} (M \bar{\rho} + M_1)]$   
 $M_u$ : 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).  
 $M \bar{\rho} + M_s \bar{\rho} + \frac{1}{3} (M \bar{\rho} + M_1)$   
 $f_s$  (Total): Sum of stresses as computed from the moments below on non-compact section (ksi).  
 $1.3 [M \bar{\rho} + M_s \bar{\rho} + \frac{1}{3} (M \bar{\rho} + M_1)]$   
VR: Maximum  $\bar{\rho}$  + impact shear range within the composite portion of the span for stud shear connector design (kips).

MOMENT TABLE 1  
RAMP 4 FLARE  
STRUCTURE NO. 016-0724

TYLIN INTERNATIONAL

DESIGNED -	PK	REVISIONS	
CHECKED -	AMD,	NAME	DATE
DRAWN -	PK		
CHECKED -	AMD,		
DATE -	08/02/10		

SHEET NO. 113 137 SHEETS	F.A.I RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
	55	0711.2R & 1011.1BR	COOK	200	143
FED. ROAD DIST. NO. 1 ILLINOIS			FED. AID PROJECT		
CONTRACT NO. 60L39					