



**BILL OF MATERIAL**

Item	Unit	Quantity
Furnishing and Erecting Structural Steel	Pound	2,560

**END OF BEAM REPAIR**  
(See Framing Plan, Sht. S14 for locations)  
(16 thus)

Note:  
All holes field drilled into existing steel members shall be included in the cost of Furnishing and Erecting Structural Steel.

$I_s, S_s$ : 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).  
 $Q$ : Un-factored non-composite dead load (kips/ft.).  
 $M_Q$ : Un-factored moment due to non-composite dead load (kip-ft.).  
 $s_Q$ : Un-factored long-term composite (superimposed) dead load (kips/ft.).  
 $M_s Q$ : Un-factored moment due to long-term composite (superimposed) dead load (kip-ft.).  
 $M_L$ : Un-factored live load moment (kip-ft.).  
 $M_I$ : Un-factored moment due to impact (kip-ft.).  
 $M_a$ : Factored design moment (kip-ft.).  
 $L_3 [M_Q + M_s Q + \frac{1}{3} (M_L + M_I)]$   
 $M_u$ : 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).  
 $M_Q + M_s Q + \frac{1}{3} (M_L + M_I)$   
 $f_s$  (Total): Sum of stresses as computed from the moments below on non-compact section (ksi).  
 $L_3 [M_Q + M_s Q + \frac{1}{3} (M_L + M_I)]$   
 $VR$ : Maximum + impact shear range within the composite portion of the span for stud shear connector design (kips).

INTERIOR GIRDER MOMENT TABLE						
		0.4 Sp. 1	0.5 Sp. 2 or 0.5 Sp. 3	Piers 1 or 3	Pier 2	0.6 Sp. 4
$I_s$	(in⁴)	8,902	8,902	8,902	12,704	8,902
$I_c(n)$	(in⁴)	23,728	23,728	-	-	23,728
$I_c(3n)$	(in⁴)	17,307	17,307	-	-	17,307
$S_s$	(in³)	496	496	496	687	496
$S_c(n)$	(in³)	734	734	-	-	734
$S_c(3n)$	(in³)	661	661	-	-	661
$Q$	(k/ft)	0.882	0.882	1.343	1.343	0.882
$M_Q$	(k)	82.3	250.8	502.3	708.7	93.9
$s_Q$	(k/ft)	0.461	0.461	-	-	0.461
$M_s Q$	(k)	53.9	160.6	-	-	60.1
$M_L$	(k)	294.0	480.4	273.0	333.4	305.4
$M_I$	(k)	86.1	118.7	68.3	82.3	88.8
$M_a [M_Q + I]$	(k)	633.5	998.5	568.9	692.8	657.0
$M_u$	(k)	1,000.6	1,832.9	1,392.0	1,822.0	1,054.3
$M_u$	(k)	2,143.8	2,026.2	-	-	2,136.5
$f_s Q$ non-comp	(ksi)	2.0	6.1	12.2	12.4	2.3
$f_s Q$ (comp)	(ksi)	1.0	2.9	-	-	1.1
$f_s [M_Q + M_I]$	(ksi)	10.4	16.3	9.3	9.1	10.8
$f_s$ (Overload)	(ksi)	13.4	25.3	21.5	21.5	14.2
$f_s$ (Total)	(ksi)	-	-	28.0	28.0	-
$VR$	(k)	44.9	50.8	-	-	49.1

INTERIOR GIRDER REACTION TABLE				
	Abut's.	Piers 1 & 3	Pier 2	
$R_Q$	(k)	20.7	92.0	109.7
$R_L$	(k)	35.2	45.9	50.9
$R_I$	(k)	10.3	12.3	12.6
$R_{Total}$	(k)	66.2	150.2	173.2

\* Compact section  
\*\* Braced non-compact and partially braced section

FILE NAME = I:\022909\_Centrol\_Ave\Structural\CADD Sheets\0168P17-15-beam-end-repair.dgn

	USER NAME = IDOT	DESIGNED - J.C.N./B.N.S.	REVISED -
	PLOT SCALE = 50.000000 ' / IN.	CHECKED - B.N.S.	REVISED -
	PLOT DATE = 12/12/2011	DRAWN - F.M.	REVISED -
		DATE - DECEMBER 9, 2011	REVISED -

**STATE OF ILLINOIS**  
**DEPARTMENT OF TRANSPORTATION**

**BEAM END REPAIRS**  
**STRUCTURE NO. 016-2458**  
 SHEET NO. S15 OF S24 SHEETS

F.A.I. R.T.E.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
80	1415-803HB-R	COOK	51	30
CONTRACT NO. 60P17				
ILLINOIS FED. AID PROJECT				