



	0.4 Sp. 1	Pier 1	0.5 Sp. 2	Pier 2	0.5 Sp. 3	Pier 3	0.6 Sp. 4
I_s (in ⁴)	5900	5900	5900	8518	5900	5900	5900
I_c (n) (in ⁴)	15856	---	15856	---	15856	---	15856
I_c (sn) (in ⁴)	11683	---	11683	---	11683	---	11683
S_s (in ³)	359	359	359	505	359	359	359
S_c (n) (in ³)	531	---	531	---	531	---	531
S_c (sn) (in ³)	480	---	480	---	480	---	480
ϕ (k/ft.)	0.810	1.257	0.810	1.257	0.810	1.257	0.810
$M\phi$ (k)	85	351	156	523	158	344	72
$s\phi$ (k/ft.)	0.447	---	0.447	---	0.447	---	0.447
$M_s\phi$ (k)	58	---	119	---	120	---	51
$M\phi$ (k)	256	183	385	244	383	180	242
M (Imp) (k)	77	51	100	64	100	51	72
$5_s[M\phi + M(\text{Imp})]$ (k)	555	390	808	513	805	385	523
M_a (k)	907	963	1407	1347	1408	948	840
* M_u (k)	1528	---	1474	---	1474	---	1541
$f_s\phi$ non-comp (k.s.i.)	2.8	11.8	5.2	12.4	5.3	11.5	2.4
$f_s\phi$ (comp) (k.s.i.)	1.5	---	3.0	---	3.0	---	1.3
$f_s 5_s(\phi + \text{Imp})$ (k.s.i.)	12.5	13.0	18.2	12.2	18.2	12.9	11.8
f_s (Overload) (k.s.i.)	16.8	24.8	26.4	24.6	26.5	24.4	15.5
** f_s (Total) (k.s.i.)	---	32.2	---	32.0	---	31.7	---
VR (k)	47.0	---	51.0	---	51.0	---	47.0

* Compact, braced section.
 ** Non-compact, partially braced section.

	W. Abut.	Pier 1	Pier 2	Pier 3	E. Abut.
$R\phi$ (k)	47.7	75.0	89.8	74.0	46.5
$R\phi$ (k)	32.0	40.0	43.2	40.0	32.0
Imp. (k)	9.6	11.2	11.2	11.2	9.6
R (Total) (k)	89.3	126.2	144.2	125.2	88.1

I_s and S_s are the moment of inertia and section modulus of the steel section used in computing f_s (Total & Overload).

$I_{c(n)}$ and $S_{c(n)}$ are the moment of inertia and section modulus of the composite section used in computing stresses due to Live Load.

$I_{c(sn)}$ and $S_{c(sn)}$ are the moment of inertia and section modulus of the composite section used in computing stresses due to superimposed dead loads. (see AASHTO 10.38)

VR is the maximum Live Load + Impact shear range in span.

The Plastic Moment capacity (M_u) is computed according to AASHTO 10.48.1 and 10.50.1.1.

f_s (Total) (Non-compact section) is the sum of the stresses due to $1.3[M\phi + M_s\phi + 5_s(M\phi + M(\text{Imp}))]$.

f_s (Overload) is the sum of the stresses due to $M\phi + M_s\phi + 5_s(M\phi + M(\text{Imp}))$.

$M\phi$ - Moment due to dead loads on non-composite section.
 $M_s\phi$ - Moment due to dead loads on composite section.

$M\phi$ - Moment due to live loads on non-composite or composite section.

M (Imp) - Moment due to live load impact on non-composite or composite section.

M_a (Applied Moment) = $1.3[M\phi + M_s\phi + 5_s(M\phi + M(\text{Imp}))]$.

DESIGNED Ruben V. Boehler
 CHECKED Tim S. Howard
 DRAWN Nicole L. Darling
 CHECKED Michael D. Cummins

Work this sheet with sheet 13 of 22.

STRUCTURAL STEEL

IL ROUTE 133 OVER I-57
 F.A.I. ROUTE 57 SECTION (15,21-25HB-2)BR
 DOUGLAS COUNTY
 STA. 1492+76.53
 S.N. 021-0024

CUMMINS ENGINEERING CORPORATION
 JOB #: 2114
 FILE: 2114SS
 DATE: 10/24/06