V Slab Bridge Design Software
Superstructure Design Check

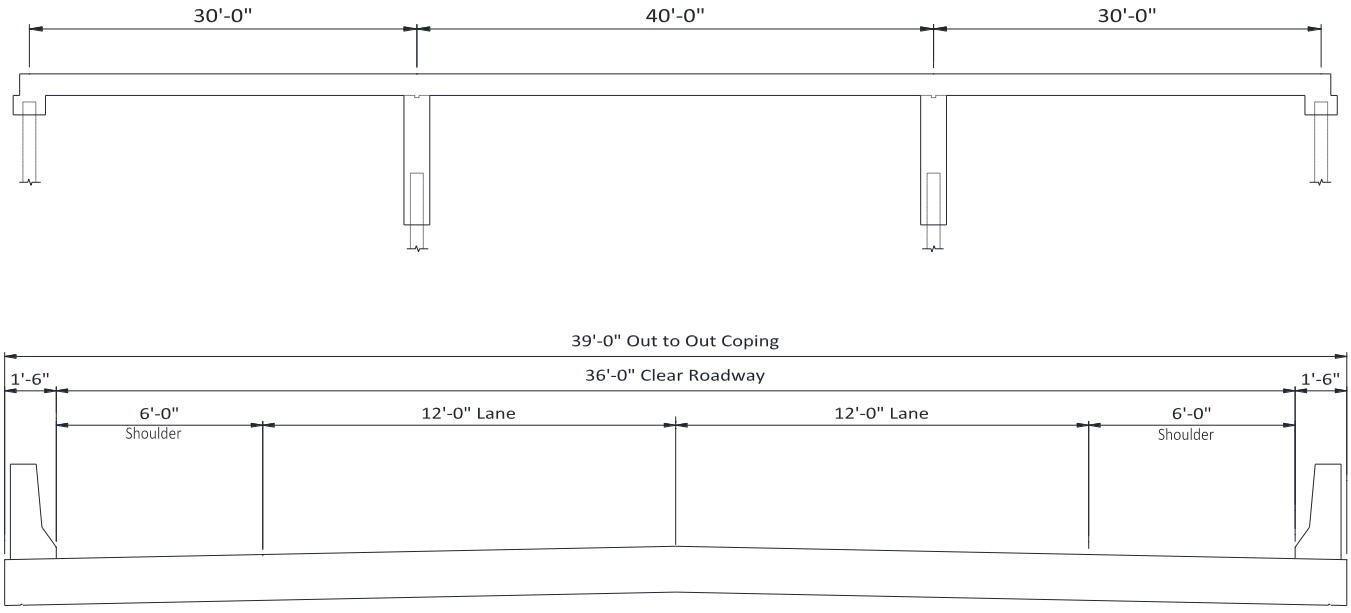
PURPOSE

This superstructure design check is provided to assist the Engineer of Record (EOR) in the verification process for the V Slab Bridge Design Program.

GENERAL DISCUSSION

This superstructure design check provides detailed design verification at several sections to illustrate the calculation processes used.

The bridge geometry used for the loading verification study is also used for these design checks. For this example, a three span (30’,40’,30’) continuous flat slab was selected. The slab depth is 20 inches.



The bridge cross section consists of two 12-foot lanes with 6-foot shoulders and 18-inch barrier railing on each side. Based on the calculation Roadway/12, the code indicates a 3-lane bridge. However, we have overridden this calculation and specified a 2 lanes bridge.

For this example, the railing weighs 400 plf, and a future wearing surface of 35 psf was used. For simplicity of calculations, the bridge is not skewed. The V Slab report output is included in the appendix.

DISTRIBUTION FACTORS

From [4.6.2.3], the interior strip width is calculated as:

E (interior) = 84 + 1.44 * $\sqrt{}$ (30 x 39) / (12”/ft.) = 11.1 ft. < 12 x 39 / 2 / (12”/ft.) = 19.5 ft.
E (interior) = 11.1 ft.

From [4.6.2.1.4b], the edge beam strip width is calculated as:

E (edge) = 1.5 ft. (barrier) + 1 ft. + ¼ x 11.1 ft. = 5.275 ft. < ½ x 11.1 = 5.55 ft. (6 ft. Max.)
E (edge) = 5.275 ft.

DEAD LOAD

The unfactored dead load moments and reactions are provided in the dead load and deflection summary table. These are for unfactored slab weight only, as described below the table. The maximum unfactored dead load negative moment at support 2 is -31.597 ft-k/ft. The slab weight is 250 psf which was determined by 150 pcf x 20” / (12”/ft).

The future wearing surface (FWS) load is applied directly to the interior strip unit width (i.e. 35 psf load) for this case. For the exterior strip width, the FWS load is only applied to the roadway width. The railing width is equal to (39’ – 36’) / 2 = 1.5 feet. The exterior strip load is a ratio of the tributary roadway width of the exterior strip to the total strip width. The exterior strip load concepts are described later in this document.

FWS (exterior strip) = 35 psf x (5.275 ft – 1.5 ft) / (5.275 ft) = 25.05 psf

The railing load is applied to the interior strip and exterior strip according to the percentages specified. For this example, 50% was specified for distribution over the bridge width. This results in an equivalent interior strip load of:

W (interior strip rail) = 0.5 x 2 x 400 plf / 39 ft = 10.26 psf

The exterior strip rail load includes both this distributed portion and 50% of the line load distributed over the exterior strip width.

W (exterior strip rail) = 10.26 psf + 0.50 x 400 plf / 5.275ft = 48.17 psf

LIVE LOAD

Live load analysis is discussed in detail in the “V Slab – Loading Verification Study,” which uses the same structure geometric layout as this design check.

INTERIOR STRIP DESIGN CHECK

The interior strip will be used for the superstructure design review. Only the negative moment condition will be verified as the positive moment checks are very similar to these and can be verified by the designer using the methodology provided in this check. The design moments are calculated below:

NEGATIVE MOMENT – SUPPORT #2 (TOP)

Mu = 31.597 x (1.25 + 1.25 x 10.26 / 250 + 1.5 x 35 / 250) + 1.75 x 379.74 / 11.1 = 107.621 ft-k
Mu = 1,291,458 in - # / ft width

Mu = 1,291,153 in - # / ft width from report (Interior Strip Design Moments)

Ms = 31.597 x (1 + 10.26 / 250 + 35 / 250) + 379.74 / 11.1 = 71.528 ft-k
Ms = 858,338 in - # / ft width

Ms = 858,163 in - # / ft width from report (Interior Strip Top Bar Section Checks)

REQUIRED AREA OF STEEL

d- = 20" – 2.5" (cover) – 0.5" (Assume a #8 bar diameter) = 17 inches
Ku = 1,291 in-k / (0.9 x 12" x 4 x 17^2) = 0.103406
ω = 0.85 x (1 - $\sqrt{}$ (1 – 2.36 x Ku)) = 0.110958
ρ = ω x f'c / fy = 0.007397
As = ρ x b x d = 1.51 in^2 / ft (1.52 in^2 / ft from printout)

TENSION / COMPRESSION CONTROL CHECK (STEEL STRAIN)

There is no longer a calculation to limit the maximum area of steel at a section. Instead, the strain at nominal strength is checked to determine if the section is tension or compression controlled. In accordance with 5.5.4.2 & 5.6.2.1, the strain limits for tension and compression control are checked. These values are dependent on the grade of reinforcing provided. Tension controlled sections use a $\emptyset$ = 0.9 and compression-controlled sections must use a $\emptyset$ = 0.75. Between these limits, a transition equation is used.

For grade 60 steel, the tension-controlled strain is 0.005 and the compression-controlled strain is 0.002. This is completed in the program by finding the strain at each design section. The strain, in the extreme tension steel, is found by strain compatibility using the full factored load at nominal strength.

T = C → As Fy = .85 f'c b a
a = As Fy / .85 f'c b

$c = a / \beta_1$

$\varepsilon_s = 0.003 (d - c) / c = 0.003 (\beta_1 d / a - 1)$, $\beta_1 = 0.85$

$\varepsilon_s = 0.003 (.85 \beta_1 f'c\ b\ d / As\ Fy - 1)$

$\varepsilon_s = 0.003 (.85 \times .85 \times 4 \times 12 \times 17 / (1.51 \times 60) - 1) = 0.01659 > 0.005$ (Tension Controlled)

MINIMUM AREA OF STEEL

For the minimum steel requirement, the provided steel must be greater than that required to meet 1.2Mcr, or at least 1.33 times the calculated steel if it is less than 1.2Mcr. Temperature and shrinkage steel must also be satisfied.

The cracking moment per [5.6.3.3] is calculated. This utilizes variability factors that include reinforcing steel types. For grade 60 steel, the program used a variability factor of 0.75 x 1.6 = 1.2.

$Fr = 0.24 \sqrt{f'c} = 0.48$ ksi
$S = b\ t^2 / 6 = 12 \times 20^2 / 6 = 800$ in^3

1.2Mcr = 1.2 Mcr * S *1.2 = 1.2 x 0.48 x 800 x 1.2 = 553 in-k/ft < Mu = 1,291 in-k/ft (o.k.)

CRACK CONTROL MAXIMUM SPACING

If the service moment is greater than 80% of the cracking moment, the maximum spacing in [5.7.3.4] must be checked. Per the previous section, a variability factor of 1.2 was used.

From report, Bar 1 is a #9 bar and Bar 2 is a #8 bar at a spacing of 6 inches
As (provided) = 1.79 in^2 / ft

$Fr = 0.24 \sqrt{f'c} = 0.48$ ksi

0.8Mcr = 0.8 Mcr * S *1.2 = 0.8 x 0.48 x 800 x 1.2 = 369 in-k/ft < Ms = 856 in-k/ft

$S_{max} < 700\ \gamma_e / \beta_s\ f_{ss} - 2\ d_c$
$\gamma_e = 0.75$
Average Bar Diameter = (1.0 + 1.128) / 2 = 1.064”
d_c = 2.5” (top cover) + 1.064 / 2 = 3.032”
d = 20” – 3.032” = 16.968”

T = C → Fs As = ½ fc b c (c is the depth of the triangular concrete stress block)

$Es\ \varepsilon_s\ As = ½\ \varepsilon_c\ Ec\ b\ c$

$\varepsilon_c = c\ \varepsilon_s / (d – c)$

$Es\ \varepsilon_s\ As = ½\ c\ \varepsilon_s\ Ec\ b\ c / (d – c)$

$As (d – c)\ Es / Ec = ½\ b\ c^2$

$n = Es / Ec$

$Ec = 1{,}820 \sqrt{f'c} = 3{,}640$ ksi, Es = 29,000ksi

$n = 29{,}000 / 3{,}640 = 7.97$

$n\ As\ d – n\ As\ c – ½\ b\ c^2 = 0$

$½\ b\ c^2 + n\ As\ c – n\ As\ d = 0$

$A = 0.5\ b = 0.5 \times 12 = 6$

$B = n\ As = 7.97 \times 1.79 = 14.266$

$C = - n\ As\ d = -7.97 \times 1.79 \times 16.968 = -242.07$

$c = (-B + \sqrt{(B^2 - 4\ A\ C)}) / (2\ A)$

$c = 5.273$ inches

The term β_s is the ratio of strain at the extreme tension fiber to the strain at the steel centroid. The equation below is a simplified method, provided in the code, to estimate the calculated value.

$\beta_s = 1 + d_c / 0.7 (h - d_c)$

$\beta_s = 1 + 3.032 / 0.7 (20 – 3.032) = 1.188$

Using similar triangles, the ratio of strain to the distance from the neutral axis is

(Strain at Extreme Fiber) / (h - c) = (Strain at Steel Centroid) / (h – c - dc)

(Strain at Extreme Fiber) / (Strain at Steel Centroid) = (h - c) / (h – c - dc)

$\beta_s = (h - c) / (h – c - dc)$

$\beta_s = (20 – 5.273) / (20 – 5.273 – 3.032)$

$\beta_s = 1.259$ (since this is the actual value, V Slab uses this calculation)

$T = Ms / (d – c/3) = 858 / (16.968 – 5.273 / 3) = 56.409$ kips

$F_{ss} = T / As = 56.409 / 1.79 = 31.513$ ksi

$S_{max} < 700 \times .75 / (1.259 \times 31.513 \text{ ksi}) – 2 \times 3.032 = 7.17$ inches (7.14” from report)

This is reasonably close considering the number of calculations and the opportunity for roundoff errors to compound.

FATIGUE STRESS RANGE

When calculating the area of steel required at each section, the program checks the steel required for strength, then checks crack control and fatigue based on the selected toggle (No Fatigue, Fatigue I or Fatigue II) under the design envelope. If the strength reinforcing does not satisfy these requirements, the bar spacing and/or reinforcing steel selection is adjusted until the conditions are satisfied.

This check didn't control the required area of steel, for the negative moment steel at support 2, so values can't be compared with those in the report. However, a fatigue load rating was included in the report. This calculates fatigue based on the area of steel provided. For comparison purposes, the check is completed for this condition using the provided negative moment reinforcing.

Mf (max) = -770,723 in-#/ft
Mf (min) = -409,787 in-#/ft

As (provided) = 1.79 in^2

c = 5.273 inches (See Crack Control Calculations)

$T_{min} = Mf_{min} / (d – c/3) = 409 .8 / (16.968 – 5.273 / 3) = 26.94$ kips
$f_{min} = T / As = 26.94 / 1.79 = 15.05$ ksi(15.08 ksi from report)

$T_{max} = Mf_{max} / (d – c/3) = 770.7 / (16.968 – 5.273 / 3) = 50.67$ kips
$f_{max} = T / As = 50.67 / 1.79 = 28.31$ ksi (28.36 ksi from report)

$f_r = f_{max} - f_{min} < 28.31 – 15.05 = 13.26$ ksi (13.28 ksi from report)
$f_r < 26 – 22 * f_{min} / Fy = 26 – 22 \times 15.05 / 60 = 20.48$ ksi (20.47 ksi from report)

13.26 ksi < 20.48 ksi (o.k.)

These values agree reasonable well with the values included in the interior strip top bar fatigue I load rating table in the report.

INTERIOR STRIP NEGATIVE MOMENT – TOP BAR CUTOFF IN SPAN 2

Span 2 was selected to demonstrate the top steel bar cutoff because the span has symmetrical cutoff locations at support 2 & 3. Typically, Bar 2 is cut at the location where the Bar 1 area of steel, at twice the spacing, equals the required steel. The spacing limits are checked for the continuing reinforcing steel, Bar 1, at a spacing twice the typical spacing, since the cutoff bar no longer contributes. The cutoff bar is then extended by the greater of: d(neg), 15db, or Span/20

d- = 17" (approximately)
15db = 15 x 1" = 15"
Span / 20 = 40' / 20 = 2.0' (controls)

V Slab calculated the Bar 2 cut location, in span 2, to end at 7 feet from the support. The location at support 3 was calculated by the program. The Bar 2 starting location at support 3 is 33.17 feet (measure from the left end of the span) which is 6.83 feet from support 3. For support 2, the ending location for Bar 2 was manually set to 6.75 feet, about an inch shorter than provided by the program.

In the design section check table, following the top bar definition page, the location of the critical section for these cuts are 6.75' – 2' = 4.75' and 33.17' + 2' = 35.17' for the cutoff bars. As indicated in the table, both locations meet the area of steel requirements, but the section at 4.75' fails the spacing requirements. The section at 35.17 feet passes for spacing as the service moment appears to be less than 80% of the cracking moment. The spacing requirements at 4.75' will be verified by calculation.

Ms = 372,400.1 IN-# (From Table)
db = 1.128" (Only the #9 bar is effective)
d_c = 2.5" (top cover) + 1.128" / 2 = 3.064"
d = 20" - 3.064" = 16.936"

As = 1.0 Sq. Inches (Only the #9 bar is effective)
n = 7.97 (defined earlier)

A = 0.5 b = 0.5 x 12 = 6
B = n As = 7.97 x 1.0 = 7.97
C = - n As d = -7.97 x 1.0 x 16.936 = -134.98

$c = (-B + \sqrt{(B^2 - 4 A C)}) / (2 A)$
c = 4.125 inches

$\beta_s = (h - c) / (h – c - dc)$
$\beta_s = (20 – 4.125) / (20 – 4.125 – 3.064)$
$\beta_s = 1.239$

T = Ms / (d – c/3) = 372.4 / (16.936 – 4.125 / 3) = 23.932 kips
F_{ss} = T / As = 23.932 / 1.0 = 23.932 ksi

$S_{max} < 700 \times .75 / (1.239 \times 23.932ksi) – 2 \times 3.064 = 11.58$ inches (11.58" from report)

The continuing #9 reinforcing bars are spaced at twice the typical spacing 2" x 6" = 12" since the cut bar is no longer effective. Since this exceeds the maximum spacing, the spacing check, in the table, indicates a <FAIL> condition. Therefore, the initial location selected by the program was appropriate.

In addition to the area of steel and spacing requirements, the location of the cut bar termination must be beyond the development length of the cut bar from the support, since the bars selected at the maximum moment location are assumed to be fully engaged. Reinforcing steel development and splice lengths will be discussed in detail in a separate study.

EXTERIOR STRIP CALCULATIONS

The edge of the slab creates a discontinuity which must be designed as a beam [9.7.1.4]. The edge beam, defined as the exterior strip, design follows the same methodology as the interior strip. The live load is applied as ½ of the vehicle live load, and the dead load is that portion discussed in the dead load section. By code, the exterior strip reinforcing cannot be less than the interior strip.

Some agencies require the edge beam to be checked for shear. While superstructure shear design calculations are not required by the code [5.12.2.1] because the moment design is in accordance with [4.6.2.3], designers can obtain shear loads from the program. The calculated shear loads are provided for the interior and exterior beam strips. The shear summary table is printed if the designer checks the appropriate box on the loading page.

For the purposes of the design check, the exterior strip moment calculation at support 2 will be illustrated. The exterior strip distribution width is E (edge) = 5.275 ft. The future wearing surface and railing loads were calculated in the dead load section.

Mu = 31.597 x (1.25 + 1.25 x 48.17/250 + 1.5 x 25.05/250) + 1.75 x 379.74 / (2 x 5.275)
Mu = 114.845 ft-k = 1,378,140 in - # / ft width

Mu = 1,333,889 in - # / ft width from report (Exterior Strip Design Moments)

The difference between these values is related to the live load calculation. For the design check, the maximum HL93 negative moment was divide by 2. However, the actual required loading is for one line of wheels and the prorated amount of the distributed lane load, based on the exterior tributary width (outside of the railing) divide by the 10 Ft. lane load width.

By dividing the total HL-93 moment by two, half of the distributed lane load is also applied to the exterior strip. Since the exterior strip roadway width (3.775 Ft. same as the future wearing surface width), is less than 5 Ft. (half of the lane load width), the live load used in the program will be overestimated in this calculation.

This difference can be calculated if desired. The user can select the “Print HL-93 Lane Load only Table,” under the Loading Specification Tab, to obtain the information necessary to complete this calculation.

V SLAB OUTPUT

SUPERSTRUCTURE DESIGN CHECK REPORT

GENERAL BRIDGE DATA

Code Check is based on the AASHTO LRFD Bridge Design Specification, 9th Edition

THE BRIDGE IS A 3 SPAN CONTINUOUS
FLAT SLAB BRIDGE

SPAN # 1 LENGTH OF SPAN = 30.00 Ft., SLAB DEPTH = 20.00 In.
SPAN # 2 LENGTH OF SPAN = 40.00 Ft., SLAB DEPTH = 20.00 In.
SPAN # 3 LENGTH OF SPAN = 30.00 Ft., SLAB DEPTH = 20.00 In.

GEOMETRICS

ROADWAY WIDTH =	36.00 ft.
OUT TO OUT BRIDGE WIDTH =	39.00 ft.
NUMBER OF TRAFFIC LANES =	2
UPPER CLEAR COVER =	2.50 In.
LOWER CLEAR COVER =	1.00 In.
TIRE WEAR DEPTH =	0.50 In.
BRIDGE SKEW =	0.00 Degrees
TOP EXPOSURE FACTOR =	0.750
BOTTOM EXPOSURE FACTOR =	0.750

MATERIAL PROPERTIES

Fy = 60.00 ksi
TOP REINFORCING IS EPOXY COATED
BOTTOM REINFORCING IS EPOXY COATED

F'c = 4.00 ksi
REINF. CONCRETE UNIT WEIGHT = 0.15 kcf
THE CALCULATED LIVE LOAD CONCRETE MODULUS WAS USED
A USER DEFINED DEAD LOAD CONCRETE MODULUS WAS ENTERED

LOADING SPECIFICATION

RAILING LOAD / SIDE = 400.00 plf
50% RAILING LOAD TO BRIDGE & 50% TO EDGE BEAM

FUTURE WEARING SURFACE =	35.00 psf
INTERIOR STRIP SPECIAL DISTRIBUTED LOAD =	0.00 Plf
EXTERIOR STRIP SPECIAL DISTRIBUTED LOAD =	0.00 Plf
ADDITIONAL EXTERIOR STRIP DEAD LOAD =	0.00 Plf

REINFORCING DEVELOPMENT AND SPLICE VALUES

CALCULATED DEVELOPMENT AND SPLICE TABLE VALUES

_____ TOP REINFORCING FACTORS _____

λrl = 1.3, λcf = 1.5, λrl * λcf = 1.70, λ = λer = 1.0, Ktr = 0.0
λrc (Cover Only) = 0.40(#4), 0.40(#5), 0.40(#6), 0.40(#7), 0.40(#8), 0.40(#9), 0.41(#10), 0.45(#11)

CLASS B SPLICE SELECTED

_____ BOTTOM REINFORCING FACTORS _____

λrl = 1.0, λcf = 1.5, λrl * λcf = 1.5, λ = λer = 1.0, Ktr = 0.0
λrc (Cover Only) = 0.40(#4), 0.48(#5), 0.55(#6), 0.61(#7), 0.67(#8), 0.72(#9), 0.78(#10), 0.84(#11)

CLASS B SPLICE SELECTED

BAR SIZE	TOP Ld LENGTH (FT)	TOP SPLICE LENGTH (FT)	BOTTOM Ld LENGTH (FT)	BOTTOM SPLICE LENGTH (FT)
#4	2.040	2.652	1.800	2.340
#5	2.550	3.315	2.679	3.482
#6	3.060	3.978	3.682	4.786
#7	3.570	4.641	4.793	6.232
#8	4.080	5.304	6.000	7.800
#9	4.602	5.983	7.322	9.518
#10	5.248	6.822	8.878	11.542
#11	6.569	8.539	10.850	14.105

LOADING APPLICATION DETAILS

DISTRIBUTION WIDTH DEFINITION

FATIGUE WIDTH = 1.2 x SINGLE LANE DISTR. = 16.00 ft./Lane

CALCULATED INTERIOR DISTRIBUTION WIDTH = 11.10 ft./Lane

CALCULATED EXTERIOR DISTRIBUTION WIDTH = 5.28 ft./Lane

DESIGN ENVELOPE LOADING DEFINITION

HL93 LOADING WAS INCLUDED
SPECIAL VEHICLE LOADING WAS INCLUDED
FATIGUE I LOADING COMBINATION WAS INCLUDED

SPECIAL INTERIOR STRIP LINE LOAD WAS INCLUDED
SPECIAL EXTERIOR STRIP LINE LOAD WAS INCLUDED
ADDITIONAL EXTERIOR STRIP DEAD LOAD WAS INCLUDED

MOMENTS WERE NOT REDUCED FOR SKEW CORRECTION

LOAD RATING DEFINITION

CONDITION RATING FACTOR x SYSTEM RATING FACTOR
COMBINED RATING FACTOR: Phi(c) x Phi(s) = 1.00

SPECIAL INTERIOR STRIP LINE LOAD WAS INCLUDED
SPECIAL EXTERIOR STRIP LINE LOAD WAS INCLUDED
ADDITIONAL EXTERIOR STRIP DEAD LOAD WAS INCLUDED
FUTURE WEARING SURFACE WAS INCLUDED AS DEAD LOAD (DC)

MOMENTS WERE NOT REDUCED FOR SKEW CORRECTION

FATIGUE TRUCK ONLY
Values Include 1.15 Dynamic Load Allowance

LOCATION (FT)	POSITIVE MOMENT (FT-K/LANE)	NEGATIVE MOMENT (FT-K/LANE)	POSITIVE SHEAR (K/LANE)	NEGATIVE SHEAR (K/LANE)	MAXIMUM REACTION (K/LANE)	MINIMUM REACTION (K/LANE)
Support # 1					40.93	-4.01
0.00	0.000	0.000	40.927	-4.012		
2.14	79.274	-8.597	36.994	-5.562		
4.29	141.927	-17.195	33.116	-9.772		
6.43	188.458	-25.792	29.316	-13.718		
8.57	219.566	-34.389	25.616	-17.391		
10.71	236.154	-42.986	22.041	-20.716		
12.86	239.323	-51.584	18.614	-23.788		
15.00	230.378	-60.181	15.359	-26.601		
17.14	213.719	-68.778	12.467	-29.867		
19.29	191.007	-77.375	9.904	-33.036		
21.43	160.933	-85.973	7.510	-35.940		
23.57	125.025	-94.570	5.304	-38.568		
25.71	84.973	-139.791	3.304	-40.906		
27.86	42.627	-190.391	1.530	-42.933		
30.00	28.967	-246.033	0.966	-44.666		
Support # 2					56.16	-4.22
0.00	28.967	-246.033	45.434	-3.259		
2.86	28.746	-168.197	41.250	-3.259		
5.71	95.557	-105.843	39.024	-3.259		
8.57	149.067	-73.451	36.396	-6.368		
11.43	185.499	-64.140	33.380	-10.699		
14.29	210.383	-54.830	30.039	-14.742		
17.14	224.255	-45.519	26.416	-18.438		
20.00	223.487	-36.208	22.503	-22.503		
22.86	224.255	-45.519	18.438	-26.416		
25.71	210.383	-54.830	14.742	-30.039		
28.57	185.499	-64.140	10.699	-33.380		
31.43	149.067	-73.451	6.368	-36.396		
34.29	95.557	-105.843	3.259	-39.024		
37.14	28.746	-168.197	3.259	-41.250		
40.00	28.967	-246.033	3.259	-45.434		
Support # 3					56.16	-4.22

LOCATION (FT)	POSITIVE MOMENT (FT-K/LANE)	NEGATIVE MOMENT (FT-K/LANE)	POSITIVE SHEAR (K/LANE)	NEGATIVE SHEAR (K/LANE)	MAXIMUM REACTION (K/LANE)	MINIMUM REACTION (K/LANE)
0.00	28.967	-246.033	44.666	-0.966		
2.14	42.627	-190.391	42.933	-1.530		
4.29	84.973	-139.791	40.906	-3.304		
6.43	125.025	-94.570	38.568	-5.304		
8.57	160.933	-85.973	35.940	-7.510		
10.71	191.007	-77.375	33.036	-9.904		
12.86	213.719	-68.778	29.867	-12.467		
15.00	230.378	-60.181	26.601	-15.359		
17.14	239.323	-51.584	23.788	-18.614		
19.29	236.154	-42.986	20.716	-22.041		
21.43	219.566	-34.389	17.391	-25.616		
23.57	188.458	-25.792	13.718	-29.316		
25.71	141.927	-17.195	9.772	-33.116		
27.86	79.274	-8.597	5.562	-36.994		
30.00	0.000	0.000	4.012	-40.927		
Support # 4					40.93	-4.01

HL-93 LIVE LOAD ENVELOPE SUMMARY
Values are Unfactored but Include Dynamic Load Allowance

LOCATION (FT)	POSITIVE MOMENT (FT-K/LANE)	NEGATIVE MOMENT (FT-K/LANE)	POSITIVE SHEAR (K/LANE)	NEGATIVE SHEAR (K/LANE)	MAXIMUM REACTION (K/LANE)	MINIMUM REACTION (K/LANE)
Support # 1					70.86	-10.65
0.00	0.000	0.000	70.864	-10.646		
2.14	135.772	-22.812	62.735	-10.706		
4.29	244.002	-45.624	55.803	-13.439		
6.43	325.330	-68.437	49.091	-18.302		
8.57	380.686	-91.249	42.630	-22.969		
10.71	411.293	-114.061	36.451	-27.347		
12.86	418.662	-136.873	30.585	-32.901		
15.00	411.754	-159.686	25.063	-38.969		
17.14	390.228	-182.498	19.914	-44.936		
19.29	348.487	-205.310	15.166	-50.761		
21.43	288.802	-228.122	10.847	-56.404		
23.57	213.732	-250.935	6.986	-62.601		
25.71	128.439	-276.061	4.259	-69.746		
27.86	60.047	-310.491	2.117	-76.534		
30.00	59.708	-379.739	1.990	-82.911		
Support # 2					111.88	-8.67
0.00	59.708	-379.739	88.096	-6.717		
2.86	50.531	-250.590	79.884	-6.760		
5.71	152.681	-176.821	71.312	-6.902		
8.57	252.818	-151.436	62.567	-10.168		
11.43	341.429	-134.953	54.080	-15.190		
14.29	406.034	-124.980	46.677	-20.786		
17.14	443.630	-120.944	39.907	-26.845		
20.00	452.921	-117.928	33.257	-33.257		
22.86	443.630	-120.944	26.845	-39.907		
25.71	406.034	-124.980	20.786	-46.677		
28.57	341.429	-134.953	15.190	-54.080		
31.43	252.818	-151.436	10.168	-62.567		
34.29	152.681	-176.821	6.902	-71.312		
37.14	50.531	-250.590	6.760	-79.884		
40.00	59.708	-379.739	6.717	-88.096		
Support # 3					111.88	-8.67

LOCATION (FT)	POSITIVE MOMENT (FT-K/LANE)	NEGATIVE MOMENT (FT-K/LANE)	POSITIVE SHEAR (K/LANE)	NEGATIVE SHEAR (K/LANE)	MAXIMUM REACTION (K/LANE)	MINIMUM REACTION (K/LANE)
0.00	59.708	-379.739	82.911	-1.990		
2.14	60.047	-310.491	76.534	-2.117		
4.29	128.439	-276.061	69.746	-4.259		
6.43	213.732	-250.935	62.601	-6.986		
8.57	288.802	-228.122	56.404	-10.847		
10.71	348.487	-205.310	50.761	-15.166		
12.86	390.228	-182.498	44.936	-19.914		
15.00	411.754	-159.686	38.969	-25.063		
17.14	418.661	-136.873	32.901	-30.585		
19.29	411.293	-114.061	27.347	-36.451		
21.43	380.686	-91.249	22.969	-42.630		
23.57	325.330	-68.437	18.302	-49.091		
25.71	244.002	-45.624	13.439	-55.803		
27.86	135.772	-22.812	10.706	-62.735		
30.00	0.000	0.000	10.646	-70.864		
Support # 4					70.86	-10.65

DEAD LOAD & DEFLECTION SUMMARY
MODULUS OF ELASTICITY, E(dead)= 1,200 Ksi, E(live)= 3,640 Ksi

LOCATION (FT)	SLAB * MOMENT (FT-K/FT)	SLAB DEFLECTION (IN.)	LIVE LOAD DEFLECTION (IN.)	LIVE LOAD DEFLECTION L over
Support # 1, R(Slab)* = 2.70 K/Ft.				
0.00	0.000	0.000	0.000	0
2.14	5.205	-0.047	-0.019	19271
4.29	9.262	-0.089	-0.036	9966
6.43	12.170	-0.124	-0.051	7047
8.57	13.931	-0.149	-0.063	5729
10.71	14.544	-0.163	-0.071	5081
12.86	14.009	-0.165	-0.075	4804
15.00	12.326	-0.155	-0.075	4773
17.14	9.495	-0.135	-0.072	4976
19.29	5.517	-0.107	-0.066	5466
21.43	0.390	-0.075	-0.056	6420
23.57	-5.885	-0.042	-0.043	8311
25.71	-13.308	-0.015	-0.029	12455
27.86	-21.879	0.002	-0.014	25749
30.00	-31.597	0.000	0.000	0
Support # 2, R(Slab)* = 9.80 K/Ft.				
0.00	-31.597	0.000	0.000	0
2.86	-18.332	-0.038	-0.025	18863
5.71	-7.107	-0.103	-0.054	8954
8.57	2.076	-0.178	-0.081	5942
11.43	9.219	-0.251	-0.105	4573
14.29	14.321	-0.310	-0.123	3906
17.14	17.382	-0.349	-0.134	3589
20.00	18.403	-0.363	-0.137	3496
22.86	17.382	-0.349	-0.134	3589
25.71	14.321	-0.310	-0.123	3906
28.57	9.219	-0.251	-0.105	4573
31.43	2.076	-0.178	-0.081	5942
34.29	-7.107	-0.103	-0.054	8954
37.14	-18.332	-0.038	-0.025	18863
40.00	-31.597	0.000	0.000	0
Support # 3, R(Slab)* = 9.80 K/Ft.				
0.00	-31.597	0.000	0.000	0
2.14	-21.879	0.002	-0.014	25749

LOCATION (FT)	SLAB * MOMENT (FT-K/FT)	SLAB DEFLECTION (IN.)	LIVE LOAD DEFLECTION (IN.)	LIVE LOAD DEFLECTION L over
4.29	-13.308	-0.015	-0.029	12455
6.43	-5.885	-0.042	-0.043	8311
8.57	0.390	-0.075	-0.056	6420
10.71	5.517	-0.107	-0.066	5466
12.86	9.495	-0.135	-0.072	4976
15.00	12.326	-0.155	-0.075	4773
17.14	14.009	-0.165	-0.075	4804
19.29	14.544	-0.163	-0.071	5081
21.43	13.931	-0.149	-0.063	5729
23.57	12.170	-0.124	-0.051	7047
25.71	9.262	-0.089	-0.036	9966
27.86	5.205	-0.047	-0.019	19271
30.00	0.000	0.000	0.000	0
Support # 4, R(Slab)* = 2.70 K/Ft.				

* VALUES FOR UNFACTORED SLAB DEAD LOAD

DISTRIBUTED UNIT LOAD SUMMARY
Values for Full Distributed Load of 1,000 Psf

LOCATION (FT)	UNIT LOAD MOMENT (FT-K/FT)	UNIT LOAD SHEAR (K/FT)
Support # 1, R = 10.79 K/Ft.		
0.00	0.000	10.787
2.14	20.819	8.644
4.29	37.046	6.501
6.43	48.682	4.358
8.57	55.726	2.216
10.71	58.177	0.073
12.86	56.037	-2.070
15.00	49.306	-4.213
17.14	37.982	-6.356
19.29	22.066	-8.499
21.43	1.559	-10.642
23.57	-23.540	-12.784
25.71	-53.231	-14.927
27.86	-87.514	-17.070
30.00	-126.389	-19.213
Support # 2, R = 39.21 K/Ft.		
0.00	-126.389	20.000
2.86	-73.328	17.143
5.71	-28.430	14.286
8.57	8.305	11.429
11.43	36.876	8.571
14.29	57.285	5.714
17.14	69.529	2.857
20.00	73.611	0.000
22.86	69.529	-2.857
25.71	57.285	-5.714
28.57	36.876	-8.571
31.43	8.305	-11.429
34.29	-28.430	-14.286
37.14	-73.328	-17.143
40.00	-126.389	-20.000
Support # 3, R = 39.21 K/Ft.		
0.00	-126.389	19.213
2.14	-87.514	17.070

LOCATION (FT)	UNIT LOAD MOMENT (FT-K/FT)	UNIT LOAD SHEAR (K/FT)
4.29	-53.231	14.927
6.43	-23.540	12.784
8.57	1.559	10.642
10.71	22.066	8.499
12.86	37.982	6.356
15.00	49.306	4.213
17.14	56.037	2.070
19.29	58.177	-0.073
21.43	55.726	-2.216
23.57	48.682	-4.358
25.71	37.046	-6.501
27.86	20.819	-8.644
30.00	0.000	-10.787
Support # 4, R = 10.79 K/Ft.		

SHEAR SUMMARY
All Shear Values are Factored

LOCATION (FT)	SLAB DEAD (K/FT)	INTERIOR STRIP MINIMUM (K/FT)	INTERIOR STRIP MAXIMUM (K/FT)	EXTERIOR STRIP MINIMUM (K/FT)	EXTERIOR STRIP MAXIMUM (K/FT)
Support # 1					
0.00	3.37	-1.67	11.17	-1.68	11.40
2.14	2.70	-1.68	9.89	-1.69	10.10
4.29	2.03	-2.12	8.80	-2.14	9.00
6.43	1.36	-2.88	7.74	-2.93	7.93
8.57	0.69	-3.62	6.72	-3.69	6.90
10.71	0.02	-4.31	5.74	-4.40	5.91
12.86	-0.65	-5.19	4.82	-5.29	4.96
15.00	-1.32	-6.14	3.95	-6.27	4.07
17.14	-1.99	-7.08	3.14	-7.23	3.24
19.29	-2.66	-8.00	2.39	-8.15	2.46
21.43	-3.33	-8.89	1.71	-9.05	1.76
23.57	-4.00	-9.87	1.10	-10.03	1.13
25.71	-4.66	-11.00	0.67	-11.17	0.68
27.86	-5.33	-12.07	0.33	-12.24	0.33
30.00	-6.00	-13.07	0.31	-13.25	0.31
Support # 2					
0.00	6.25	-1.05	13.89	-1.06	14.05
2.86	5.36	-1.06	12.60	-1.07	12.76
5.71	4.46	-1.08	11.24	-1.09	11.41
8.57	3.57	-1.60	9.86	-1.62	10.02
11.43	2.68	-2.39	8.53	-2.44	8.67
14.29	1.79	-3.27	7.36	-3.35	7.50
17.14	0.89	-4.23	6.29	-4.32	6.42
20.00	0.00	-5.24	5.24	-5.35	5.35
22.86	-0.89	-6.29	4.23	-6.42	4.32
25.71	-1.79	-7.36	3.27	-7.50	3.35
28.57	-2.68	-8.53	2.39	-8.67	2.44
31.43	-3.57	-9.86	1.60	-10.02	1.62
34.29	-4.46	-11.24	1.08	-11.41	1.09
37.14	-5.36	-12.60	1.06	-12.76	1.07
40.00	-6.25	-13.89	1.05	-14.05	1.06
Support # 3					
0.00	6.00	-0.31	13.07	-0.31	13.25
2.14	5.33	-0.33	12.07	-0.33	12.24

LOCATION (FT)	SLAB DEAD (K/FT)	INTERIOR STRIP MINIMUM (K/FT)	INTERIOR STRIP MAXIMUM (K/FT)	EXTERIOR STRIP MINIMUM (K/FT)	EXTERIOR STRIP MAXIMUM (K/FT)
4.29	4.66	-0.67	11.00	-0.68	11.17
6.43	4.00	-1.10	9.87	-1.13	10.03
8.57	3.33	-1.71	8.89	-1.76	9.05
10.71	2.66	-2.39	8.00	-2.46	8.15
12.86	1.99	-3.14	7.08	-3.24	7.23
15.00	1.32	-3.95	6.14	-4.07	6.27
17.14	0.65	-4.82	5.19	-4.96	5.29
19.29	-0.02	-5.74	4.31	-5.91	4.40
21.43	-0.69	-6.72	3.62	-6.90	3.69
23.57	-1.36	-7.74	2.88	-7.93	2.93
25.71	-2.03	-8.80	2.12	-9.00	2.14
27.86	-2.70	-9.89	1.68	-10.10	1.69
30.00	-3.37	-11.17	1.67	-11.40	1.68
Support # 4					

INTERIOR STRIP DESIGN MOMENTS AND REQ'D STEEL SUMMARY
Values are Provided per Foot Width of Slab

LOCATION (FT)	FACTORED POSITIVE (# - IN)	FACTORED NEGATIVE (# - IN)	STEEL POSITIVE (SQ. IN.)	STEEL NEGATIVE (SQ. IN.)	FATIGUE MAXIMUM (# - IN)	FATIGUE MINIMUM (# - IN)
Support # 1						
0.00	0.0	0.0	0.21~	0.21~	0.0	0.0
2.14	351149.3	51250.6	0.49+	0.21~	177810.9	62480.0
4.29	629395.4	81682.5	0.67< T	0.21~	317537.4	108690.7
6.43	835948.5	91295.8	0.89< T	0.21~	419834.4	138632.2
8.57	972568.3	80090.4	1.04< T	0.21~	485620.8	152304.5
10.71	1041564.0	48066.2	1.12< T	0.21~	516079.2	149707.5
12.86	1045797.0	-4776.7	1.13< T	0.21~	512656.8	130841.3
15.00	1002214.0	-78438.1	1.08< T	0.21~	477064.3	95706.0
17.14	910164.1	-172918.3	0.97< T	0.25+	415078.8	44301.3
19.29	759070.8	-288217.1	0.81< T	0.43+	328879.8	-23372.6
21.43	553222.8	-424334.6	0.58< T	0.62=	216748.0	-107315.7
23.57	297460.3	-581270.8	0.41+	0.66<T	80690.1	-207528.0
25.71	1549.3	-763402.4	0.21~	0.87<T	-77076.1	-372078.2
27.86	-283220.0	-983945.9	0.21~	1.14<T	-254121.4	-559958.1
30.00	-460114.6	-1291153.0	0.21~	1.52<T	-409787.0	-770723.3
Support # 2						
0.00	-460114.6	-1291153.0	0.21~	1.52<T	-409787.0	-770723.3
2.86	-236896.8	-806348.5	0.21~	0.92<T	-222076.0	-480563.9
5.71	159839.2	-463283.3	0.22+	0.62=	24690.1	-239647.3
8.57	515758.9	-248728.2	0.58=	0.37+	225075.2	-66979.2
11.43	812868.9	-88017.3	0.87<T	0.21~	374122.7	46471.9
14.29	1027571.0	23369.1	1.11<T	0.21~	479091.8	130999.8
17.14	1154185.0	86518.8	1.26<T	0.21~	540682.6	186604.7
20.00	1190261.0	110728.3	1.30<T	0.21~	554136.2	213286.6
22.86	1154186.0	86518.9	1.26<T	0.21~	540682.6	186604.8
25.71	1027571.0	23369.1	1.11<T	0.21~	479091.8	130999.8
28.57	812869.0	-88017.3	0.87<T	0.21~	374122.8	46471.9
31.43	515758.9	-248728.2	0.58=	0.37+	225075.2	-66979.2
34.29	159839.2	-463283.3	0.22+	0.62=	24690.1	-239647.3
37.14	-236896.7	-806348.5	0.21~	0.92<T	-222075.9	-480563.9
40.00	-460114.5	-1291153.0	0.21~	1.52<T	-409786.9	-770723.2
Support # 3						
0.00	-460114.5	-1291153.0	0.21~	1.52<T	-409786.9	-770723.2
2.14	-283220.0	-983945.9	0.21~	1.14<T	-254121.4	-559958.1

LOCATION (FT)	FACTORED POSITIVE (# - IN)	FACTORED NEGATIVE (# - IN)	STEEL POSITIVE (SQ. IN.)	STEEL NEGATIVE (SQ. IN.)	FATIGUE MAXIMUM (# - IN)	FATIGUE MINIMUM (# - IN)
4.29	1549.4	-763402.3	0.21~	0.87<T	-77076.1	-372078.3
6.43	297460.3	-581270.8	0.41+	0.66<T	80690.1	-207528.0
8.57	553222.8	-424334.6	0.58<T	0.62=	216748.0	-107315.7
10.71	759070.6	-288217.1	0.81<T	0.43+	328879.8	-23372.6
12.86	910164.3	-172918.3	0.97<T	0.25+	415078.8	44301.3
15.00	1002214.0	-78438.2	1.08<T	0.21~	477064.3	95705.9
17.14	1045797.0	-4776.6	1.13<T	0.21~	512656.8	130841.4
19.29	1041564.0	48066.2	1.12<T	0.21~	516079.2	149707.5
21.43	972568.1	80090.3	1.04<T	0.21~	485620.8	152304.5
23.57	835948.5	91295.8	0.89<T	0.21~	419834.4	138632.2
25.71	629395.4	81682.5	0.67<T	0.21~	317537.4	108690.7
27.86	351149.3	51250.6	0.49+	0.21~	177810.9	62480.0
30.00	0.0	0.0	0.21~	0.21~	0.0	0.0
Support # 4						

(<) FACTORED MOMENT CONTROLS FATIGUE STRESS RANGE CONTROLS (>)
(=) 1.2 X CRACKING MOMENT CONTROLS 1/3 MORE THAN FACTORED BUT < 1.2 MCR (+)
(~) TEMPERATURE & SHRINKAGE STEEL CONTROLS
(T) TENSION CONTROLLED (:) TRANSITION CONTROLLED (C) COMPRESSION CONTROLLED

INTERIOR STRIP BOTTOM BAR DEFINITION
All Distances are Measured from the Left End of the Span

REINFORCING IS SPACED AT 6.00 IN.

---------- SPAN #1 ----------
7 x 30.000 FT. MAIN BAR, 100% EFFECTIVE FOR LOAD RATING
BAR BEGINS AT 0.000 FT. AND ENDS AT 30.000 FT.

7 x 20.881 FT. CUT BAR, 100% EFFECTIVE FOR LOAD RATING
BAR BEGINS AT 1.938 FT. AND ENDS AT 22.819 FT.

BEGINNING BAR EXTENSION = 18.063 IN.
ENDING BAR EXTENSION = 18.063 IN.

---------- SPAN #2 ----------
8 x 40.000 FT. MAIN BAR, 100% EFFECTIVE FOR LOAD RATING
BAR BEGINS AT 0.000 FT. AND ENDS AT 40.000 FT.

7 x 23.530 FT. CUT BAR, 100% EFFECTIVE FOR LOAD RATING
BAR BEGINS AT 8.235 FT. AND ENDS AT 31.765 FT.

BEGINNING BAR EXTENSION = 24.000 IN.
ENDING BAR EXTENSION = 24.000 IN.

---------- SPAN #3 ----------
7 x 30.000 FT. MAIN BAR, 100% EFFECTIVE FOR LOAD RATING
BAR BEGINS AT 0.000 FT. AND ENDS AT 30.000 FT.

7 x 20.881 FT. CUT BAR, 100% EFFECTIVE FOR LOAD RATING
BAR BEGINS AT 7.181 FT. AND ENDS AT 28.062 FT.

BEGINNING BAR EXTENSION = 18.063 IN.
ENDING BAR EXTENSION = 18.063 IN.

INTERIOR STRIP BOTTOM BAR - DESIGN ENVELOPE SECTION CHECKS
All Distances are Measured from the Left End of the Span

LOCATION (FT)	SERVICE MOMENTS (#-IN/FT)	SPACING S(MAX.) (INCHES)	SPACING S(PROV.) (INCHES)	SPACING CHECK (P/F)	STEEL REQUIRED (SQ IN/FT)	STEEL PROVIDED (SQ IN/FT)	STEEL CHECK (P/F)
Support # 1							
3.44	326345.3	N/A	12.00	PASS	0.60	0.60	PASS
12.86	650963.0	11.62	6.00	PASS	1.13	1.20	PASS
21.31	324958.4	N/A	12.00	PASS	0.59	0.60	PASS
Support # 2							
10.24	417323.3	12.07	12.00	PASS	0.75	0.79	PASS
20.00	750249.6	11.43	6.00	PASS	1.30	1.39	PASS
29.77	417323.7	12.07	12.00	PASS	0.75	0.79	PASS
Support # 3							
8.69	324958.6	N/A	12.00	PASS	0.59	0.60	PASS
17.14	650963.0	11.62	6.00	PASS	1.13	1.20	PASS
26.56	326344.9	N/A	12.00	PASS	0.60	0.60	PASS
Support # 4							

S(MAX.) = N/A if Ms < 80% of Mcr

INTERIOR STRIP TOP BAR DEFINITION
All Distances are Measured from the Left End of the Span

REINFORCING IS SPACED AT 6.00 IN.

---------- SUPPORT #2 ----------
9 x 50.000 FT. MAIN BAR, 100% EFFECTIVE FOR LOAD RATING
BAR BEGINS AT 0.000 FT. SPAN #1 AND ENDS AT 20.000 FT. SPAN #2

8 x 14.480 FT. CUT BAR, 100% EFFECTIVE FOR LOAD RATING
BAR BEGINS AT 22.270 FT. SPAN #1 AND ENDS AT 6.750 FT. SPAN #2

BEGINNING BAR EXTENSION = 18.000 IN.
ENDING BAR EXTENSION = 24.000 IN.

---------- SUPPORT #3 ----------
9 x 50.000 FT. MAIN BAR, 100% EFFECTIVE FOR LOAD RATING
BAR BEGINS AT 20.000 FT. SPAN #2 AND ENDS AT 30.000 FT. SPAN #3

8 x 14.560 FT. CUT BAR, 100% EFFECTIVE FOR LOAD RATING
BAR BEGINS AT 33.170 FT. SPAN #2 AND ENDS AT 7.730 FT. SPAN #3

BEGINNING BAR EXTENSION = 24.000 IN.
ENDING BAR EXTENSION = 18.000 IN.

INTERIOR STRIP TOP BAR - DESIGN ENVELOPE SECTION CHECKS
All Distances are Measured from the Left End of the Span

LOCATION (FT)	SERVICE MOMENTS (#-IN/FT)	SPACING S(MAX.) (INCHES)	SPACING S(PROV.) (INCHES)	SPACING CHECK (P/F)	STEEL REQUIRED (SQ IN/FT)	STEEL PROVIDED (SQ IN/FT)	STEEL CHECK (P/F)
Support # 1							
23.77	-366837.0	N/A	12.00	PASS	0.68	1.00	PASS
30.00	-858162.8	7.14	6.00	PASS	1.52	1.79	PASS
Support # 2							
0.00	-858162.8	7.14	6.00	PASS	1.52	1.79	PASS
4.75	-372400.1	11.58	12.00	<FAIL>	0.72	1.00	PASS
35.17	-365713.5	N/A	12.00	PASS	0.71	1.00	PASS
40.00	-858162.6	7.14	6.00	PASS	1.52	1.79	PASS
Support # 3							
0.00	-858162.6	7.14	6.00	PASS	1.52	1.79	PASS
6.23	-366836.8	N/A	12.00	PASS	0.68	1.00	PASS
Support # 4							

S(MAX.) = N/A if Ms < 80% of Mcr

TRANSVERSE REINFORCING STEEL REQUIREMENTS

---------- SPAN #1 ----------
TOP TRANSVERSE TEMPERATURE & SHRINKAGE STEEL = 0.208 Sq. In./Ft.
BOTTOM TRANSVERSE DISTRIBUTION AREA OF STEEL = 0.208 Sq. In./Ft.

---------- SPAN #2 ----------
TOP TRANSVERSE TEMPERATURE & SHRINKAGE STEEL = 0.208 Sq. In./Ft.
BOTTOM TRANSVERSE DISTRIBUTION AREA OF STEEL = 0.208 Sq. In./Ft.

---------- SPAN #3 ----------
TOP TRANSVERSE TEMPERATURE & SHRINKAGE STEEL = 0.208 Sq. In./Ft.
BOTTOM TRANSVERSE DISTRIBUTION AREA OF STEEL = 0.208 Sq. In./Ft.

EXTERIOR STRIP DESIGN MOMENTS AND REQ'D STEEL SUMMARY
Values are Provided per Foot Width of Slab

LOCATION (FT)	FACTORED POSITIVE (# - IN)	FACTORED NEGATIVE (# - IN)	STEEL POSITIVE (SQ. IN.)	STEEL NEGATIVE (SQ. IN.)	FATIGUE MAXIMUM (# - IN)	FATIGUE MINIMUM (# - IN)
Support # 1						
0.00	0.0	0.0	0.21~	0.21~	0.0	0.0
2.14	364227.3	59080.8	0.51+	0.21~	184795.1	69464.2
4.29	652468.3	95554.4	0.69<T	0.21~	329965.4	121118.7
6.43	865996.5	109420.9	0.93<T	0.21~	436165.8	154963.6
8.57	1006664.0	100680.4	1.08<T	0.21~	504315.2	170998.9
10.71	1076901.0	69332.4	1.16<T	0.21~	535596.1	169224.4
12.86	1079717.0	15377.5	1.17<T	0.21~	531455.7	149640.3
15.00	1032947.0	-61184.6	1.11<T	0.21~	493604.9	112246.5
17.14	935907.2	-160353.9	1.00<T	0.24+	427820.5	57043.1
19.29	777465.7	-282130.2	0.83<T	0.42+	336282.3	-15969.9
21.43	562136.4	-426513.8	0.59<T	0.62=	217270.9	-106792.7
23.57	295012.8	-593504.4	0.41+	0.67<T	72793.0	-215425.1
25.71	-14755.3	-786580.5	0.21~	0.90<T	-94933.6	-389935.8
27.86	-316597.8	-1016246.0	0.21~	1.17<T	-283479.9	-589316.6
30.00	-508107.8	-1333889.0	0.21~	1.57<T	-452186.9	-813123.1
Support # 2						
0.00	-508107.8	-1333889.0	0.21~	1.57<T	-452186.9	-813123.1
2.86	-264906.3	-832401.9	0.21~	0.95<T	-246675.3	-505163.3
5.71	156347.2	-475463.9	0.22+	0.62=	15152.7	-249184.6
8.57	529554.3	-248608.4	0.58=	0.37+	227861.3	-64193.1
11.43	837840.2	-75321.6	0.90<T	0.21~	386493.7	58842.8
14.29	1060524.0	57207.0	1.15<T	0.21~	498309.1	150217.2
17.14	1191811.0	149545.1	1.30<T	0.21~	564007.8	209929.9
20.00	1229124.0	201692.8	1.34<T	0.21~	578830.6	237981.0
22.86	1191811.0	149545.1	1.30<T	0.21~	564007.8	209929.9
25.71	1060524.0	57207.0	1.15<T	0.21~	498309.1	150217.2
28.57	837840.4	-75321.5	0.90<T	0.21~	386493.8	58842.9
31.43	529554.2	-248608.4	0.58=	0.37+	227861.3	-64193.1
34.29	156347.3	-475463.9	0.22+	0.62=	15152.8	-249184.6
37.14	-264906.2	-832401.9	0.21~	0.95<T	-246675.2	-505163.3
40.00	-508107.8	-1333889.0	0.21~	1.57<T	-452186.8	-813123.0
Support # 3						
0.00	-508107.8	-1333889.0	0.21~	1.57<T	-452186.8	-813123.0
2.14	-316597.7	-1016246.0	0.21~	1.17<T	-283479.9	-589316.6

LOCATION (FT)	FACTORED POSITIVE (# - IN)	FACTORED NEGATIVE (# - IN)	STEEL POSITIVE (SQ. IN.)	STEEL NEGATIVE (SQ. IN.)	FATIGUE MAXIMUM (# - IN)	FATIGUE MINIMUM (# - IN)
4.29	-14755.3	-786580.5	0.21~	0.90<T	-94933.7	-389935.8
6.43	295012.8	-593504.4	0.41+	0.67<T	72793.0	-215425.1
8.57	562136.5	-426513.6	0.59<T	0.62=	217270.9	-106792.7
10.71	777465.6	-282130.2	0.83<T	0.42+	336282.3	-15970.0
12.86	935907.3	-160353.8	1.00<T	0.24+	427820.6	57043.1
15.00	1032947.0	-61184.6	1.11<T	0.21~	493604.9	112246.5
17.14	1079717.0	15377.6	1.17<T	0.21~	531455.8	149640.3
19.29	1076901.0	69332.5	1.16<T	0.21~	535596.1	169224.4
21.43	1006664.0	100680.3	1.08<T	0.21~	504315.1	170998.8
23.57	865996.5	109420.9	0.93<T	0.21~	436165.9	154963.6
25.71	652468.3	95554.4	0.69<T	0.21~	329965.4	121118.7
27.86	364227.3	59080.8	0.51+	0.21~	184795.1	69464.2
30.00	0.0	0.0	0.21~	0.21~	0.0	0.0
Support # 4						

(<) FACTORED MOMENT CONTROLS FATIGUE STRESS RANGE CONTROLS (>)
(=) 1.2 X CRACKING MOMENT CONTROLS 1/3 MORE THAN FACTORED BUT < 1.2 MCR (+)
(~) TEMPERATURE & SHRINKAGE STEEL CONTROLS
(T) TENSION CONTROLLED (:) TRANSITION CONTROLLED (C) COMPRESSION CONTROLLED

EXTERIOR STRIP BOTTOM BAR DEFINITION
All Distances are Measured from the Left End of the Span

REINFORCING IS SPACED AT 6.00 IN.

---------- SPAN #1 ----------
7 x 30.000 FT. MAIN BAR, 100% EFFECTIVE FOR LOAD RATING
BAR BEGINS AT 0.000 FT. AND ENDS AT 30.000 FT.

7 x 21.241 FT. CUT BAR, 100% EFFECTIVE FOR LOAD RATING
BAR BEGINS AT 1.673 FT. AND ENDS AT 22.914 FT.

BEGINNING BAR EXTENSION = 18.063 IN.
ENDING BAR EXTENSION = 18.063 IN.

---------- SPAN #2 ----------
8 x 40.000 FT. MAIN BAR, 100% EFFECTIVE FOR LOAD RATING
BAR BEGINS AT 0.000 FT. AND ENDS AT 40.000 FT.

7 x 23.894 FT. CUT BAR, 100% EFFECTIVE FOR LOAD RATING
BAR BEGINS AT 8.053 FT. AND ENDS AT 31.947 FT.

BEGINNING BAR EXTENSION = 24.000 IN.
ENDING BAR EXTENSION = 24.000 IN.

---------- SPAN #3 ----------
7 x 30.000 FT. MAIN BAR, 100% EFFECTIVE FOR LOAD RATING
BAR BEGINS AT 0.000 FT. AND ENDS AT 30.000 FT.

7 x 21.241 FT. CUT BAR, 100% EFFECTIVE FOR LOAD RATING
BAR BEGINS AT 7.086 FT. AND ENDS AT 28.327 FT.

BEGINNING BAR EXTENSION = 18.063 IN.
ENDING BAR EXTENSION = 18.063 IN.

EXTERIOR STRIP BOTTOM BAR - DESIGN ENVELOPE SECTION CHECKS
All Distances are Measured from the Left End of the Span

LOCATION (FT)	SERVICE MOMENTS (#-IN/FT)	SPACING S(MAX.) (INCHES)	SPACING S(PROV.) (INCHES)	SPACING CHECK (P/F)	STEEL REQUIRED (SQ IN/FT)	STEEL PROVIDED (SQ IN/FT)	STEEL CHECK (P/F)
Support # 1							
3.18	318240.1	N/A	12.00	PASS	0.60	0.60	PASS
12.86	676672.8	11.07	6.00	PASS	1.17	1.20	PASS
21.41	324218.7	N/A	12.00	PASS	0.59	0.60	PASS
Support # 2							
10.05	418580.5	12.02	12.00	PASS	0.75	0.79	PASS
20.00	780768.0	10.87	6.00	PASS	1.34	1.39	PASS
29.95	418580.8	12.02	12.00	PASS	0.75	0.79	PASS
Support # 3							
8.59	324218.9	N/A	12.00	PASS	0.59	0.60	PASS
17.14	676672.8	11.07	6.00	PASS	1.17	1.20	PASS
26.82	318239.7	N/A	12.00	PASS	0.60	0.60	PASS
Support # 4							

S(MAX.) = N/A if Ms < 80% of Mcr

EXTERIOR STRIP TOP BAR DEFINITION
All Distances are Measured from the Left End of the Span

REINFORCING IS SPACED AT 6.00 IN.

---------- SUPPORT #2 ----------
9 x 50.000 FT. MAIN BAR, 100% EFFECTIVE FOR LOAD RATING
BAR BEGINS AT 0.000 FT. SPAN #1 AND ENDS AT 20.000 FT. SPAN #2

8 x 14.860 FT. CUT BAR, 100% EFFECTIVE FOR LOAD RATING
BAR BEGINS AT 22.120 FT. SPAN #1 AND ENDS AT 6.980 FT. SPAN #2

BEGINNING BAR EXTENSION = 18.000 IN.
ENDING BAR EXTENSION = 24.000 IN.

---------- SUPPORT #3 ----------
9 x 50.000 FT. MAIN BAR, 100% EFFECTIVE FOR LOAD RATING
BAR BEGINS AT 20.000 FT. SPAN #2 AND ENDS AT 30.000 FT. SPAN #3

8 x 14.860 FT. CUT BAR, 100% EFFECTIVE FOR LOAD RATING
BAR BEGINS AT 33.020 FT. SPAN #2 AND ENDS AT 7.880 FT. SPAN #3

BEGINNING BAR EXTENSION = 24.000 IN.
ENDING BAR EXTENSION = 18.000 IN.

EXTERIOR STRIP TOP BAR - DESIGN ENVELOPE SECTION CHECKS
All Distances are Measured from the Left End of the Span

LOCATION (FT)	SERVICE MOMENTS (#-IN/FT)	SPACING S(MAX.) (INCHES)	SPACING S(PROV.) (INCHES)	SPACING CHECK (P/F)	STEEL REQUIRED (SQ IN/FT)	STEEL PROVIDED (SQ IN/FT)	STEEL CHECK (P/F)
Support # 1							
23.62	-367438.8	N/A	12.00	PASS	0.68	1.00	PASS
30.00	-896853.5	6.57	6.00	PASS	1.57	1.79	PASS
Support # 2							
0.00	-896853.5	6.57	6.00	PASS	1.57	1.79	PASS
4.98	-366687.6	N/A	12.00	PASS	0.71	1.00	PASS
35.02	-366687.3	N/A	12.00	PASS	0.71	1.00	PASS
40.00	-896853.5	6.57	6.00	PASS	1.57	1.79	PASS
Support # 3							
0.00	-896853.5	6.57	6.00	PASS	1.57	1.79	PASS
6.38	-367438.4	N/A	12.00	PASS	0.68	1.00	PASS
Support # 4							

S(MAX.) = N/A if Ms < 80% of Mcr

INTERIOR STRIP BOTTOM BAR - HL93 INVENTORY LOAD RATING
MINIMUM HL93 INVENTORY RATING IS 1.013 @ 8.69 FT. IN SPAN #3

LOCATION (FT)	EFFECTIVE STEEL AREA (SQ IN/FT)	PHI FACTOR	EFFECTIVE CAPACITY (#-IN/FT)	FACTORED DEAD (#-IN/FT)	FACTORED SPECIAL (#-IN/FT)	FACTORED LIVE (#-IN/FT)	RATING FACTOR (RF)
Support # 1							
0.00	0.60	0.90	570931	0	0	0	N/A
2.14	0.60	0.90	570931	92205	0	256758	1.865
3.44	0.60	0.90	570931	135817	0	380961	1.142
4.29	0.89	0.90	840154	164073	0	461432	1.465
6.43	1.16	0.90	1079898	215605	0	615232	1.405
8.57	1.20	0.90	1113274	246800	0	719917	1.204
10.71	1.20	0.90	1113274	257659	0	777797	1.100
12.86	1.20	0.90	1113274	248181	0	791732	1.093
15.00	1.20	0.90	1113274	218367	0	778670	1.149
17.14	1.20	0.90	1113274	168216	0	737960	1.281
19.29	1.04	0.90	973503	97728	0	659025	1.329
21.31	0.60	0.90	570931	11769	0	552200	1.013
21.43	0.60	0.90	570931	6904	0	546155	1.033
23.57	0.60	0.90	570931	-104256	0	404188	1.670
25.71	0.60	0.90	570931	-235753	0	242892	3.321
27.86	0.60	0.90	570931	-387587	0	113556	8.441
30.00	0.60	0.90	570931	-559757	0	112913	10.014
Support # 2							
0.00	0.79	0.90	743100	-559757	0	112913	11.539
2.86	0.79	0.90	743100	-324757	0	95560	11.175
5.71	0.79	0.90	743100	-125911	0	288735	3.010
8.57	0.79	0.90	743100	36782	0	478105	1.477
10.24	0.79	0.90	743100	110459	0	575674	1.099
11.43	1.19	0.90	1100259	163320	0	645677	1.451
14.29	1.39	0.90	1274364	253705	0	767852	1.329
17.14	1.39	0.90	1274364	307935	0	838949	1.152
20.00	1.39	0.90	1274364	326012	0	856520	1.107
22.86	1.39	0.90	1274364	307935	0	838950	1.152
25.71	1.39	0.90	1274364	253705	0	767852	1.329
28.57	1.19	0.90	1100259	163320	0	645677	1.451
29.77	0.79	0.90	743100	110459	0	575674	1.099
31.43	0.79	0.90	743100	36782	0	478105	1.477
34.29	0.79	0.90	743100	-125911	0	288735	3.010
37.14	0.79	0.90	743100	-324757	0	95560	11.175

LOCATION (FT)	EFFECTIVE STEEL AREA (SQ IN/FT)	PHI FACTOR	EFFECTIVE CAPACITY (#-IN/FT)	FACTORED DEAD (#-IN/FT)	FACTORED SPECIAL (#-IN/FT)	FACTORED LIVE (#-IN/FT)	RATING FACTOR (RF)
40.00	0.79	0.90	743100	-559757	0	112913	11.539
Support # 3							
0.00	0.60	0.90	570931	-559757	0	112913	10.014
2.14	0.60	0.90	570931	-387587	0	113556	8.441
4.29	0.60	0.90	570931	-235753	0	242892	3.321
6.43	0.60	0.90	570931	-104256	0	404188	1.670
8.57	0.60	0.90	570931	6904	0	546155	1.033
8.69	0.60	0.90	570931	11769	0	552201	1.013
10.71	1.04	0.90	973502	97728	0	659025	1.329
12.86	1.20	0.90	1113274	168216	0	737960	1.281
15.00	1.20	0.90	1113274	218367	0	778670	1.149
17.14	1.20	0.90	1113274	248181	0	791732	1.093
19.29	1.20	0.90	1113274	257659	0	777797	1.100
21.43	1.20	0.90	1113274	246800	0	719917	1.204
23.57	1.16	0.90	1079898	215605	0	615232	1.405
25.71	0.89	0.90	840155	164073	0	461432	1.465
26.56	0.60	0.90	570931	135817	0	380960	1.142
27.86	0.60	0.90	570931	92205	0	256758	1.865
30.00	0.60	0.90	570931	0	0	0	N/A
Support # 4							

INTERIOR STRIP BOTTOM BAR - HL93 OPERATING LOAD RATING
MINIMUM HL93 OPERATING RATING IS 1.313 @ 8.69 FT. IN SPAN #3

LOCATION (FT)	EFFECTIVE STEEL AREA (SQ IN/FT)	PHI FACTOR	EFFECTIVE CAPACITY (#-IN/FT)	FACTORED DEAD (#-IN/FT)	FACTORED SPECIAL (#-IN/FT)	FACTORED LIVE (#-IN/FT)	RATING FACTOR (RF)
Support # 1							
0.00	0.60	0.90	570931	0	0	0	N/A
2.14	0.60	0.90	570931	92205	0	198071	2.417
3.44	0.60	0.90	570931	135817	0	293884	1.481
4.29	0.89	0.90	840154	164073	0	355962	1.899
6.43	1.16	0.90	1079898	215605	0	474607	1.821
8.57	1.20	0.90	1113274	246800	0	555364	1.560
10.71	1.20	0.90	1113274	257659	0	600015	1.426
12.86	1.20	0.90	1113274	248181	0	610765	1.416
15.00	1.20	0.90	1113274	218367	0	600688	1.490
17.14	1.20	0.90	1113274	168216	0	569284	1.660
19.29	1.04	0.90	973503	97728	0	508391	1.723
21.31	0.60	0.90	570931	11769	0	425983	1.313
21.43	0.60	0.90	570931	6904	0	421319	1.339
23.57	0.60	0.90	570931	-104256	0	311802	2.165
25.71	0.60	0.90	570931	-235753	0	187374	4.305
27.86	0.60	0.90	570931	-387587	0	87600	10.942
30.00	0.60	0.90	570931	-559757	0	87105	12.981
Support # 2							
0.00	0.79	0.90	743100	-559757	0	87105	14.957
2.86	0.79	0.90	743100	-324757	0	73717	14.486
5.71	0.79	0.90	743100	-125911	0	222739	3.901
8.57	0.79	0.90	743100	36782	0	368824	1.915
10.24	0.79	0.90	743100	110459	0	444091	1.425
11.43	1.19	0.90	1100259	163320	0	498094	1.881
14.29	1.39	0.90	1274364	253705	0	592343	1.723
17.14	1.39	0.90	1274364	307935	0	647190	1.493
20.00	1.39	0.90	1274364	326012	0	660744	1.435
22.86	1.39	0.90	1274364	307935	0	647190	1.493
25.71	1.39	0.90	1274364	253705	0	592343	1.723
28.57	1.19	0.90	1100259	163320	0	498094	1.881
29.77	0.79	0.90	743100	110459	0	444092	1.425
31.43	0.79	0.90	743100	36782	0	368824	1.915
34.29	0.79	0.90	743100	-125911	0	222739	3.901
37.14	0.79	0.90	743100	-324757	0	73717	14.486

LOCATION (FT)	EFFECTIVE STEEL AREA (SQ IN/FT)	PHI FACTOR	EFFECTIVE CAPACITY (#-IN/FT)	FACTORED DEAD (#-IN/FT)	FACTORED SPECIAL (#-IN/FT)	FACTORED LIVE (#-IN/FT)	RATING FACTOR (RF)
40.00	0.79	0.90	743100	-559757	0	87105	14.957
Support # 3							
0.00	0.60	0.90	570931	-559757	0	87105	12.981
2.14	0.60	0.90	570931	-387587	0	87600	10.942
4.29	0.60	0.90	570931	-235753	0	187374	4.305
6.43	0.60	0.90	570931	-104256	0	311802	2.165
8.57	0.60	0.90	570931	6904	0	421319	1.339
8.69	0.60	0.90	570931	11769	0	425983	1.313
10.71	1.04	0.90	973502	97728	0	508391	1.723
12.86	1.20	0.90	1113274	168216	0	569284	1.660
15.00	1.20	0.90	1113274	218367	0	600688	1.490
17.14	1.20	0.90	1113274	248181	0	610765	1.416
19.29	1.20	0.90	1113274	257659	0	600015	1.426
21.43	1.20	0.90	1113274	246800	0	555364	1.560
23.57	1.16	0.90	1079898	215605	0	474608	1.821
25.71	0.89	0.90	840155	164073	0	355962	1.899
26.56	0.60	0.90	570931	135817	0	293884	1.481
27.86	0.60	0.90	570931	92205	0	198071	2.417
30.00	0.60	0.90	570931	0	0	0	N/A
Support # 4							

INTERIOR STRIP TOP BAR - HL93 INVENTORY LOAD RATING
MINIMUM HL93 INVENTORY RATING IS 1.323 @ 30.00 FT. IN SPAN #1

LOCATION (FT)	EFFECTIVE STEEL AREA (SQ IN/FT)	PHI FACTOR	EFFECTIVE CAPACITY (#-IN/FT)	FACTORED DEAD (#-IN/FT)	FACTORED SPECIAL (#-IN/FT)	FACTORED LIVE (#-IN/FT)	RATING FACTOR (RF)
Support # 1							
0.00	1.00	0.90	874838	0	0	0	N/A
2.14	1.00	0.90	874838	92205	0	-43140	22.416
4.29	1.00	0.90	874838	164073	0	-86281	12.041
6.43	1.00	0.90	874838	215605	0	-129421	8.426
8.57	1.00	0.90	874838	246800	0	-172561	6.500
10.71	1.00	0.90	874838	257659	0	-215701	5.250
12.86	1.00	0.90	874838	248181	0	-258842	4.339
15.00	1.00	0.90	874838	218367	0	-301982	3.620
17.14	1.00	0.90	874838	168216	0	-345122	3.022
19.29	1.00	0.90	874838	97728	0	-388262	2.505
21.43	1.00	0.90	874838	6904	0	-431403	2.044
23.57	1.00	0.90	874838	-104256	0	-474543	1.624
23.77	1.00	0.90	874838	-116442	0	-478946	1.583
25.71	1.60	0.90	1357954	-235753	0	-522060	2.150
27.86	1.79	0.90	1509812	-387587	0	-587170	1.911
30.00	1.79	0.90	1509812	-559757	0	-718125	1.323
Support # 2							
0.00	1.79	0.90	1509812	-559757	0	-718125	1.323
2.86	1.72	0.90	1454710	-324757	0	-473892	2.384
4.75	1.00	0.90	874838	-193021	0	-381470	1.787
5.71	1.00	0.90	874838	-125911	0	-334387	2.240
8.57	1.00	0.90	874838	36782	0	-286382	3.183
11.43	1.00	0.90	874838	163320	0	-255209	4.068
14.29	1.00	0.90	874838	253705	0	-236350	4.775
17.14	1.00	0.90	874838	307935	0	-228717	5.171
20.00	1.00	0.90	874838	326012	0	-223013	5.385
22.86	1.00	0.90	874838	307935	0	-228717	5.171
25.71	1.00	0.90	874838	253705	0	-236350	4.775
28.57	1.00	0.90	874838	163320	0	-255209	4.068
31.43	1.00	0.90	874838	36782	0	-286382	3.183
34.29	1.00	0.90	874838	-125911	0	-334387	2.240
35.17	1.00	0.90	874838	-187453	0	-377564	1.821
37.14	1.75	0.90	1478316	-324757	0	-473892	2.434
40.00	1.79	0.90	1509812	-559757	0	-718125	1.323

LOCATION (FT)	EFFECTIVE STEEL AREA (SQ IN/FT)	PHI FACTOR	EFFECTIVE CAPACITY (#-IN/FT)	FACTORED DEAD (#-IN/FT)	FACTORED SPECIAL (#-IN/FT)	FACTORED LIVE (#-IN/FT)	RATING FACTOR (RF)
Support # 3							
0.00	1.79	0.90	1509812	-559757	0	-718125	1.323
2.14	1.79	0.90	1509812	-387587	0	-587170	1.911
4.29	1.60	0.90	1357956	-235753	0	-522060	2.150
6.23	1.00	0.90	874838	-116442	0	-478946	1.583
6.43	1.00	0.90	874838	-104256	0	-474543	1.624
8.57	1.00	0.90	874838	6904	0	-431403	2.044
10.71	1.00	0.90	874838	97728	0	-388262	2.505
12.86	1.00	0.90	874838	168216	0	-345122	3.022
15.00	1.00	0.90	874838	218367	0	-301982	3.620
17.14	1.00	0.90	874838	248181	0	-258842	4.339
19.29	1.00	0.90	874838	257659	0	-215701	5.250
21.43	1.00	0.90	874838	246800	0	-172561	6.500
23.57	1.00	0.90	874838	215605	0	-129421	8.426
25.71	1.00	0.90	874838	164073	0	-86281	12.041
27.86	1.00	0.90	874838	92205	0	-43140	22.416
30.00	1.00	0.90	874838	0	0	0	N/A
Support # 4							

INTERIOR STRIP TOP BAR - HL93 OPERATING LOAD RATING
MINIMUM HL93 OPERATING RATING IS 1.715 @ 30.00 FT. IN SPAN #1

LOCATION (FT)	EFFECTIVE STEEL AREA (SQ IN/FT)	PHI FACTOR	EFFECTIVE CAPACITY (#-IN/FT)	FACTORED DEAD (#-IN/FT)	FACTORED SPECIAL (#-IN/FT)	FACTORED LIVE (#-IN/FT)	RATING FACTOR (RF)
Support # 1							
0.00	1.00	0.90	874838	0	0	0	N/A
2.14	1.00	0.90	874838	92205	0	-33280	29.058
4.29	1.00	0.90	874838	164073	0	-66559	15.609
6.43	1.00	0.90	874838	215605	0	-99839	10.922
8.57	1.00	0.90	874838	246800	0	-133119	8.426
10.71	1.00	0.90	874838	257659	0	-166398	6.806
12.86	1.00	0.90	874838	248181	0	-199678	5.624
15.00	1.00	0.90	874838	218367	0	-232958	4.693
17.14	1.00	0.90	874838	168216	0	-266237	3.918
19.29	1.00	0.90	874838	97728	0	-299517	3.247
21.43	1.00	0.90	874838	6904	0	-332796	2.649
23.57	1.00	0.90	874838	-104256	0	-366076	2.105
23.77	1.00	0.90	874838	-116442	0	-369473	2.053
25.71	1.60	0.90	1357954	-235753	0	-402732	2.786
27.86	1.79	0.90	1509812	-387587	0	-452960	2.478
30.00	1.79	0.90	1509812	-559757	0	-553982	1.715
Support # 2							
0.00	1.79	0.90	1509812	-559757	0	-553982	1.715
2.86	1.72	0.90	1454710	-324757	0	-365574	3.091
4.75	1.00	0.90	874838	-193021	0	-294277	2.317
5.71	1.00	0.90	874838	-125911	0	-257956	2.903
8.57	1.00	0.90	874838	36782	0	-220923	4.126
11.43	1.00	0.90	874838	163320	0	-196876	5.273
14.29	1.00	0.90	874838	253705	0	-182328	6.190
17.14	1.00	0.90	874838	307935	0	-176439	6.704
20.00	1.00	0.90	874838	326012	0	-172039	6.980
22.86	1.00	0.90	874838	307935	0	-176439	6.704
25.71	1.00	0.90	874838	253705	0	-182328	6.190
28.57	1.00	0.90	874838	163320	0	-196876	5.273
31.43	1.00	0.90	874838	36782	0	-220923	4.126
34.29	1.00	0.90	874838	-125911	0	-257956	2.903
35.17	1.00	0.90	874838	-187453	0	-291264	2.360
37.14	1.75	0.90	1478316	-324757	0	-365574	3.155
40.00	1.79	0.90	1509812	-559757	0	-553982	1.715

LOCATION (FT)	EFFECTIVE STEEL AREA (SQ IN/FT)	PHI FACTOR	EFFECTIVE CAPACITY (#-IN/FT)	FACTORED DEAD (#-IN/FT)	FACTORED SPECIAL (#-IN/FT)	FACTORED LIVE (#-IN/FT)	RATING FACTOR (RF)
Support # 3							
0.00	1.79	0.90	1509812	-559757	0	-553982	1.715
2.14	1.79	0.90	1509812	-387587	0	-452960	2.478
4.29	1.60	0.90	1357956	-235753	0	-402732	2.786
6.23	1.00	0.90	874838	-116442	0	-369473	2.053
6.43	1.00	0.90	874838	-104256	0	-366076	2.105
8.57	1.00	0.90	874838	6904	0	-332796	2.649
10.71	1.00	0.90	874838	97728	0	-299517	3.247
12.86	1.00	0.90	874838	168216	0	-266237	3.918
15.00	1.00	0.90	874838	218367	0	-232958	4.693
17.14	1.00	0.90	874838	248181	0	-199678	5.624
19.29	1.00	0.90	874838	257659	0	-166398	6.806
21.43	1.00	0.90	874838	246800	0	-133119	8.426
23.57	1.00	0.90	874838	215605	0	-99839	10.922
25.71	1.00	0.90	874838	164073	0	-66559	15.609
27.86	1.00	0.90	874838	92205	0	-33280	29.058
30.00	1.00	0.90	874838	0	0	0	N/A
Support # 4							

INTERIOR STRIP BOTTOM BAR - FATIGUE I TRUCK LOAD RATING

LOCATION (FT)	EFF. STEEL (IN^2/FT)	MAX. MOMENT (#-IN/FT)	MIN. MOMENT (#-IN/FT)	MAX. STRESS (PSI)	MIN. STRESS (PSI)	STRESS RANGE (PSI)	THRESHOLD RANGE (PSI)	FATIGUE CHECK (P/F)
Support # 1								
0.00	0.60	0	0	0	0	0	26,000	PASS
2.14	0.60	177811	62480	17,511	6,153	11,358	23,744	PASS
3.44	0.60	262601	90522	25,861	8,915	16,946	22,731	PASS
4.29	0.89	317537	108691	21,266	7,279	13,987	23,331	PASS
6.43	1.16	419834	138632	21,840	7,212	14,628	23,356	PASS
8.57	1.20	485621	152305	24,496	7,683	16,814	23,183	PASS
10.71	1.20	516079	149708	26,033	7,552	18,481	23,231	PASS
12.86	1.20	512657	130841	25,860	6,600	19,260	23,580	PASS
15.00	1.20	477064	95706	24,065	4,828	19,237	24,230	PASS
17.14	1.20	415079	44301	20,938	2,235	18,703	25,181	PASS
19.29	1.04	328880	-23373	18,996	-244	19,240	26,089	PASS
21.31	0.60	222754	-102820	21,937	-1,865	23,801	26,684	PASS
21.43	0.60	216748	-107316	21,345	-1,946	23,291	26,714	PASS
23.57	0.60	80690	-207528	7,946	-3,763	11,710	27,380	PASS
25.71	0.60	-77076	-372078	0	0	0	26,000	PASS
27.86	0.60	-254121	-559958	0	0	0	26,000	PASS
30.00	0.60	-409787	-770723	0	0	0	26,000	PASS
Support # 2								
0.00	0.79	-409787	-770723	0	0	0	26,000	PASS
2.86	0.79	-222076	-480564	0	0	0	26,000	PASS
5.71	0.79	24690	-239647	1,870	-3,220	5,089	27,181	PASS
8.57	0.79	225075	-66979	17,044	-900	17,944	26,330	PASS
10.24	0.79	311858	-922	23,616	-12	23,628	26,005	PASS
11.43	1.19	374123	46472	19,096	2,372	16,724	25,130	PASS
14.29	1.39	479092	131000	21,065	5,760	15,305	23,888	PASS
17.14	1.39	540683	186605	23,774	8,205	15,569	22,992	PASS
20.00	1.39	554136	213287	24,365	9,378	14,987	22,561	PASS
22.86	1.39	540683	186605	23,774	8,205	15,569	22,992	PASS
25.71	1.39	479092	131000	21,065	5,760	15,305	23,888	PASS
28.57	1.19	374123	46472	19,096	2,372	16,724	25,130	PASS
29.77	0.79	311858	-922	23,616	-12	23,628	26,005	PASS
31.43	0.79	225075	-66979	17,044	-900	17,944	26,330	PASS
34.29	0.79	24690	-239647	1,870	-3,220	5,089	27,181	PASS
37.14	0.79	-222076	-480564	0	0	0	26,000	PASS

LOCATION (FT)	EFF. STEEL (IN^2/FT)	MAX. MOMENT (#-IN/FT)	MIN. MOMENT (#-IN/FT)	MAX. STRESS (PSI)	MIN. STRESS (PSI)	STRESS RANGE (PSI)	THRESHOLD RANGE (PSI)	FATIGUE CHECK (P/F)
40.00	0.79	-409787	-770723	0	0	0	26,000	PASS
Support # 3								
0.00	0.60	-409787	-770723	0	0	0	26,000	PASS
2.14	0.60	-254121	-559958	0	0	0	26,000	PASS
4.29	0.60	-77076	-372078	0	0	0	26,000	PASS
6.43	0.60	80690	-207528	7,946	-3,763	11,710	27,380	PASS
8.57	0.60	216748	-107316	21,345	-1,946	23,291	26,714	PASS
8.69	0.60	222754	-102819	21,937	-1,864	23,801	26,684	PASS
10.71	1.04	328880	-23373	18,996	-244	19,240	26,089	PASS
12.86	1.20	415079	44301	20,938	2,235	18,703	25,181	PASS
15.00	1.20	477064	95706	24,065	4,828	19,237	24,230	PASS
17.14	1.20	512657	130841	25,860	6,600	19,260	23,580	PASS
19.29	1.20	516079	149708	26,033	7,552	18,481	23,231	PASS
21.43	1.20	485621	152305	24,496	7,683	16,814	23,183	PASS
23.57	1.16	419834	138632	21,840	7,212	14,628	23,356	PASS
25.71	0.89	317537	108691	21,266	7,279	13,987	23,331	PASS
26.56	0.60	262601	90522	25,861	8,915	16,946	22,731	PASS
27.86	0.60	177811	62480	17,511	6,153	11,358	23,744	PASS
30.00	0.60	0	0	0	0	0	26,000	PASS
Support # 4								

INTERIOR STRIP TOP BAR - FATIGUE I TRUCK LOAD RATING

LOCATION (FT)	EFF. STEEL (IN^2/FT)	MAX. MOMENT (#-IN/FT)	MIN. MOMENT (#-IN/FT)	MAX. STRESS (PSI)	MIN. STRESS (PSI)	STRESS RANGE (PSI)	THRESHOLD RANGE (PSI)	FATIGUE CHECK (P/F)
Support # 1								
0.00	1.00	0	0	0	0	0	26,000	PASS
2.14	1.00	177811	62480	0	0	0	26,000	PASS
4.29	1.00	317537	108691	0	0	0	26,000	PASS
6.43	1.00	419834	138632	0	0	0	26,000	PASS
8.57	1.00	485621	152305	0	0	0	26,000	PASS
10.71	1.00	516079	149708	0	0	0	26,000	PASS
12.86	1.00	512657	130841	0	0	0	26,000	PASS
15.00	1.00	477064	95706	0	0	0	26,000	PASS
17.14	1.00	415079	44301	0	0	0	26,000	PASS
19.29	1.00	328880	-23373	1,502	-1,869	3,371	26,685	PASS
21.43	1.00	216748	-107316	6,896	-301	7,197	26,110	PASS
23.57	1.00	80690	-207528	13,336	-112	13,448	26,041	PASS
23.77	1.00	66070	-222777	14,316	-92	14,408	26,034	PASS
25.71	1.60	-77076	-372078	15,282	3,166	12,116	24,839	PASS
27.86	1.79	-254121	-559958	20,607	9,352	11,255	22,571	PASS
30.00	1.79	-409787	-770723	28,363	15,081	13,283	20,470	PASS
Support # 2								
0.00	1.79	-409787	-770723	28,363	15,081	13,283	20,470	PASS
2.86	1.72	-222076	-480564	18,382	8,494	9,887	22,885	PASS
4.75	1.00	-58593	-320957	20,625	3,765	16,860	24,619	PASS
5.71	1.00	24690	-239647	15,400	-82	15,482	26,030	PASS
8.57	1.00	225075	-66979	4,304	-749	5,053	26,275	PASS
11.43	1.00	374123	46472	0	0	0	26,000	PASS
14.29	1.00	479092	131000	0	0	0	26,000	PASS
17.14	1.00	540683	186605	0	0	0	26,000	PASS
20.00	1.00	554136	213287	0	0	0	26,000	PASS
22.86	1.00	540683	186605	0	0	0	26,000	PASS
25.71	1.00	479092	131000	0	0	0	26,000	PASS
28.57	1.00	374123	46472	0	0	0	26,000	PASS
31.43	1.00	225075	-66979	4,304	-749	5,053	26,275	PASS
34.29	1.00	24690	-239647	15,400	-82	15,482	26,030	PASS
35.17	1.00	-51684	-314211	20,192	3,321	16,871	24,782	PASS
37.14	1.75	-222076	-480564	18,077	8,354	9,723	22,937	PASS
40.00	1.79	-409787	-770723	28,363	15,081	13,283	20,470	PASS

LOCATION (FT)	EFF. STEEL (IN^2/FT)	MAX. MOMENT (#-IN/FT)	MIN. MOMENT (#-IN/FT)	MAX. STRESS (PSI)	MIN. STRESS (PSI)	STRESS RANGE (PSI)	THRESHOLD RANGE (PSI)	FATIGUE CHECK (P/F)
Support # 3								
0.00	1.79	-409787	-770723	28,363	15,081	13,283	20,470	PASS
2.14	1.79	-254121	-559958	20,607	9,352	11,255	22,571	PASS
4.29	1.60	-77076	-372078	15,282	3,166	12,116	24,839	PASS
6.23	1.00	66070	-222776	14,316	-92	14,408	26,034	PASS
6.43	1.00	80690	-207528	13,336	-112	13,448	26,041	PASS
8.57	1.00	216748	-107316	6,896	-301	7,197	26,110	PASS
10.71	1.00	328880	-23373	1,502	-1,869	3,371	26,685	PASS
12.86	1.00	415079	44301	0	0	0	26,000	PASS
15.00	1.00	477064	95706	0	0	0	26,000	PASS
17.14	1.00	512657	130841	0	0	0	26,000	PASS
19.29	1.00	516079	149708	0	0	0	26,000	PASS
21.43	1.00	485621	152305	0	0	0	26,000	PASS
23.57	1.00	419834	138632	0	0	0	26,000	PASS
25.71	1.00	317537	108691	0	0	0	26,000	PASS
27.86	1.00	177811	62480	0	0	0	26,000	PASS
30.00	1.00	0	0	0	0	0	26,000	PASS
Support # 4								

EXTERIOR STRIP BOTTOM BAR - HL93 INVENTORY LOAD RATING
MINIMUM HL93 INVENTORY RATING IS 1.012 @ 8.59 FT. IN SPAN #3

LOCATION (FT)	EFFECTIVE STEEL AREA (SQ IN/FT)	PHI FACTOR	EFFECTIVE CAPACITY (#-IN/FT)	FACTORED DEAD (#-IN/FT)	FACTORED SPECIAL (#-IN/FT)	FACTORED LIVE (#-IN/FT)	RATING FACTOR (RF)
Support # 1							
0.00	0.60	0.90	570931	0	0	0	N/A
2.14	0.60	0.90	570931	100935	0	261728	1.796
3.18	0.60	0.90	570931	138947	0	362394	1.192
4.29	0.93	0.90	870112	179608	0	470076	1.469
6.43	1.20	0.90	1109149	236019	0	626319	1.394
8.57	1.20	0.90	1113274	270168	0	732308	1.151
10.71	1.20	0.90	1113274	282055	0	790474	1.052
12.86	1.20	0.90	1113274	271680	0	803826	1.047
15.00	1.20	0.90	1113274	239042	0	790199	1.106
17.14	1.20	0.90	1113274	184143	0	748910	1.241
19.29	1.05	0.90	984112	106982	0	668826	1.311
21.41	0.60	0.90	570931	8476	0	555517	1.012
21.43	0.60	0.90	570931	7558	0	554461	1.016
23.57	0.60	0.90	570931	-114128	0	410909	1.667
25.71	0.60	0.90	570931	-258075	0	247320	3.352
27.86	0.60	0.90	570931	-424285	0	114264	8.710
30.00	0.60	0.90	570931	-612757	0	114147	10.370
Support # 2							
0.00	0.79	0.90	743100	-612757	0	114147	11.878
2.86	0.79	0.90	743100	-355506	0	96110	11.431
5.71	0.79	0.90	743100	-137833	0	296316	2.973
8.57	0.79	0.90	743100	40264	0	488666	1.438
10.05	0.79	0.90	743100	112094	0	575585	1.096
11.43	1.21	0.90	1120231	178784	0	656285	1.435
14.29	1.39	0.90	1274364	277726	0	778492	1.280
17.14	1.39	0.90	1274364	337092	0	849494	1.103
20.00	1.39	0.90	1274364	356880	0	866711	1.059
22.86	1.39	0.90	1274364	337092	0	849494	1.103
25.71	1.39	0.90	1274364	277726	0	778492	1.280
28.57	1.21	0.90	1120231	178784	0	656285	1.435
29.95	0.79	0.90	743100	112094	0	575585	1.096
31.43	0.79	0.90	743100	40264	0	488666	1.438
34.29	0.79	0.90	743100	-137833	0	296316	2.973
37.14	0.79	0.90	743100	-355506	0	96110	11.431

LOCATION (FT)	EFFECTIVE STEEL AREA (SQ IN/FT)	PHI FACTOR	EFFECTIVE CAPACITY (#-IN/FT)	FACTORED DEAD (#-IN/FT)	FACTORED SPECIAL (#-IN/FT)	FACTORED LIVE (#-IN/FT)	RATING FACTOR (RF)
40.00	0.79	0.90	743100	-612757	0	114147	11.878
Support # 3							
0.00	0.60	0.90	570931	-612757	0	114147	10.370
2.14	0.60	0.90	570931	-424285	0	114264	8.710
4.29	0.60	0.90	570931	-258075	0	247320	3.352
6.43	0.60	0.90	570931	-114128	0	410909	1.667
8.57	0.60	0.90	570931	7558	0	554461	1.016
8.59	0.60	0.90	570931	8476	0	555517	1.012
10.71	1.05	0.90	984112	106982	0	668826	1.311
12.86	1.20	0.90	1113274	184143	0	748910	1.241
15.00	1.20	0.90	1113274	239042	0	790199	1.106
17.14	1.20	0.90	1113274	271680	0	803826	1.047
19.29	1.20	0.90	1113274	282055	0	790474	1.052
21.43	1.20	0.90	1113274	270168	0	732308	1.151
23.57	1.20	0.90	1109150	236019	0	626319	1.394
25.71	0.93	0.90	870113	179608	0	470076	1.469
26.82	0.60	0.90	570931	138947	0	362394	1.192
27.86	0.60	0.90	570931	100935	0	261728	1.796
30.00	0.60	0.90	570931	0	0	0	N/A
Support # 4							

EXTERIOR STRIP BOTTOM BAR - HL93 OPERATING LOAD RATING
MINIMUM HL93 OPERATING RATING IS 1.312 @ 8.59 FT. IN SPAN #3

LOCATION (FT)	EFFECTIVE STEEL AREA (SQ IN/FT)	PHI FACTOR	EFFECTIVE CAPACITY (#-IN/FT)	FACTORED DEAD (#-IN/FT)	FACTORED SPECIAL (#-IN/FT)	FACTORED LIVE (#-IN/FT)	RATING FACTOR (RF)
Support # 1							
0.00	0.60	0.90	570931	0	0	0	N/A
2.14	0.60	0.90	570931	100935	0	201904	2.328
3.18	0.60	0.90	570931	138947	0	279561	1.545
4.29	0.93	0.90	870112	179608	0	362630	1.904
6.43	1.20	0.90	1109149	236019	0	483160	1.807
8.57	1.20	0.90	1113274	270168	0	564923	1.492
10.71	1.20	0.90	1113274	282055	0	609794	1.363
12.86	1.20	0.90	1113274	271680	0	620094	1.357
15.00	1.20	0.90	1113274	239042	0	609583	1.434
17.14	1.20	0.90	1113274	184143	0	577731	1.608
19.29	1.05	0.90	984112	106982	0	515951	1.700
21.41	0.60	0.90	570931	8476	0	428541	1.312
21.43	0.60	0.90	570931	7558	0	427727	1.317
23.57	0.60	0.90	570931	-114128	0	316987	2.161
25.71	0.60	0.90	570931	-258075	0	190790	4.345
27.86	0.60	0.90	570931	-424285	0	88146	11.290
30.00	0.60	0.90	570931	-612757	0	88056	13.442
Support # 2							
0.00	0.79	0.90	743100	-612757	0	88056	15.398
2.86	0.79	0.90	743100	-355506	0	74142	14.818
5.71	0.79	0.90	743100	-137833	0	228587	3.854
8.57	0.79	0.90	743100	40264	0	376971	1.864
10.05	0.79	0.90	743100	112094	0	444023	1.421
11.43	1.21	0.90	1120231	178784	0	506277	1.860
14.29	1.39	0.90	1274364	277726	0	600551	1.660
17.14	1.39	0.90	1274364	337092	0	655324	1.430
20.00	1.39	0.90	1274364	356880	0	668606	1.372
22.86	1.39	0.90	1274364	337092	0	655324	1.430
25.71	1.39	0.90	1274364	277726	0	600551	1.660
28.57	1.21	0.90	1120231	178784	0	506277	1.860
29.95	0.79	0.90	743100	112094	0	444023	1.421
31.43	0.79	0.90	743100	40264	0	376971	1.864
34.29	0.79	0.90	743100	-137833	0	228587	3.854
37.14	0.79	0.90	743100	-355506	0	74142	14.818

LOCATION (FT)	EFFECTIVE STEEL AREA (SQ IN/FT)	PHI FACTOR	EFFECTIVE CAPACITY (#-IN/FT)	FACTORED DEAD (#-IN/FT)	FACTORED SPECIAL (#-IN/FT)	FACTORED LIVE (#-IN/FT)	RATING FACTOR (RF)
40.00	0.79	0.90	743100	-612757	0	88056	15.398
Support # 3							
0.00	0.60	0.90	570931	-612757	0	88056	13.442
2.14	0.60	0.90	570931	-424285	0	88146	11.290
4.29	0.60	0.90	570931	-258075	0	190790	4.345
6.43	0.60	0.90	570931	-114128	0	316987	2.161
8.57	0.60	0.90	570931	7558	0	427727	1.317
8.59	0.60	0.90	570931	8476	0	428542	1.312
10.71	1.05	0.90	984112	106982	0	515951	1.700
12.86	1.20	0.90	1113274	184143	0	577731	1.608
15.00	1.20	0.90	1113274	239042	0	609583	1.434
17.14	1.20	0.90	1113274	271680	0	620094	1.357
19.29	1.20	0.90	1113274	282055	0	609794	1.363
21.43	1.20	0.90	1113274	270168	0	564923	1.492
23.57	1.20	0.90	1109150	236019	0	483160	1.807
25.71	0.93	0.90	870113	179608	0	362630	1.904
26.82	0.60	0.90	570931	138947	0	279561	1.545
27.86	0.60	0.90	570931	100935	0	201904	2.328
30.00	0.60	0.90	570931	0	0	0	N/A
Support # 4							

EXTERIOR STRIP TOP BAR - HL93 INVENTORY LOAD RATING
MINIMUM HL93 INVENTORY RATING IS 1.261 @ 30.00 FT. IN SPAN #1

LOCATION (FT)	EFFECTIVE STEEL AREA (SQ IN/FT)	PHI FACTOR	EFFECTIVE CAPACITY (#-IN/FT)	FACTORED DEAD (#-IN/FT)	FACTORED SPECIAL (#-IN/FT)	FACTORED LIVE (#-IN/FT)	RATING FACTOR (RF)
Support # 1							
0.00	1.00	0.90	874838	0	0	0	N/A
2.14	1.00	0.90	874838	100935	0	-43419	22.473
4.29	1.00	0.90	874838	179608	0	-86838	12.143
6.43	1.00	0.90	874838	236019	0	-130257	8.528
8.57	1.00	0.90	874838	270168	0	-173676	6.593
10.71	1.00	0.90	874838	282055	0	-217095	5.329
12.86	1.00	0.90	874838	271680	0	-260513	4.401
15.00	1.00	0.90	874838	239042	0	-303932	3.665
17.14	1.00	0.90	874838	184143	0	-347351	3.049
19.29	1.00	0.90	874838	106982	0	-390770	2.513
21.43	1.00	0.90	874838	7558	0	-434189	2.032
23.57	1.00	0.90	874838	-114128	0	-477608	1.593
23.62	1.00	0.90	874838	-117391	0	-478671	1.582
25.71	1.64	0.90	1394057	-258075	0	-524505	2.166
27.86	1.79	0.90	1509812	-424285	0	-585385	1.854
30.00	1.79	0.90	1509812	-612757	0	-711634	1.261
Support # 2							
0.00	1.79	0.90	1509812	-612757	0	-711634	1.261
2.86	1.79	0.90	1509812	-355506	0	-471385	2.449
4.98	1.00	0.90	874838	-193775	0	-370419	1.839
5.71	1.00	0.90	874838	-137833	0	-335495	2.197
8.57	1.00	0.90	874838	40264	0	-289497	3.161
11.43	1.00	0.90	874838	178784	0	-256877	4.102
14.29	1.00	0.90	874838	277726	0	-224824	5.127
17.14	1.00	0.90	874838	337092	0	-192772	6.287
20.00	1.00	0.90	874838	356880	0	-160719	7.664
22.86	1.00	0.90	874838	337092	0	-192772	6.287
25.71	1.00	0.90	874838	277726	0	-224824	5.127
28.57	1.00	0.90	874838	178784	0	-256877	4.102
31.43	1.00	0.90	874838	40264	0	-289497	3.161
34.29	1.00	0.90	874838	-137833	0	-335495	2.197
35.02	1.00	0.90	874838	-193774	0	-370419	1.839
37.14	1.79	0.90	1509812	-355506	0	-471385	2.449
40.00	1.79	0.90	1509812	-612757	0	-711634	1.261

LOCATION (FT)	EFFECTIVE STEEL AREA (SQ IN/FT)	PHI FACTOR	EFFECTIVE CAPACITY (#-IN/FT)	FACTORED DEAD (#-IN/FT)	FACTORED SPECIAL (#-IN/FT)	FACTORED LIVE (#-IN/FT)	RATING FACTOR (RF)
Support # 3							
0.00	1.79	0.90	1509812	-612757	0	-711634	1.261
2.14	1.79	0.90	1509812	-424285	0	-585385	1.854
4.29	1.64	0.90	1394058	-258075	0	-524505	2.166
6.38	1.00	0.90	874838	-117390	0	-478671	1.582
6.43	1.00	0.90	874838	-114128	0	-477608	1.593
8.57	1.00	0.90	874838	7558	0	-434189	2.032
10.71	1.00	0.90	874838	106982	0	-390770	2.513
12.86	1.00	0.90	874838	184143	0	-347351	3.049
15.00	1.00	0.90	874838	239042	0	-303932	3.665
17.14	1.00	0.90	874838	271680	0	-260513	4.401
19.29	1.00	0.90	874838	282055	0	-217094	5.329
21.43	1.00	0.90	874838	270168	0	-173676	6.593
23.57	1.00	0.90	874838	236019	0	-130257	8.528
25.71	1.00	0.90	874838	179608	0	-86838	12.143
27.86	1.00	0.90	874838	100935	0	-43419	22.473
30.00	1.00	0.90	874838	0	0	0	N/A
Support # 4							

EXTERIOR STRIP TOP BAR - HL93 OPERATING LOAD RATING
MINIMUM HL93 OPERATING RATING IS 1.634 @ 30.00 FT. IN SPAN #1

LOCATION (FT)	EFFECTIVE STEEL AREA (SQ IN/FT)	PHI FACTOR	EFFECTIVE CAPACITY (#-IN/FT)	FACTORED DEAD (#-IN/FT)	FACTORED SPECIAL (#-IN/FT)	FACTORED LIVE (#-IN/FT)	RATING FACTOR (RF)
Support # 1							
0.00	1.00	0.90	874838	0	0	0	N/A
2.14	1.00	0.90	874838	100935	0	-33495	29.132
4.29	1.00	0.90	874838	179608	0	-66989	15.741
6.43	1.00	0.90	874838	236019	0	-100484	11.055
8.57	1.00	0.90	874838	270168	0	-133978	8.546
10.71	1.00	0.90	874838	282055	0	-167473	6.908
12.86	1.00	0.90	874838	271680	0	-200968	5.705
15.00	1.00	0.90	874838	239042	0	-234462	4.751
17.14	1.00	0.90	874838	184143	0	-267957	3.952
19.29	1.00	0.90	874838	106982	0	-301451	3.257
21.43	1.00	0.90	874838	7558	0	-334946	2.634
23.57	1.00	0.90	874838	-114128	0	-368440	2.065
23.62	1.00	0.90	874838	-117391	0	-369260	2.051
25.71	1.64	0.90	1394057	-258075	0	-404618	2.808
27.86	1.79	0.90	1509812	-424285	0	-451583	2.404
30.00	1.79	0.90	1509812	-612757	0	-548975	1.634
Support # 2							
0.00	1.79	0.90	1509812	-612757	0	-548975	1.634
2.86	1.79	0.90	1509812	-355506	0	-363640	3.174
4.98	1.00	0.90	874838	-193775	0	-285752	2.383
5.71	1.00	0.90	874838	-137833	0	-258810	2.848
8.57	1.00	0.90	874838	40264	0	-223326	4.098
11.43	1.00	0.90	874838	178784	0	-198162	5.317
14.29	1.00	0.90	874838	277726	0	-173436	6.645
17.14	1.00	0.90	874838	337092	0	-148710	8.150
20.00	1.00	0.90	874838	356880	0	-123984	9.935
22.86	1.00	0.90	874838	337092	0	-148710	8.150
25.71	1.00	0.90	874838	277726	0	-173436	6.645
28.57	1.00	0.90	874838	178784	0	-198162	5.317
31.43	1.00	0.90	874838	40264	0	-223326	4.098
34.29	1.00	0.90	874838	-137833	0	-258810	2.848
35.02	1.00	0.90	874838	-193774	0	-285752	2.383
37.14	1.79	0.90	1509812	-355506	0	-363640	3.174
40.00	1.79	0.90	1509812	-612757	0	-548975	1.634

LOCATION (FT)	EFFECTIVE STEEL AREA (SQ IN/FT)	PHI FACTOR	EFFECTIVE CAPACITY (#-IN/FT)	FACTORED DEAD (#-IN/FT)	FACTORED SPECIAL (#-IN/FT)	FACTORED LIVE (#-IN/FT)	RATING FACTOR (RF)
Support # 3							
0.00	1.79	0.90	1509812	-612757	0	-548975	1.634
2.14	1.79	0.90	1509812	-424285	0	-451583	2.404
4.29	1.64	0.90	1394058	-258075	0	-404618	2.808
6.38	1.00	0.90	874838	-117390	0	-369260	2.051
6.43	1.00	0.90	874838	-114128	0	-368440	2.065
8.57	1.00	0.90	874838	7558	0	-334946	2.634
10.71	1.00	0.90	874838	106982	0	-301451	3.257
12.86	1.00	0.90	874838	184143	0	-267957	3.952
15.00	1.00	0.90	874838	239042	0	-234462	4.751
17.14	1.00	0.90	874838	271680	0	-200967	5.705
19.29	1.00	0.90	874838	282055	0	-167473	6.908
21.43	1.00	0.90	874838	270168	0	-133978	8.546
23.57	1.00	0.90	874838	236019	0	-100484	11.055
25.71	1.00	0.90	874838	179608	0	-66989	15.741
27.86	1.00	0.90	874838	100935	0	-33495	29.132
30.00	1.00	0.90	874838	0	0	0	N/A
Support # 4							

EXTERIOR STRIP BOTTOM BAR - FATIGUE I TRUCK LOAD RATING

LOCATION (FT)	EFF. STEEL (IN^2/FT)	MAX. MOMENT (#-IN/FT)	MIN. MOMENT (#-IN/FT)	MAX. STRESS (PSI)	MIN. STRESS (PSI)	STRESS RANGE (PSI)	THRESHOLD RANGE (PSI)	FATIGUE CHECK (P/F)
Support # 1								
0.00	0.60	0	0	0	0	0	26,000	PASS
2.14	0.60	184795	69464	18,199	6,841	11,358	23,492	PASS
3.18	0.60	254936	94422	25,106	9,299	15,808	22,590	PASS
4.29	0.93	329965	121119	21,335	7,831	13,504	23,128	PASS
6.43	1.20	436166	154964	22,084	7,846	14,238	23,123	PASS
8.57	1.20	504315	170999	25,439	8,626	16,814	22,837	PASS
10.71	1.20	535596	169224	27,017	8,536	18,481	22,870	PASS
12.86	1.20	531456	149640	26,808	7,548	19,260	23,232	PASS
15.00	1.20	493605	112247	24,899	5,662	19,237	23,924	PASS
17.14	1.20	427821	57043	21,581	2,877	18,703	24,945	PASS
19.29	1.05	336282	-15970	19,212	-165	19,377	26,060	PASS
21.41	0.60	218369	-105954	21,505	-1,921	23,426	26,704	PASS
21.43	0.60	217271	-106793	21,397	-1,937	23,333	26,710	PASS
23.57	0.60	72793	-215425	7,169	-3,906	11,075	27,432	PASS
25.71	0.60	-94934	-389936	0	0	0	26,000	PASS
27.86	0.60	-283480	-589317	0	0	0	26,000	PASS
30.00	0.60	-452187	-813123	0	0	0	26,000	PASS
Support # 2								
0.00	0.79	-452187	-813123	0	0	0	26,000	PASS
2.86	0.79	-246675	-505163	0	0	0	26,000	PASS
5.71	0.79	15153	-249185	1,147	-3,348	4,495	27,228	PASS
8.57	0.79	227861	-64193	17,255	-862	18,117	26,316	PASS
10.05	0.79	310120	-393	23,484	-5	23,489	26,002	PASS
11.43	1.21	386494	58843	19,372	2,949	16,422	24,919	PASS
14.29	1.39	498309	150217	21,910	6,605	15,305	23,578	PASS
17.14	1.39	564008	209930	24,799	9,231	15,569	22,615	PASS
20.00	1.39	578831	237981	25,451	10,464	14,987	22,163	PASS
22.86	1.39	564008	209930	24,799	9,231	15,569	22,615	PASS
25.71	1.39	498309	150217	21,910	6,605	15,305	23,578	PASS
28.57	1.21	386494	58843	19,372	2,949	16,422	24,919	PASS
29.95	0.79	310120	-393	23,484	-5	23,489	26,002	PASS
31.43	0.79	227861	-64193	17,255	-862	18,117	26,316	PASS
34.29	0.79	15153	-249185	1,147	-3,348	4,495	27,228	PASS
37.14	0.79	-246675	-505163	0	0	0	26,000	PASS

LOCATION (FT)	EFF. STEEL (IN^2/FT)	MAX. MOMENT (#-IN/FT)	MIN. MOMENT (#-IN/FT)	MAX. STRESS (PSI)	MIN. STRESS (PSI)	STRESS RANGE (PSI)	THRESHOLD RANGE (PSI)	FATIGUE CHECK (P/F)
40.00	0.79	-452187	-813123	0	0	0	26,000	PASS
Support # 3								
0.00	0.60	-452187	-813123	0	0	0	26,000	PASS
2.14	0.60	-283480	-589317	0	0	0	26,000	PASS
4.29	0.60	-94934	-389936	0	0	0	26,000	PASS
6.43	0.60	72793	-215425	7,169	-3,906	11,075	27,432	PASS
8.57	0.60	217271	-106793	21,397	-1,937	23,333	26,710	PASS
8.59	0.60	218370	-105954	21,505	-1,921	23,426	26,704	PASS
10.71	1.05	336282	-15970	19,212	-165	19,377	26,060	PASS
12.86	1.20	427821	57043	21,581	2,877	18,703	24,945	PASS
15.00	1.20	493605	112247	24,899	5,662	19,237	23,924	PASS
17.14	1.20	531456	149640	26,808	7,548	19,260	23,232	PASS
19.29	1.20	535596	169224	27,017	8,536	18,481	22,870	PASS
21.43	1.20	504315	170999	25,439	8,626	16,814	22,837	PASS
23.57	1.20	436166	154964	22,084	7,846	14,238	23,123	PASS
25.71	0.93	329965	121119	21,335	7,831	13,504	23,128	PASS
26.82	0.60	254936	94422	25,106	9,299	15,808	22,590	PASS
27.86	0.60	184795	69464	18,199	6,841	11,358	23,492	PASS
30.00	0.60	0	0	0	0	0	26,000	PASS
Support # 4								

EXTERIOR STRIP TOP BAR - FATIGUE I TRUCK LOAD RATING

LOCATION (FT)	EFF. STEEL (IN^2/FT)	MAX. MOMENT (#-IN/FT)	MIN. MOMENT (#-IN/FT)	MAX. STRESS (PSI)	MIN. STRESS (PSI)	STRESS RANGE (PSI)	THRESHOLD RANGE (PSI)	FATIGUE CHECK (P/F)
Support # 1								
0.00	1.00	0	0	0	0	0	26,000	PASS
2.14	1.00	184795	69464	0	0	0	26,000	PASS
4.29	1.00	329965	121119	0	0	0	26,000	PASS
6.43	1.00	436166	154964	0	0	0	26,000	PASS
8.57	1.00	504315	170999	0	0	0	26,000	PASS
10.71	1.00	535596	169224	0	0	0	26,000	PASS
12.86	1.00	531456	149640	0	0	0	26,000	PASS
15.00	1.00	493605	112247	0	0	0	26,000	PASS
17.14	1.00	427821	57043	0	0	0	26,000	PASS
19.29	1.00	336282	-15970	1,026	-1,947	2,973	26,714	PASS
21.43	1.00	217271	-106793	6,863	-301	7,164	26,111	PASS
23.57	1.00	72793	-215425	13,844	-101	13,945	26,037	PASS
23.62	1.00	68991	-219381	14,098	-96	14,194	26,035	PASS
25.71	1.64	-94934	-389936	15,587	3,795	11,793	24,609	PASS
27.86	1.79	-283480	-589317	21,688	10,432	11,255	22,175	PASS
30.00	1.79	-452187	-813123	29,924	16,641	13,283	19,898	PASS
Support # 2								
0.00	1.79	-452187	-813123	29,924	16,641	13,283	19,898	PASS
2.86	1.79	-246675	-505163	18,591	9,078	9,513	22,671	PASS
4.98	1.00	-52137	-314971	20,241	3,350	16,890	24,772	PASS
5.71	1.00	15153	-249185	16,013	-50	16,064	26,018	PASS
8.57	1.00	227861	-64193	4,125	-758	4,883	26,278	PASS
11.43	1.00	386494	58843	0	0	0	26,000	PASS
14.29	1.00	498309	150217	0	0	0	26,000	PASS
17.14	1.00	564008	209930	0	0	0	26,000	PASS
20.00	1.00	578831	237981	0	0	0	26,000	PASS
22.86	1.00	564008	209930	0	0	0	26,000	PASS
25.71	1.00	498309	150217	0	0	0	26,000	PASS
28.57	1.00	386494	58843	0	0	0	26,000	PASS
31.43	1.00	227861	-64193	4,125	-758	4,883	26,278	PASS
34.29	1.00	15153	-249185	16,013	-50	16,064	26,018	PASS
35.02	1.00	-52137	-314971	20,241	3,350	16,890	24,772	PASS
37.14	1.79	-246675	-505163	18,591	9,078	9,513	22,671	PASS
40.00	1.79	-452187	-813123	29,924	16,641	13,283	19,898	PASS

LOCATION (FT)	EFF. STEEL (IN^2/FT)	MAX. MOMENT (#-IN/FT)	MIN. MOMENT (#-IN/FT)	MAX. STRESS (PSI)	MIN. STRESS (PSI)	STRESS RANGE (PSI)	THRESHOLD RANGE (PSI)	FATIGUE CHECK (P/F)
Support # 3								
0.00	1.79	-452187	-813123	29,924	16,641	13,283	19,898	PASS
2.14	1.79	-283480	-589317	21,688	10,432	11,255	22,175	PASS
4.29	1.64	-94934	-389936	15,587	3,795	11,793	24,609	PASS
6.38	1.00	68991	-219381	14,098	-96	14,194	26,035	PASS
6.43	1.00	72793	-215425	13,844	-101	13,945	26,037	PASS
8.57	1.00	217271	-106793	6,863	-301	7,164	26,111	PASS
10.71	1.00	336282	-15970	1,026	-1,947	2,973	26,714	PASS
12.86	1.00	427821	57043	0	0	0	26,000	PASS
15.00	1.00	493605	112247	0	0	0	26,000	PASS
17.14	1.00	531456	149640	0	0	0	26,000	PASS
19.29	1.00	535596	169224	0	0	0	26,000	PASS
21.43	1.00	504315	170999	0	0	0	26,000	PASS
23.57	1.00	436166	154964	0	0	0	26,000	PASS
25.71	1.00	329965	121119	0	0	0	26,000	PASS
27.86	1.00	184795	69464	0	0	0	26,000	PASS
30.00	1.00	0	0	0	0	0	26,000	PASS
Support # 4								