Structural Load Rating Calculations

Volume 6

Section 5.6 to 5.9.10

CLINE AVENUE BRIDGE

S.R. 912 OVER THE INDIANA HARBOR CANAL
AT EAST CHICAGO, INDIANA
LAKE COUNTY

Prepared by:

URS

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	6.11.1 Results Comparison	6	PT	IC
	6.11.2 Tango Model	1	PT	IC
	6.11.3 Tango Input	16	PT	IC
	6.12 Ramp A			
	6.12.1 Results Comparison	9	PT	IC
	6.12.2 Tango Model	6	PT	IC
	6.12.3 Tango Input	23	PT	IC
	6.13 Ramp B			
	6.13.1 Results Comparison	9	PT	IC
	6.13.2 Tango Model	1	PT	IC
	6.13.3 Tango Input	8	PT	IC
	6.14 Ramp C			
	6.14.1 Results Comparison	9	PT	IC
	6.14.2 Tango Model	1	PT	IC
	6.14.3 Tango Input	12	PT	IC
	6.15 Ramp D			
	6.15.1 Results Comparison	9	PT	IC
	6.15.2 Tango Model	1	PT	IC
	6.15.3 Tango Input	7	PT	IC
	6.16 Temperature Gradient Comparison	10	PT	IC
	6.17 Permit Truck Live Load Comparison	10	PT	IC
	7 Transverse Analysis Verification			
	7.1 Summary	1	PT	N/A
	7.2 Minimum Live Load Moment at Edge of Cantilever			
	7.2.1 Midas Results and Comparison	1	PT/DEM	N/A
	7.2.2 Brug Results	1	PT	N/A
	7.2.3 Homberg Chart Results	3	PT	N/A
	7.2.3.1 Homberg Charts – Fixed End Moment Beam	9	PT	N/A
	7.2.3.2 Homberg Charts – Continuous Beam	3	PT	N/A
	7.3 Minimum Live Load Moment at Edge of Web			
	7.3.1 Midas Results and Comparison	1	PT/DEM	N/A
	7.3.2 Brug Results	1	PT	N/A
	7.3.3. Homberg Chart Results	2	PT	N/A

Job: Cline Avenue Load Rating
Item: Calculation Index
File: V:\Projects\Cline Avenue\Calc Index\[Calculation_Index.xls]Index

		Number of Pages	Designed	Checked
	7.3.3.1 Homberg Charts – Fixed End Moment Beam	2	PT	N/A
	7.3.3.2 Homberg Charts – Continuous Beam	3	PT	N/A
Volume 7A	7.4 Minimum Live Load Moment at Top Slab - Thickness Change Location			
	7.4.1 Midas Results and Comparison	1	PT/DEM	N/A
	7.4.2 Brug Results	1	PT	N/A
	7.4.3 Homberg Chart Results	4	PT	N/A
	7.4.3.1 Homberg Charts – Fixed End Moment Beam	6	PT	N/A
	7.4.3.2 Homberg Charts – Continuous Beam	6	PT	N/A
	7.5 Maximum Live Load Moment at Top Slab - Thickness Change Location			
	7.5.1 Midas Results and Comparison	1	PT/DEM	N/A
	7.5.2 Brug Results	1	PT	N/A
	7.5.3 Homberg Chart Results	4	PT	N/A
	7.5.3.1 Homberg Charts – Fixed End Moment Beam	7	PT	N/A
	7.5.3.2 Homberg Charts – Continuous Beam	6	PT	N/A
	7.6 Minimum Live Load Moment at Top Slab - Centerline			
	7.6.1 Midas Results and Comparison	1	PT/DEM	N/A
	7.6.2 Brug Results	1	PT	N/A
	7.6.3 Homberg Chart Results	3	PT	N/A
	7.6.3.1 Homberg Charts – Fixed End Moment Beam	-	PT	N/A
	7.6.3.2 Homberg Charts – Continuous Beam	-	PT	N/A
	7.7 Maximum Live Load Moment at Top Slab - Centerline			
	7.7.1 Midas Results and Comparison	1	PT/DEM	N/A
	7.7.2 Brug Results	1	PT	N/A
	7.7.3 Homberg Chart Results	2	PT	N/A
	7.7.3.1 Homberg Charts – Fixed End Moment Beam	4	PT	N/A
	7.7.3.2 Homberg Charts – Continuous Beam	3	PT	N/A
	7.8 Minimum Live Load Moment at Top of Web			
	7.8.1 Midas Results and Comparison	1	PT/DEM	N/A
	7.8.2 Brug Results	1	PT	N/A
	7.8.3 Homberg Chart Results	2	PT	N/A
	7.8.3.1 Homberg Charts – Fixed End Moment Beam	-	PT	N/A
	7.8.3.2 Homberg Charts – Continuous Beam	-	PT	N/A
	7.9 Maximum Live Load Moment at Top of Web			
	7.9.1 Midas Results and Comparison	1	PT/DEM	N/A
	7.9.2 Brug Results	1	PT	N/A
	7.9.3 Homberg Chart Results	2	PT	N/A
	7.9.3.1 Homberg Charts – Fixed End Moment Beam	-	PT	N/A
	7.9.3.2 Homberg Charts – Continuous Beam	-	PT	N/A
	7.10 2D GTSTRUDL Analysis – Equivalent Loads on Continuous Beam	19	PT	N/A
	7.11 2D GTSTRUDL Analysis –Frame Model	20	PT	N/A
Volume 7E	**8 Review of Longitudinal Shear and Transverse Analysis**			
	8.1 Summary		RJB	N/A
	8.2 References for Interaction of Longitudinal Shear and Transverse Bending		RJB	N/A
	8.3 Initial Review of Transverse Analysis		RJB	N/A
	8.4 Revised Transverse Analysis Based on Revised Effective Span Length		RJB	N/A
	8.5 Review of Longitudinal Shear Analysis (MATHCAD Analysis)		RJB	N/A
	8.6 Comparison of the MCFT Shear Analysis - Tabularized Values (2007) Vs. Equations (2009)		RJB	N/A
Electronic Files	**8 Appendix A – GP Input Files - Geometry**		DEM	
	9 Appendix B - RM Input Files - Dead Load		DEM	
	10 Appendix C - RM Input Files - Live Load		DEM	
	10 Appendix D - Additional Longitudinal Rating Calculations		TSP	
	10 Appendix E - Brug Output Files		PT	

5.6 Section IVA

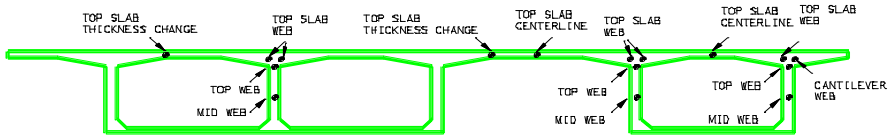
5.6.1 Rating Summary AASHTO Lanes

URS

PROJECT: Triple Cell- Five Web Box, 87.34' Wide (Case IV-A) CALCS BY: PT DATE: 1/27/09

ESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP- IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length



Cline Avenue			Inventory	Operating										
			LFR Design Loads	LFR Design Loads	INDOT Legal Loads*			INDOT Permit Loads						
			HL93 or Tandem*	HI93 or Tandem*	Single Vehicle (SV)			Super Loads						
					R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Gross Vehicle Weight (tons)			32	32	45	45	63	67	67.1	129	133.5	175	152.5	240
Longitudinal	Factored	Flexure												
		Shear												
	Service	Flexure												
		Principal Stress												
Transverse	Factored	Top Slab Centerline	1.05	1.36	1.53	1.60	1.68	1.40	1.37	1.30	1.32	1.15	1.37	1.20
		Top Slab Thickness Change	1.60	2.07	2.26	2.31	2.15	2.01	1.95	1.76	1.77	1.50	1.71	1.42
		Top Slab Webs & Cantilever	1.89	2.45	2.26	2.59	2.25	1.94	1.92	1.67	1.67	1.45	1.64	1.40

Overall Rating Factor	1.05	1.36	1.53	1.15
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)		43.45	69.01	77.19

* Max number of lanes loaded = 2

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IV A.XLS]Truck Data

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)**

Import Brug Data | Delete Load Rating Factors | Calculate Load Rating Factors | Print Load Rating Results | View Single LC Results

CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue**

CHECKED BY: TSP - IC RJE DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

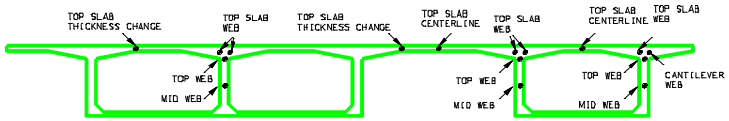
Summary of Rating Factors:

	Combine Trucks?	Truck Description		Operating - Strength I		View Single LC Results	Operating - Strength I						AS required - With Live Load		PRINT	Calculate Rating Factors
	Y or N	Rating Truck ID	Truck Name	Brug File with 2 or more vehicles	Brug File with a single vehicle	Y or N	RF	RF Controlling Location	Top Slab Centerline	Top Slab (Thickness Change Section)	Top Slab Webs	Cantilever at Webs	Top of Web	Middle of Web	Y or N	Y or N
HL93- DESIGN LOADS	N	1	HL93-TRUCK	IV_A_HL93_TRUCK_EL.OUT	1_IV_A_HL93_TRUCK_EL.OUT	N	1.36	Top Slab Centerline	1.36	2.07	2.50	2.74	0.45	0.25	N	Y
	N	2	HL93-TANDEM	V_A_HL93_TANDEM_EL.OU	IV_A_HL93_TANDEM_EL.OU	N	1.41	Top Slab Centerline	1.41	2.31	2.45	2.49	0.43	0.23	N	Y
INDOT DESIGN LOADS	N	3	R1	IV_A_R1_EL.OUT	1_IV_A_R1_EL.OUT	N	1.53	Top Slab Centerline	1.53	2.26	2.26	2.47	0.49	0.27	N	Y
	N	4	R2	IV_A_R2_EL.OUT	1_IV_A_R2_EL.OUT	N	1.60	Top Slab Centerline	1.60	2.31	2.59	3.06	0.45	0.26	N	Y
	N	5	R3	IV_A_R3_EL.OUT	1_IV_A_R3_EL.OUT	N	1.68	Top Slab Centerline	1.68	2.15	2.25	3.03	0.49	0.28	N	Y
	N	6	NOT USED	n/a	n/a	N									N	N
	N	7	NOT USED	n/a	n/a	N									N	N
	N	8	NOT USED	n/a	n/a	N									N	N
	N	9	NOT USED	n/a	n/a	N									N	N
	N	10	NOT USED	n/a	n/a	N									N	N
	N	11	NOT USED	n/a	n/a	N									N	N
INDOT DESIGN LOADS	Y	12	R4 + HL93	IV_A_R4_EL.OUT	1_IV_A_R4_EL.OUT	N	1.40	Top Slab Centerline	1.40	2.01	1.94	2.96	0.49	0.27	N	Y
	Y	13	R5 + HL93	IV_A_R5_EL.OUT	1_IV_A_R5_EL.OUT	N	1.37	Top Slab Centerline	1.37	1.95	1.92	2.36	0.51	0.28	N	Y
INDOT PERMIT LOADS	Y	14	S1 + HL93	IV_A_S1_EL.OUT	1_IV_A_S1_EL.OUT	N	1.30	Top Slab Centerline	1.30	1.76	1.67	2.36	0.56	0.31	N	Y
	Y	15	S2 + HL93	IV_A_S2_EL.OUT	1_IV_A_S2_EL.OUT	N	1.32	Top Slab Centerline	1.32	1.77	1.67	2.42	0.55	0.31	N	Y
	Y	16	S3 + HL93	IV_A_S3_EL.OUT	1_IV_A_S3_EL.OUT	Y	1.15	Top Slab Centerline	1.15	1.50	1.45	1.89	0.62	0.34	N	Y
	Y	17	S4 + HL93	IV_A_S4_EL.OUT	1_IV_A_S4_EL.OUT	N	1.37	Top Slab Centerline	1.37	1.71	1.64	2.76	0.56	0.31	N	Y
	Y	18	S5 + HL93	IV_A_S5_EL.OUT	1_IV_A_S5_EL.OUT	N	1.20	Top Slab Centerline	1.20	1.42	1.40	2.08	0.64	0.35	N	Y
	N	19	NOT USED	n/a	n/a	N									N	N
	N	20	NOT USED	n/a	n/a	N									N	N
	N	21	NOT USED	n/a	n/a	N									N	N
	N	22	NOT USED	n/a	n/a	N									N	N
	N	23	NOT USED	n/a	n/a	N									N	N
	N	24	NOT USED	n/a	n/a	N									N	N
	N	25	NOT USED	n/a	n/a	N									N	N
	N	26	NOT USED	n/a	n/a	N									N	N

LRFR Load Factors For Segmental Bridges				Multiple Presence Factor	
LOAD CASE	DL	SDL	LL	one lane	two lanes
Operating - Strength I	1.25	1.50	1.35	1.20	1.00

Brug plates with reversed moment sign and reversed LL Max/Min
11
12
14

	Multiple Presence Factor	
LOAD CASE	one lane	two lanes
Operating - Strength I	1.00	1.00



URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]Truck Data

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)**

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue**

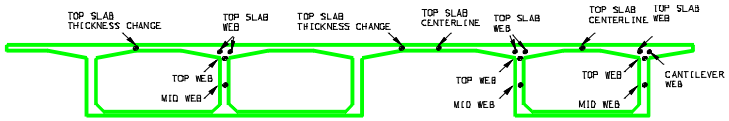
Import Brug Data | Delete Load Rating Factors | Calculate Load Rating Factors | Print Load Rating Results | View Single LC Results

CALCS BY: PT DATE: 1/27/09

CHECKED BY: TSP - IC RJE DATE: Jan 09 - Aug 09

	Combine Trucks?	Truck Description		Inventory - Strength I		PRINT	Operating - Strength I						AS required		PRINT	Calculate Rating Factors
	Y or N	Rating Truck ID	Truck Name	RF	RF Controlling Location	Y or N	RF	RF Controlling Location	Top Slab Centerline	Top Slab (Thickness Change Section)	Top Slab Webs	Cantilever at Webs	Top of Web	Middle of Web	Y or N	Y or N
HS20- DESIGN LOADS	N	1	HL93-TRUCK	IV_A_HL93_TRUCK_EL.OUT	1_IV_A_HL93_TRUCK_EL.OUT	N	1.05	Top Slab Centerline	1.05	1.60	1.93	2.12	0.53	0.28	Y	Y
	N	2	HL93-TANDEM	V_A_HL93_TANDEM_EL.OU	IV_A_HL93_TANDEM_EL.OU	N	1.09	Top Slab Centerline	1.09	1.78	1.89	1.92	0.50	0.26	N	Y

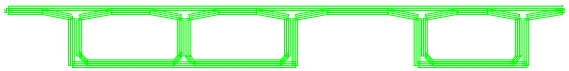
LFR Load Factors For Segmental Bridges - NC DOT				Multiple Presence Factor	
LOAD CASE	DL	SDL	LL	one lane	two lanes
Inventory - Strength I	1.25	1.50	1.75	1.20	1.00



URS

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)**
DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue**
Area of Steel Requirements

CALCS BY: PT DATE: 1/27/09
CHECKED BY: TSP- IC RJB DATE: Jan 09 - Aug 09



LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

			Middle of Web		Top of Web	
Section	Inventory / Operating	Combined Name	A_b req'd (in^2/ft)	$A_{b\ Dead}$ req'd (in^2/ft)	A_b req'd (in^2/ft)	$A_{b\ Dead}$ req'd (in^2/ft)
HL-93	Inventory	HL-93 Inventory	0.28	0.12	0.53	0.19
HL-93	Operating	HL-93 Operating	0.25	0.12	0.45	0.19
HL-93-s	Operating	HL-93-s Operating	0.25	0.12	0.45	0.19
R1	Operating	R1 Operating	0.27	0.12	0.49	0.19
R1-s	Operating	R1-s Operating	0.27	0.12	0.49	0.19
R2	Operating	R2 Operating	0.26	0.12	0.45	0.19
R2-s	Operating	R2-s Operating	0.26	0.12	0.45	0.19
R3	Operating	R3 Operating	0.28	0.12	0.49	0.19
R3-s	Operating	R3-s Operating	0.28	0.12	0.49	0.19
R4	Operating	R4 Operating	0.27	0.12	0.49	0.19
R4-s	Operating	R4-s Operating	0.27	0.12	0.49	0.19
R5	Operating	R5 Operating	0.28	0.12	0.51	0.19
R5-s	Operating	R5-s Operating	0.28	0.12	0.51	0.19
S1	Operating	S1 Operating	0.31	0.12	0.56	0.19
S1-s	Operating	S1-s Operating	0.31	0.12	0.56	0.19
S2	Operating	S2 Operating	0.31	0.12	0.55	0.19
S2-s	Operating	S2-s Operating	0.31	0.12	0.55	0.19
S3	Operating	S3 Operating	0.34	0.12	0.62	0.19
S3-s	Operating	S3-s Operating	0.34	0.12	0.62	0.19
S4	Operating	S4 Operating	0.31	0.12	0.56	0.19
S4-s	Operating	S4-s Operating	0.31	0.12	0.56	0.19
S5	Operating	S5 Operating	0.35	0.12	0.64	0.19
S5-s	Operating	S5-s Operating	0.35	0.12	0.64	0.19

5.6.2 General Data AASHTO Lanes

URS

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	SP - IC RJ	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]General Data

GENERAL DATA:

Concrete Strength, F'c, final conditions: 5000 psi

Width of Section, b: 1.00 ft

Steel Strength, Fsy: 60,000 psi

Rating Action	Description
0	No Action
1	Calculate Area of Steel Required at Top of Webs
2	Calculate Area of Steel Required at Middle of Webs
3	Calculate Rating Factor - Top Slab Centerline
4	Calculate Rating Factor - Top Slab Thickness Change (Between Webs)
5	Calculate Rating Factor - Top Slab at Web
6	Calculate Rating Factor - Top Slab at Cantilever

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

*** Clear Cover, longitudinal bars are below top steel and above bottom steel

Ref: Sheet 532, 540, 561

Initialize Spreadsheet

Calculate Mn

SECTION	GTSTRUDL NODE NO.	Rating Action	Calculate Moment Capacity	Depth (ft)	*** Cover - at (in)	dt (in)	Regular Reinforcement (Top) Size of Bar	Regular Reinforcement (Top) No. of Bars	*** Cover - ab (in)	db (in)	Regular Reinforcement (Bot) Size of Bar	Regular Reinforcement (Bot) No. of Bars	fc'= 5000 ϕ Mn ** (Kip-ft) MAX.	MIN.
1 a		0	Y	0.750	1.50	7.19	5	2.42	1.00	7.75	4	1.00	6.88	-22.90
1 b		6	Y	1.667	1.50	18.19	5	2.42	1.00	18.75	4	1.00	16.78	-60.04
2 a		5	Y	1.667	1.50	18.19	5	2.42	1.00	18.75	4	1.00	16.78	-60.03
2 b		4	Y	0.750	1.50	7.19	5	2.42	1.00	7.63	6	1.00	14.63	-22.90
2 c		3	Y	0.750	1.50	7.19	5	1.00	1.00	7.63	6	1.00	14.63	-9.80
3 a		5	Y	1.667	1.50	18.19	5	2.42	1.00	18.75	4	1.00	16.78	-60.03
3 b		4	Y	0.750	1.50	7.19	5	2.42	1.00	7.63	6	1.00	14.63	-22.90
3 c		3	Y	0.750	1.50	7.19	5	1.00	1.00	7.63	6	1.00	14.63	-9.80
4 a		5	Y	1.667	1.50	18.19	5	2.42	1.00	18.75	4	1.00	16.78	-60.03
4 b		4	Y	0.750	1.50	7.19	5	2.42	1.00	7.63	6	1.00	14.63	-22.90
4 c		3	Y	0.750	1.50	7.19	5	1.00	1.00	7.63	6	1.00	14.63	-9.80
5 a		5	Y	1.667	1.50	18.19	5	2.42	1.00	18.75	4	1.00	16.78	-60.03
5 b		4	Y	0.750	1.50	7.19	5	2.42	1.00	7.63	6	1.00	14.63	-22.90
5 c		3	Y	0.750	1.50	7.19	5	1.00	1.00	7.63	6	1.00	14.63	-9.80
6 a		6	Y	1.667	1.50	18.19	5	2.42	1.00	18.75	4	1.00	16.78	-60.03
7 a		0	N	1.458	1.00	16.25	4	1.20	1.00	16.19	5	1.20		
7 b		0	N	0.458	1.00	4.25	4	1.20	1.00	4.19	5	1.20		
7 c		0	N	0.458	1.00	4.25	4	1.20	1.00	4.19	5	1.20		
8 a		0	N	1.458	1.00	16.25	4	1.20	1.00	16.19	5	1.20		
8 b		0	N	0.458	1.00	4.25	4	1.20	1.00	4.19	5	1.20		
8 c		0	N	0.458	1.00	4.25	4	1.20	1.00	4.19	5	1.20		
9 a		0	N	1.458	1.00	16.25	4	1.20	1.00	16.19	5	1.20		
9 b		0	N	0.458	1.00	4.25	4	1.20	1.00	4.19	5	1.20		
9 c		0	N	0.458	1.00	4.25	4	1.20	1.00	4.19	5	1.20		
10 a		1	N	1.167	1.00	12.69	5		1.00	12.69	5			
10 b		2	N	1.167	1.00	12.69	5		1.00	12.69	5			
11 a		1	N	1.167	1.00	12.69	5		1.00	12.69	5			
11 b		2	N	1.167	1.00	12.69	5		1.00	12.69	5			
12 a		1	N	1.167	1.00	12.69	5		1.00	12.69	5			
12 b		2	N	1.167	1.00	12.69	5		1.00	12.69	5			
13 a		1	N	1.167	1.00	12.69	5		1.00	12.69	5			
13 b		2	N	1.167	1.00	12.69	5		1.00	12.69	5			
14 a		1	N	1.167	1.00	12.69	5		1.00	12.69	5			
14 b		2	N	1.167	1.00	12.69	5		1.00	12.69	5			

5.6.3 Load Summary AASHTO Lanes

URS

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]LLMu

Project: Triple Cell- Five Web Box, 87.34' Wide (Case IV-A) | Design: PT | Date: 1/27/09

Portion: Superstructure - Transverse Analysis - Cline Avenue | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 11 12 14 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 or 2 Vehicles)**

SECTION NO.	GTSTRUDL NODE	Truck 1 - HL93-TRUCK Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 1 - HL93-TRUCK Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 2 - HL93-TANDEM Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 2 - HL93-TANDEM Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 3 - R1 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 3 - R1 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 4 - R2 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 4 - R2 Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	1.02	0.00	-6.27	0.00	0.68	0.00	-6.83	0.00	0.39	0.00	-6.55	0.00	0.70	0.00	-5.48
1 b		0.00	0.06	0.00	-11.01	0.00	0.12	0.00	-12.66	0.00	0.07	0.00	-11.65	0.00	0.04	0.00	-9.39
2 a		0.00	1.05	0.00	-6.37	0.00	-0.07	0.00	-7.53	0.00	1.38	0.00	-6.06	0.00	1.93	0.00	-5.20
2 b		0.00	4.09	0.00	-1.32	0.00	3.50	0.00	-1.31	0.00	3.97	0.00	-1.26	0.00	3.89	0.00	-1.21
2 c		0.00	4.86	0.00	-0.91	0.00	4.66	0.00	-0.79	0.00	4.34	0.00	-1.12	0.00	4.13	0.00	-0.95
3 a		0.00	1.92	0.00	-8.73	0.00	0.73	0.00	-9.19	0.00	2.43	0.00	-8.76	0.00	2.62	0.00	-7.59
3 b		0.00	3.96	0.00	-1.97	0.00	3.54	0.00	-1.47	0.00	3.64	0.00	-1.83	0.00	3.56	0.00	-1.77
3 c		0.00	5.16	0.00	-0.80	0.00	4.86	0.00	-0.65	0.00	4.71	0.00	-0.98	0.00	4.50	0.00	-0.91
4 a		0.00	4.36	0.00	-13.16	0.00	2.80	0.00	-13.42	0.00	5.42	0.00	-14.51	0.00	5.60	0.00	-12.68
4 b		0.00	5.04	0.00	-5.05	0.00	4.15	0.00	-4.24	0.00	5.02	0.00	-5.46	0.00	4.95	0.00	-5.24
4 c		0.00	6.72	0.00	-0.34	0.00	6.46	0.00	-0.34	0.00	5.95	0.00	-0.42	0.00	5.71	0.00	-0.38
5 a		0.00	1.63	0.00	-5.07	0.00	0.18	0.00	-6.76	0.00	1.93	0.00	-4.72	0.00	2.32	0.00	-3.82
5 b		0.00	4.40	0.00	-1.11	0.00	3.92	0.00	-1.18	0.00	4.40	0.00	-1.05	0.00	4.19	0.00	-0.89
5 c		0.00	4.91	0.00	-0.64	0.00	4.59	0.00	-0.58	0.00	4.63	0.00	-0.79	0.00	4.39	0.00	-0.70
6 a		0.00	0.08	0.00	-4.76	0.00	0.17	0.00	-5.79	0.00	0.09	0.00	-4.13	0.00	0.03	0.00	-3.44
7 a		0.00	1.22	0.00	-0.67	0.00	0.93	0.00	-0.49	0.00	1.48	0.00	-0.82	0.00	1.38	0.00	-0.77
7 b		0.00	1.04	0.00	-0.58	0.00	0.77	0.00	-0.42	0.00	1.27	0.00	-0.71	0.00	1.19	0.00	-0.67
7 c		0.00	0.06	0.00	-0.05	0.00	0.05	0.00	-0.04	0.00	0.07	0.00	-0.06	0.00	0.06	0.00	-0.05
8 a		0.00	1.11	0.00	-0.90	0.00	0.85	0.00	-0.66	0.00	1.34	0.00	-1.10	0.00	1.26	0.00	-1.03
8 b		0.00	0.94	0.00	-0.78	0.00	0.69	0.00	-0.57	0.00	1.14	0.00	-0.95	0.00	1.08	0.00	-0.90
8 c		0.00	0.05	0.00	-0.07	0.00	0.04	0.00	-0.06	0.00	0.06	0.00	-0.09	0.00	0.06	0.00	-0.08
9 a		0.00	0.66	0.00	-0.79	0.00	0.61	0.00	-0.62	0.00	0.78	0.00	-0.95	0.00	0.67	0.00	-0.89
9 b		0.00	0.53	0.00	-0.67	0.00	0.45	0.00	-0.49	0.00	0.64	0.00	-0.82	0.00	0.56	0.00	-0.77
9 c		0.00	0.04	0.00	-0.09	0.00	0.03	0.00	-0.07	0.00	0.05	0.00	-0.11	0.00	0.04	0.00	-0.10
10 a		0.00	4.65	0.00	-9.35	0.00	4.81	0.00	-8.58	0.00	5.27	0.00	-10.89	0.00	4.52	0.00	-9.47
10 b		0.00	2.45	0.00	-4.66	0.00	2.39	0.00	-4.13	0.00	2.96	0.00	-5.65	0.00	2.45	0.00	-4.91
11 a		0.00	9.13	0.00	-7.92	0.00	7.81	0.00	-7.04	0.00	10.73	0.00	-9.24	0.00	9.61	0.00	-8.15
11 b		0.00	4.19	0.00	-3.81	0.00	3.56	0.00	-3.31	0.00	5.08	0.00	-4.62	0.00	4.53	0.00	-4.07
12 a		0.00	8.81	0.00	-11.10	0.00	7.61	0.00	-9.82	0.00	10.33	0.00	-13.13	0.00	9.36	0.00	-11.71
12 b		0.00	4.69	0.00	-5.71	0.00	3.90	0.00	-4.85	0.00	5.70	0.00	-6.95	0.00	5.16	0.00	-6.20
13 a		0.00	11.26	0.00	-7.27	0.00	9.18	0.00	-7.23	0.00	13.33	0.00	-8.44	0.00	12.31	0.00	-7.08
13 b		0.00	5.93	0.00	-3.65	0.00	4.69	0.00	-3.45	0.00	7.21	0.00	-4.43	0.00	6.67	0.00	-3.72
14 a		0.00	5.54	0.00	-2.22	0.00	5.32	0.00	-1.82	0.00	6.38	0.00	-2.62	0.00	5.47	0.00	-2.36
14 b		0.00	2.94	0.00	-0.93	0.00	2.68	0.00	-0.76	0.00	3.57	0.00	-1.13	0.00	3.06	0.00	-1.01

Project: Triple Cell- Five Web Box, 87.34' Wide (Case IV-A) Design: PT Date: 1/27/09

Portion: Check: TSP - IC RJB Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 11 12 14 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 or 2 Vehicles)**

SECTION NO.	GTSTRUDL NODE	Truck 5 - R3 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 5 - R3 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 6 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 6 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 7 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 7 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 8 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 8 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	0.50	0.00	-5.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 b		0.00	0.02	0.00	-9.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 a		0.00	2.08	0.00	-5.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 b		0.00	3.87	0.00	-1.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 c		0.00	3.91	0.00	-0.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 a		0.00	2.86	0.00	-8.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 b		0.00	3.63	0.00	-2.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 c		0.00	4.40	0.00	-1.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 a		0.00	6.84	0.00	-14.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 b		0.00	5.52	0.00	-6.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 c		0.00	5.43	0.00	-0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 a		0.00	2.18	0.00	-3.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 b		0.00	4.38	0.00	-0.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 c		0.00	4.40	0.00	-0.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 a		0.00	0.02	0.00	-4.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 a		0.00	1.58	0.00	-0.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 b		0.00	1.36	0.00	-0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 c		0.00	0.05	0.00	-0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8 a		0.00	1.49	0.00	-1.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8 b		0.00	1.28	0.00	-1.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8 c		0.00	0.06	0.00	-0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 a		0.00	0.65	0.00	-1.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 b		0.00	0.52	0.00	-0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 c		0.00	0.04	0.00	-0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10 a		0.00	4.68	0.00	-9.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10 b		0.00	2.42	0.00	-4.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11 a		0.00	10.53	0.00	-8.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11 b		0.00	4.81	0.00	-4.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12 a		0.00	11.00	0.00	-13.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12 b		0.00	5.84	0.00	-7.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13 a		0.00	14.42	0.00	-7.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13 b		0.00	7.74	0.00	-3.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14 a		0.00	5.51	0.00	-2.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14 b		0.00	3.00	0.00	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project: Triple Cell- Five Web Box, 87.34' Wide (Case IV-A) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 11 12 14 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 or 2 Vehicles)**

	Truck 9 - NOT USED		Truck 9 - NOT USED		Truck 10 - NOT USED		Truck 10 - NOT USED		Truck 11 - NOT USED		Truck 11 - NOT USED		Truck 12 - R4 + HL93		Truck 12 - R4 + HL93	
	Maximum		Minimum		Maximum		Minimum		Maximum		Minimum		Maximum		Minimum	
GTSTRUDL	Positive Moment		Negative Moment		Positive Moment		Negative Moment		Positive Moment		Negative Moment		Positive Moment		Negative Moment	
SECTION NODE NO.	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)
1 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.51	0.00	-5.41
1 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.00	-9.15
2 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.41	0.00	-5.61
2 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.38	0.00	-1.68
2 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.01	0.00	-1.12
3 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.11	0.00	-8.85
3 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.82	0.00	-2.22
3 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.55	0.00	-1.22
4 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.46	0.00	-16.03
4 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.06	0.00	-7.43
4 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.52	0.00	-0.48
5 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.56	0.00	-3.36
5 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.78	0.00	-1.08
5 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.61	0.00	-0.89
6 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	-2.76
7 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.88	0.00	-1.07
7 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.64	0.00	-0.92
7 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	-0.06
8 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.73	0.00	-1.43
8 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.51	0.00	-1.24
8 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	-0.10
9 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	0.00	-1.22
9 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.69	0.00	-1.07
9 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	-0.13
10 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.39	0.00	-11.34
10 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.94	0.00	-5.99
11 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.13	0.00	-9.97
11 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.77	0.00	-5.09
12 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.41	0.00	-15.25
12 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.76	0.00	-8.28
13 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.34	0.00	-8.33
13 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.98	0.00	-4.58
14 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.74	0.00	-2.99
14 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.67	0.00	-1.29

Project: Triple Cell- Five Web Box, 87.34' Wide (Case IV-A) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 11 12 14 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 or 2 Vehicles)**

SECTION NO.	GTSTRUDL NODE	Truck 13 - R5 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 13 - R5 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 14 - S1 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 14 - S1 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 15 - S2 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 15 - S2 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 16 - S3 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 16 - S3 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	0.11	0.00	-6.96	0.00	0.60	0.00	-7.20	0.00	0.47	0.00	-7.00	0.00	0.41	0.00	-9.14
1 b		0.00	0.04	0.00	-12.54	0.00	0.03	0.00	-13.12	0.00	0.05	0.00	-12.60	0.00	0.06	0.00	-16.33
2 a		0.00	2.47	0.00	-6.98	0.00	3.32	0.00	-8.02	0.00	3.41	0.00	-7.73	0.00	4.64	0.00	-9.91
2 b		0.00	4.53	0.00	-1.69	0.00	5.35	0.00	-2.06	0.00	5.18	0.00	-1.94	0.00	6.70	0.00	-2.58
2 c		0.00	4.40	0.00	-1.29	0.00	5.19	0.00	-1.15	0.00	4.93	0.00	-1.14	0.00	6.21	0.00	-1.62
3 a		0.00	3.56	0.00	-10.38	0.00	4.53	0.00	-11.47	0.00	4.58	0.00	-11.13	0.00	6.14	0.00	-14.65
3 b		0.00	3.99	0.00	-2.24	0.00	5.17	0.00	-2.86	0.00	4.93	0.00	-2.71	0.00	6.14	0.00	-3.48
3 c		0.00	4.94	0.00	-1.29	0.00	5.97	0.00	-1.61	0.00	5.71	0.00	-1.60	0.00	7.21	0.00	-2.07
4 a		0.00	7.99	0.00	-17.94	0.00	10.96	0.00	-21.83	0.00	11.02	0.00	-21.70	0.00	14.29	0.00	-28.17
4 b		0.00	6.08	0.00	-7.65	0.00	8.17	0.00	-10.31	0.00	7.93	0.00	-10.25	0.00	10.04	0.00	-13.15
4 c		0.00	6.02	0.00	-0.52	0.00	7.26	0.00	-0.56	0.00	6.90	0.00	-0.56	0.00	8.65	0.00	-0.76
5 a		0.00	2.83	0.00	-4.83	0.00	3.20	0.00	-4.69	0.00	3.24	0.00	-4.39	0.00	4.52	0.00	-5.73
5 b		0.00	5.11	0.00	-1.24	0.00	6.18	0.00	-1.41	0.00	5.99	0.00	-1.41	0.00	7.70	0.00	-1.84
5 c		0.00	5.02	0.00	-0.97	0.00	6.09	0.00	-1.08	0.00	5.86	0.00	-1.07	0.00	7.43	0.00	-1.41
6 a		0.00	0.03	0.00	-4.10	0.00	0.03	0.00	-5.22	0.00	0.06	0.00	-4.73	0.00	0.07	0.00	-5.63
7 a		0.00	1.98	0.00	-1.11	0.00	2.29	0.00	-1.26	0.00	2.26	0.00	-1.25	0.00	3.03	0.00	-1.68
7 b		0.00	1.71	0.00	-0.96	0.00	1.98	0.00	-1.10	0.00	1.96	0.00	-1.08	0.00	2.62	0.00	-1.46
7 c		0.00	0.08	0.00	-0.07	0.00	0.07	0.00	-0.07	0.00	0.07	0.00	-0.07	0.00	0.11	0.00	-0.09
8 a		0.00	1.82	0.00	-1.49	0.00	2.23	0.00	-1.73	0.00	2.21	0.00	-1.71	0.00	2.90	0.00	-2.28
8 b		0.00	1.57	0.00	-1.29	0.00	1.91	0.00	-1.50	0.00	1.90	0.00	-1.49	0.00	2.50	0.00	-1.99
8 c		0.00	0.08	0.00	-0.11	0.00	0.10	0.00	-0.12	0.00	0.10	0.00	-0.12	0.00	0.13	0.00	-0.16
9 a		0.00	0.93	0.00	-1.29	0.00	0.84	0.00	-1.57	0.00	0.82	0.00	-1.56	0.00	1.13	0.00	-2.05
9 b		0.00	0.77	0.00	-1.11	0.00	0.69	0.00	-1.35	0.00	0.68	0.00	-1.34	0.00	0.95	0.00	-1.77
9 c		0.00	0.06	0.00	-0.14	0.00	0.06	0.00	-0.16	0.00	0.06	0.00	-0.16	0.00	0.08	0.00	-0.21
10 a		0.00	6.26	0.00	-13.03	0.00	6.61	0.00	-13.66	0.00	6.54	0.00	-13.48	0.00	8.75	0.00	-18.12
10 b		0.00	3.35	0.00	-6.82	0.00	3.43	0.00	-6.88	0.00	3.43	0.00	-6.85	0.00	4.65	0.00	-9.35
11 a		0.00	13.48	0.00	-11.32	0.00	15.03	0.00	-12.00	0.00	14.84	0.00	-11.82	0.00	19.78	0.00	-15.92
11 b		0.00	6.39	0.00	-5.70	0.00	6.87	0.00	-5.90	0.00	6.84	0.00	-5.87	0.00	9.23	0.00	-7.99
12 a		0.00	13.32	0.00	-16.48	0.00	16.77	0.00	-20.13	0.00	16.67	0.00	-20.05	0.00	21.63	0.00	-26.15
12 b		0.00	7.37	0.00	-8.81	0.00	8.92	0.00	-10.75	0.00	8.91	0.00	-10.72	0.00	11.62	0.00	-14.09
13 a		0.00	17.56	0.00	-9.62	0.00	21.75	0.00	-10.14	0.00	21.56	0.00	-10.08	0.00	28.09	0.00	-13.48
13 b		0.00	9.58	0.00	-5.08	0.00	11.74	0.00	-5.41	0.00	11.70	0.00	-5.39	0.00	15.32	0.00	-7.31
14 a		0.00	7.49	0.00	-3.25	0.00	7.50	0.00	-3.15	0.00	7.36	0.00	-3.06	0.00	10.06	0.00	-4.26
14 b		0.00	4.24	0.00	-1.41	0.00	4.17	0.00	-1.29	0.00	4.16	0.00	-1.26	0.00	5.69	0.00	-1.79

Project: Triple Cell- Five Web Box, 87.34' Wide (Case IV-A) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 11 12 14 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 or 2 Vehicles)**

SECTION	GTSTRUDL NODE NO.	Truck 17 - S4 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 17 - S4 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 18 - S5 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 18 - S5 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 19 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 19 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 20 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 20 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	0.37	0.00	-5.86	0.00	0.52	0.00	-8.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 b		0.00	0.01	0.00	-10.45	0.00	0.05	0.00	-14.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 a		0.00	4.14	0.00	-6.91	0.00	4.93	0.00	-9.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 b		0.00	4.88	0.00	-2.06	0.00	6.48	0.00	-2.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 c		0.00	4.22	0.00	-1.10	0.00	5.86	0.00	-1.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 a		0.00	5.39	0.00	-10.43	0.00	6.56	0.00	-13.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 b		0.00	4.74	0.00	-2.78	0.00	6.35	0.00	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 c		0.00	5.05	0.00	-1.68	0.00	6.96	0.00	-2.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 a		0.00	12.03	0.00	-22.02	0.00	15.45	0.00	-28.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 b		0.00	7.95	0.00	-10.88	0.00	10.54	0.00	-14.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 c		0.00	5.90	0.00	-0.57	0.00	8.26	0.00	-0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 a		0.00	3.76	0.00	-3.36	0.00	4.40	0.00	-4.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 b		0.00	5.66	0.00	-1.46	0.00	7.60	0.00	-1.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 c		0.00	5.29	0.00	-1.12	0.00	7.26	0.00	-1.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 a		0.00	0.01	0.00	-3.60	0.00	0.07	0.00	-5.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 a		0.00	2.34	0.00	-1.30	0.00	2.99	0.00	-1.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 b		0.00	2.03	0.00	-1.13	0.00	2.60	0.00	-1.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 c		0.00	0.07	0.00	-0.06	0.00	0.09	0.00	-0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8 a		0.00	2.28	0.00	-1.78	0.00	2.96	0.00	-2.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8 b		0.00	1.97	0.00	-1.55	0.00	2.55	0.00	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8 c		0.00	0.10	0.00	-0.12	0.00	0.14	0.00	-0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 a		0.00	0.79	0.00	-1.60	0.00	1.01	0.00	-2.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 b		0.00	0.67	0.00	-1.39	0.00	0.85	0.00	-1.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 c		0.00	0.07	0.00	-0.16	0.00	0.09	0.00	-0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10 a		0.00	6.05	0.00	-12.90	0.00	8.25	0.00	-16.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10 b		0.00	3.32	0.00	-6.65	0.00	4.34	0.00	-8.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11 a		0.00	14.65	0.00	-11.53	0.00	19.14	0.00	-14.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11 b		0.00	6.79	0.00	-5.76	0.00	8.81	0.00	-7.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12 a		0.00	16.95	0.00	-20.56	0.00	22.42	0.00	-27.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12 b		0.00	9.12	0.00	-11.18	0.00	12.01	0.00	-14.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13 a		0.00	21.87	0.00	-10.06	0.00	28.84	0.00	-13.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13 b		0.00	11.96	0.00	-5.55	0.00	15.70	0.00	-7.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14 a		0.00	7.09	0.00	-3.04	0.00	9.12	0.00	-3.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14 b		0.00	3.98	0.00	-1.25	0.00	5.17	0.00	-1.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

URS

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]LLSir

Project: Triple Cell- Five Web Box, 87.34' Wide (Case IV-A) | Design: PT | Date: 1/27/09

Portion: Superstructure - Transverse Analysis - Cline Avenue | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 11 12 14 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 Vehicle Only)**

SECTION NO.	GTSTRUDL NODE	Truck 1 - HL93-TRUCK Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 1 - HL93-TRUCK Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 2 - HL93-TANDEM Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 2 - HL93-TANDEM Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 3 - R1 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 3 - R1 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 4 - R2 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 4 - R2 Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	1.00	0.00	-6.01	0.00	0.64	0.00	-6.36	0.00	0.37	0.00	-6.33	0.00	0.69	0.00	-5.34
1 b		0.00	-0.01	0.00	-9.86	0.00	0.00	0.00	-10.85	0.00	-0.01	0.00	-10.93	0.00	-0.01	0.00	-8.83
2 a		0.00	1.05	0.00	-5.03	0.00	-0.07	0.00	-6.05	0.00	1.38	0.00	-4.70	0.00	1.93	0.00	-3.83
2 b		0.00	3.86	0.00	-0.19	0.00	3.44	0.00	-0.49	0.00	3.52	0.00	-0.21	0.00	3.45	0.00	-0.07
2 c		0.00	4.05	0.00	-0.57	0.00	3.83	0.00	-0.50	0.00	3.48	0.00	-0.70	0.00	3.38	0.00	-0.59
3 a		0.00	1.03	0.00	-6.48	0.00	0.73	0.00	-7.15	0.00	1.35	0.00	-6.47	0.00	1.66	0.00	-5.43
3 b		0.00	3.62	0.00	-1.30	0.00	3.27	0.00	-1.12	0.00	3.22	0.00	-1.09	0.00	3.19	0.00	-1.01
3 c		0.00	4.18	0.00	-0.46	0.00	3.92	0.00	-0.38	0.00	3.64	0.00	-0.57	0.00	3.55	0.00	-0.50
4 a		0.00	2.29	0.00	-7.60	0.00	1.19	0.00	-9.20	0.00	2.90	0.00	-8.58	0.00	3.15	0.00	-7.31
4 b		0.00	4.05	0.00	-2.90	0.00	3.46	0.00	-2.81	0.00	3.81	0.00	-2.91	0.00	3.78	0.00	-2.73
4 c		0.00	4.88	0.00	-0.23	0.00	4.69	0.00	-0.19	0.00	4.24	0.00	-0.29	0.00	4.09	0.00	-0.25
5 a		0.00	1.63	0.00	-4.69	0.00	0.18	0.00	-5.78	0.00	1.93	0.00	-4.72	0.00	2.32	0.00	-3.82
5 b		0.00	4.01	0.00	-0.56	0.00	3.59	0.00	-0.58	0.00	3.67	0.00	-0.66	0.00	3.59	0.00	-0.53
5 c		0.00	4.06	0.00	-0.40	0.00	3.77	0.00	-0.35	0.00	3.62	0.00	-0.49	0.00	3.52	0.00	-0.41
6 a		0.00	-0.01	0.00	-3.98	0.00	0.00	0.00	-4.51	0.00	-0.01	0.00	-3.62	0.00	-0.01	0.00	-3.06
7 a		0.00	0.93	0.00	-0.37	0.00	0.76	0.00	-0.27	0.00	1.10	0.00	-0.45	0.00	1.01	0.00	-0.43
7 b		0.00	0.77	0.00	-0.32	0.00	0.59	0.00	-0.23	0.00	0.93	0.00	-0.39	0.00	0.87	0.00	-0.37
7 c		0.00	0.04	0.00	-0.04	0.00	0.03	0.00	-0.03	0.00	0.05	0.00	-0.05	0.00	0.04	0.00	-0.04
8 a		0.00	0.61	0.00	-0.48	0.00	0.50	0.00	-0.36	0.00	0.74	0.00	-0.59	0.00	0.69	0.00	-0.55
8 b		0.00	0.51	0.00	-0.42	0.00	0.38	0.00	-0.31	0.00	0.63	0.00	-0.51	0.00	0.59	0.00	-0.48
8 c		0.00	0.03	0.00	-0.05	0.00	0.02	0.00	-0.04	0.00	0.04	0.00	-0.06	0.00	0.03	0.00	-0.05
9 a		0.00	0.39	0.00	-0.69	0.00	0.38	0.00	-0.51	0.00	0.46	0.00	-0.84	0.00	0.39	0.00	-0.78
9 b		0.00	0.31	0.00	-0.59	0.00	0.27	0.00	-0.43	0.00	0.37	0.00	-0.72	0.00	0.32	0.00	-0.67
9 c		0.00	0.02	0.00	-0.06	0.00	0.02	0.00	-0.05	0.00	0.03	0.00	-0.07	0.00	0.02	0.00	-0.06
10 a		0.00	3.41	0.00	-9.35	0.00	3.50	0.00	-8.58	0.00	3.95	0.00	-10.89	0.00	3.26	0.00	-9.47
10 b		0.00	1.83	0.00	-4.66	0.00	1.75	0.00	-4.13	0.00	2.22	0.00	-5.65	0.00	1.84	0.00	-4.91
11 a		0.00	5.66	0.00	-5.02	0.00	5.38	0.00	-4.94	0.00	6.68	0.00	-5.90	0.00	5.91	0.00	-5.15
11 b		0.00	2.68	0.00	-2.46	0.00	2.32	0.00	-2.17	0.00	3.25	0.00	-2.99	0.00	2.86	0.00	-2.61
12 a		0.00	5.38	0.00	-6.27	0.00	5.12	0.00	-6.19	0.00	6.35	0.00	-7.32	0.00	5.65	0.00	-6.49
12 b		0.00	2.89	0.00	-3.20	0.00	2.46	0.00	-2.92	0.00	3.51	0.00	-3.90	0.00	3.14	0.00	-3.47
13 a		0.00	6.86	0.00	-4.40	0.00	5.83	0.00	-4.90	0.00	8.14	0.00	-4.95	0.00	7.39	0.00	-4.13
13 b		0.00	3.63	0.00	-2.15	0.00	2.97	0.00	-2.24	0.00	4.42	0.00	-2.62	0.00	4.02	0.00	-2.20
14 a		0.00	4.05	0.00	-2.22	0.00	3.93	0.00	-1.82	0.00	4.72	0.00	-2.62	0.00	4.00	0.00	-2.36
14 b		0.00	2.17	0.00	-0.93	0.00	1.98	0.00	-0.76	0.00	2.63	0.00	-1.13	0.00	2.24	0.00	-1.01

Project: Triple Cell- Five Web Box, 87.34' Wide (Case IV-A) Design: PT Date: 1/27/09

Portion: Check: TSP - IC RJB Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 11 12 14 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 Vehicle Only)**

SECTION NO.	GTSTRUDL NODE	Truck 5 - R3 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 5 - R3 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 6 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 6 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 7 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 7 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 8 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 8 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	0.49	0.00	-5.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 b		0.00	-0.01	0.00	-8.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 a		0.00	2.08	0.00	-4.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 b		0.00	3.46	0.00	-0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 c		0.00	3.15	0.00	-0.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 a		0.00	1.80	0.00	-5.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 b		0.00	3.22	0.00	-1.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 c		0.00	3.38	0.00	-0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 a		0.00	3.68	0.00	-7.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 b		0.00	3.94	0.00	-3.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 c		0.00	3.87	0.00	-0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 a		0.00	2.18	0.00	-3.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 b		0.00	3.63	0.00	-0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 c		0.00	3.38	0.00	-0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 a		0.00	-0.01	0.00	-3.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 a		0.00	1.15	0.00	-0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 b		0.00	0.97	0.00	-0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 c		0.00	0.03	0.00	-0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8 a		0.00	0.81	0.00	-0.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8 b		0.00	0.69	0.00	-0.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8 c		0.00	0.03	0.00	-0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 a		0.00	0.37	0.00	-0.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 b		0.00	0.29	0.00	-0.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 c		0.00	0.02	0.00	-0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10 a		0.00	3.09	0.00	-9.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10 b		0.00	1.68	0.00	-4.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11 a		0.00	6.34	0.00	-5.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11 b		0.00	2.96	0.00	-2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12 a		0.00	6.36	0.00	-7.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12 b		0.00	3.44	0.00	-3.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13 a		0.00	8.42	0.00	-3.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13 b		0.00	4.51	0.00	-2.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14 a		0.00	3.91	0.00	-2.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14 b		0.00	2.15	0.00	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project: Triple Cell- Five Web Box, 87.34' Wide (Case IV-A) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 11 12 14 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 Vehicle Only)**

SECTION NO.	GTSTRUDL NODE	Truck 9 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 9 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 10 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 10 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 11 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 11 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 12 - R4 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 12 - R4 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	-5.39
1 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	-9.05
2 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.41	0.00	-3.57
2 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.69	0.00	-0.10
2 c		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.22	0.00	-0.69
3 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.76	0.00	-5.66
3 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.34	0.00	-1.23
3 c		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.46	0.00	-0.64
4 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.91	0.00	-8.33
4 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.26	0.00	-3.78
4 c		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.90	0.00	-0.32
5 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.56	0.00	-3.36
5 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.84	0.00	-0.59
5 c		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.53	0.00	-0.50
6 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	-2.71
7 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.33	0.00	-0.59
7 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.16	0.00	-0.51
7 c		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	-0.05
8 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.94	0.00	-0.75
8 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.00	-0.65
8 c		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	-0.06
9 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.00	-1.06
9 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.00	-0.91
9 c		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	-0.08
10 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.52	0.00	-11.34
10 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.09	0.00	-5.99
11 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.32	0.00	-6.21
11 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.58	0.00	-3.22
12 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.09	0.00	-8.15
12 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.02	0.00	-4.43
13 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.35	0.00	-4.68
13 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.30	0.00	-2.57
14 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.41	0.00	-2.99
14 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.66	0.00	-1.29

Project: Triple Cell- Five Web Box, 87.34' Wide (Case IV-A) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 11 12 14 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 Vehicle Only)**

SECTION NO.	GTSTRUDL NODE	Truck 13 - R5 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 13 - R5 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 14 - S1 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 14 - S1 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 15 - S2 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 15 - S2 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 16 - S3 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 16 - S3 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	0.10	0.00	-6.77	0.00	0.59	0.00	-6.93	0.00	0.46	0.00	-6.74	0.00	0.40	0.00	-8.86
1 b		0.00	-0.01	0.00	-11.95	0.00	-0.02	0.00	-11.93	0.00	-0.02	0.00	-11.59	0.00	-0.02	0.00	-15.37
2 a		0.00	2.47	0.00	-4.97	0.00	3.32	0.00	-5.45	0.00	3.41	0.00	-5.21	0.00	4.64	0.00	-6.59
2 b		0.00	3.88	0.00	-0.11	0.00	4.72	0.00	-1.04	0.00	4.48	0.00	-1.00	0.00	5.69	0.00	-1.35
2 c		0.00	3.43	0.00	-0.80	0.00	4.15	0.00	-0.70	0.00	3.92	0.00	-0.70	0.00	4.89	0.00	-0.99
3 a		0.00	2.19	0.00	-7.21	0.00	2.91	0.00	-7.59	0.00	2.98	0.00	-7.33	0.00	4.01	0.00	-9.59
3 b		0.00	3.47	0.00	-1.28	0.00	4.45	0.00	-1.56	0.00	4.23	0.00	-1.44	0.00	5.28	0.00	-1.87
3 c		0.00	3.68	0.00	-0.71	0.00	4.52	0.00	-0.82	0.00	4.29	0.00	-0.81	0.00	5.36	0.00	-1.06
4 a		0.00	4.38	0.00	-10.05	0.00	5.88	0.00	-11.35	0.00	5.95	0.00	-11.28	0.00	7.83	0.00	-14.77
4 b		0.00	4.35	0.00	-3.93	0.00	5.58	0.00	-5.18	0.00	5.37	0.00	-5.15	0.00	6.81	0.00	-6.60
4 c		0.00	4.24	0.00	-0.35	0.00	5.14	0.00	-0.39	0.00	4.87	0.00	-0.39	0.00	6.08	0.00	-0.51
5 a		0.00	2.83	0.00	-4.83	0.00	3.20	0.00	-4.69	0.00	3.24	0.00	-4.39	0.00	4.52	0.00	-5.73
5 b		0.00	4.02	0.00	-0.71	0.00	4.96	0.00	-0.72	0.00	4.71	0.00	-0.72	0.00	5.97	0.00	-0.96
5 c		0.00	3.75	0.00	-0.56	0.00	4.59	0.00	-0.56	0.00	4.38	0.00	-0.55	0.00	5.50	0.00	-0.74
6 a		0.00	-0.01	0.00	-3.66	0.00	-0.02	0.00	-4.39	0.00	-0.02	0.00	-4.01	0.00	-0.02	0.00	-4.94
7 a		0.00	1.44	0.00	-0.61	0.00	1.66	0.00	-0.69	0.00	1.64	0.00	-0.68	0.00	2.18	0.00	-0.92
7 b		0.00	1.24	0.00	-0.53	0.00	1.41	0.00	-0.60	0.00	1.40	0.00	-0.59	0.00	1.87	0.00	-0.80
7 c		0.00	0.05	0.00	-0.05	0.00	0.05	0.00	-0.05	0.00	0.05	0.00	-0.05	0.00	0.07	0.00	-0.07
8 a		0.00	0.99	0.00	-0.79	0.00	1.20	0.00	-0.90	0.00	1.19	0.00	-0.89	0.00	1.57	0.00	-1.20
8 b		0.00	0.85	0.00	-0.68	0.00	1.03	0.00	-0.78	0.00	1.02	0.00	-0.78	0.00	1.35	0.00	-1.04
8 c		0.00	0.04	0.00	-0.07	0.00	0.05	0.00	-0.08	0.00	0.05	0.00	-0.08	0.00	0.07	0.00	-0.10
9 a		0.00	0.53	0.00	-1.11	0.00	0.46	0.00	-1.23	0.00	0.45	0.00	-1.21	0.00	0.63	0.00	-1.64
9 b		0.00	0.44	0.00	-0.96	0.00	0.36	0.00	-1.06	0.00	0.36	0.00	-1.05	0.00	0.52	0.00	-1.42
9 c		0.00	0.03	0.00	-0.09	0.00	0.03	0.00	-0.10	0.00	0.03	0.00	-0.10	0.00	0.04	0.00	-0.13
10 a		0.00	4.39	0.00	-13.03	0.00	4.20	0.00	-13.66	0.00	4.16	0.00	-13.48	0.00	5.63	0.00	-18.12
10 b		0.00	2.51	0.00	-6.82	0.00	2.30	0.00	-6.88	0.00	2.30	0.00	-6.85	0.00	3.19	0.00	-9.35
11 a		0.00	8.27	0.00	-7.15	0.00	8.98	0.00	-7.44	0.00	8.88	0.00	-7.35	0.00	11.89	0.00	-9.93
11 b		0.00	4.01	0.00	-3.64	0.00	4.20	0.00	-3.70	0.00	4.18	0.00	-3.68	0.00	5.67	0.00	-5.03
12 a		0.00	7.98	0.00	-9.13	0.00	9.47	0.00	-10.41	0.00	9.41	0.00	-10.37	0.00	12.29	0.00	-13.71
12 b		0.00	4.44	0.00	-4.88	0.00	5.14	0.00	-5.51	0.00	5.15	0.00	-5.48	0.00	6.80	0.00	-7.32
13 a		0.00	10.49	0.00	-5.64	0.00	12.54	0.00	-5.37	0.00	12.43	0.00	-5.35	0.00	16.28	0.00	-7.32
13 b		0.00	5.74	0.00	-3.00	0.00	6.76	0.00	-2.83	0.00	6.74	0.00	-2.81	0.00	8.90	0.00	-3.91
14 a		0.00	5.44	0.00	-3.25	0.00	5.32	0.00	-3.15	0.00	5.25	0.00	-3.06	0.00	7.13	0.00	-4.26
14 b		0.00	3.09	0.00	-1.41	0.00	2.97	0.00	-1.29	0.00	2.96	0.00	-1.26	0.00	4.08	0.00	-1.79

Project: Triple Cell- Five Web Box, 87.34' Wide (Case IV-A) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 11 12 14 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 Vehicle Only)**

SECTION	GTSTRUDL NODE NO.	Truck 17 - S4 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 17 - S4 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 18 - S5 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 18 - S5 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 19 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 19 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 20 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 20 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	0.37	0.00	-5.74	0.00	0.50	0.00	-7.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 b		0.00	-0.02	0.00	-9.93	0.00	-0.03	0.00	-13.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 a		0.00	4.14	0.00	-4.21	0.00	4.93	0.00	-6.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 b		0.00	4.12	0.00	-1.08	0.00	5.54	0.00	-1.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 c		0.00	3.32	0.00	-0.66	0.00	4.63	0.00	-0.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 a		0.00	3.49	0.00	-6.35	0.00	4.27	0.00	-8.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 b		0.00	3.85	0.00	-1.45	0.00	5.26	0.00	-1.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 c		0.00	3.72	0.00	-0.85	0.00	5.16	0.00	-1.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 a		0.00	6.60	0.00	-11.13	0.00	8.37	0.00	-14.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 b		0.00	5.12	0.00	-5.48	0.00	6.86	0.00	-7.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 c		0.00	4.13	0.00	-0.41	0.00	5.79	0.00	-0.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 a		0.00	3.76	0.00	-3.36	0.00	4.40	0.00	-4.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 b		0.00	4.33	0.00	-0.75	0.00	5.83	0.00	-0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 c		0.00	3.86	0.00	-0.57	0.00	5.33	0.00	-0.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 a		0.00	-0.02	0.00	-3.25	0.00	-0.03	0.00	-4.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 a		0.00	1.66	0.00	-0.71	0.00	2.15	0.00	-0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 b		0.00	1.43	0.00	-0.62	0.00	1.84	0.00	-0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 c		0.00	0.05	0.00	-0.05	0.00	0.06	0.00	-0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8 a		0.00	1.22	0.00	-0.92	0.00	1.59	0.00	-1.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8 b		0.00	1.06	0.00	-0.80	0.00	1.37	0.00	-1.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8 c		0.00	0.05	0.00	-0.08	0.00	0.07	0.00	-0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 a		0.00	0.41	0.00	-1.25	0.00	0.53	0.00	-1.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 b		0.00	0.35	0.00	-1.09	0.00	0.44	0.00	-1.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 c		0.00	0.03	0.00	-0.10	0.00	0.04	0.00	-0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10 a		0.00	3.65	0.00	-12.90	0.00	5.03	0.00	-16.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10 b		0.00	2.12	0.00	-6.65	0.00	2.78	0.00	-8.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11 a		0.00	8.66	0.00	-7.05	0.00	11.35	0.00	-9.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11 b		0.00	4.11	0.00	-3.59	0.00	5.33	0.00	-4.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12 a		0.00	9.26	0.00	-10.48	0.00	12.37	0.00	-13.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12 b		0.00	5.13	0.00	-5.69	0.00	6.78	0.00	-7.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13 a		0.00	12.44	0.00	-5.21	0.00	16.43	0.00	-6.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13 b		0.00	6.82	0.00	-2.87	0.00	8.95	0.00	-3.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14 a		0.00	4.84	0.00	-3.04	0.00	6.38	0.00	-3.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14 b		0.00	2.81	0.00	-1.25	0.00	3.66	0.00	-1.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

URS

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]DC&PTBrug

SERVICE FORCES

MAXIMUM loads for section(s) 11 12 14 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SECTION	GTStrudl NODE NO.	Selfweight F (Kip)	Selfweight M (Kip-ft)	Surcharge (WS) F (Kip)	Surcharge (WS) M (Kip-ft)	Surcharge (Barrier) F (Kip)	Surcharge (Barrier) M (Kip-ft)
1 a		0.00	-3.30	0.00	-0.74	0.00	-3.07
1 b		0.00	-6.45	0.00	-1.30	0.00	-4.16
2 a		0.00	-3.08	0.00	-0.48	0.00	0.11
2 b		0.00	0.39	0.00	0.07	0.00	-0.17
2 c		0.00	0.55	0.00	0.10	0.00	-0.34
3 a		0.00	-5.51	0.00	-0.95	0.00	-0.17
3 b		0.00	-0.64	0.00	-0.10	0.00	-0.15
3 c		0.00	0.34	0.00	0.11	0.00	-0.14
4 a		0.00	-9.68	0.00	-1.19	0.00	-1.20
4 b		0.00	-2.09	0.00	-0.12	0.00	-0.66
4 c		0.00	1.64	0.00	0.33	0.00	-0.15
5 a		0.00	-2.26	0.00	-0.43	0.00	-0.18
5 b		0.00	0.99	0.00	0.12	0.00	-0.15
5 c		0.00	1.11	0.00	0.17	0.00	-0.12
6 a		0.00	-2.60	0.00	-0.40	0.00	-2.15
7 a		0.00	-0.95	0.00	0.07	0.00	0.37
7 b		0.00	-0.44	0.00	0.07	0.00	0.33
7 c		0.00	0.90	0.00	0.00	0.00	0.02
8 a		0.00	-2.07	0.00	-0.08	0.00	-0.05
8 b		0.00	-1.41	0.00	-0.07	0.00	-0.04
8 c		0.00	0.92	0.00	0.00	0.00	0.01
9 a		0.00	-1.25	0.00	0.03	0.00	-0.22
9 b		0.00	-0.72	0.00	0.02	0.00	-0.19
9 c		0.00	0.76	0.00	0.00	0.00	0.01
10 a		0.00	-3.36	0.00	-0.77	0.00	-4.03
10 b		0.00	-2.52	0.00	-0.42	0.00	-2.20
11 a		0.00	-0.62	0.00	-0.07	0.00	0.55
11 b		0.00	-0.22	0.00	-0.03	0.00	0.19
12 a		0.00	-6.68	0.00	-0.77	0.00	-1.01
12 b		0.00	-4.31	0.00	-0.41	0.00	-0.56
13 a		0.00	2.08	0.00	-0.10	0.00	0.97
13 b		0.00	0.53	0.00	-0.05	0.00	0.47
14 a		0.00	0.76	0.00	0.18	0.00	-2.07
14 b		0.00	-0.19	0.00	0.09	0.00	-1.11

5.6.4 Operating Rating Evaluations
AASHTO Lanes

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]SummaryRFLegal

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 1 - HL93-TRUCK					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.36	Top Slab Centerline	**1.36**	2.07	2.50	2.74

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]SummaryASLegal

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 1 - HL93-TRUCK	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.45	0.25

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50		1.35	1.35	1.35	1.35

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
2 c	0.55	-0.34	0.10		4.86	-0.91	4.86	-0.68	1	2	14.63	-9.80	2.18	8.24
3 c	0.34	-0.14	0.11		5.16	-0.80	5.02	-0.55	2	2	14.63	-9.80	2.05	9.42
4 c	1.64	-0.15	0.33		6.72	-0.34	5.86	-0.28	2	2	14.63	-9.80	1.36	26.38
5 c	1.11	-0.12	0.17		4.91	-0.64	4.87	-0.48	2	2	14.63	-9.80	1.99	13.02

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
2 b	0.39	-0.17	0.07		4.09	-1.32	4.63	-0.23	1	2	14.63	-22.90	2.29	13.04
3 b	-0.64	-0.15	-0.10		3.96	-1.97	4.34	-1.56	1	2	14.63	-22.90	2.69	8.17
4 b	-2.09	-0.66	-0.12		5.04	-5.05	4.86	-3.48	2	2	14.63	-22.90	2.71	2.81
5 b	0.99	-0.15	0.12		4.40	-1.11	4.81	-0.67	1	2	14.63	-22.90	2.07	16.08

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
2 a	-3.08	0.11	-0.48		1.05	-6.37	1.26	-6.04	1	2	16.78	-60.03	12.45	6.47
3 a	-5.51	-0.17	-0.95		1.92	-8.73	1.24	-7.78	2	2	16.78	-60.03	9.77	4.37
4 a	-9.68	-1.20	-1.19		4.36	-13.16	2.75	-9.12	2	2	16.78	-60.03	5.51	2.50
5 a	-2.26	-0.18	-0.43		1.63	-5.07	1.96	-5.63	1	1	16.78	-60.03	7.77	7.41

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
1 b	-6.45	-4.16	-1.30		0.06	-11.01	-0.01	-11.83	2	1	16.78	-60.04	407.70	2.74
6 a	-2.60	-2.15	-0.40		0.08	-4.76	-0.01	-4.78	2	1	16.78	-60.03	220.90	8.21

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]Stre

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.20				1.00	1.20					
	LF =	1.25	1.50	1.35	Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	10 a	-3.36	-4.79	-9.35	-11.22	1	-26.53	0.45	4.65	4.09	2	-5.11	0.09	-11.39	0.191
	11 a	-0.62	0.48	-7.92	-6.02	2	-10.75	0.18	9.13	6.79	2	12.27	0.21	-0.06	0.001
	12 a	-6.68	-1.77	-11.10	-7.52	2	-26.00	0.44	8.81	6.46	2	0.88	0.01	-11.01	0.184
	13 a	2.08	0.87	-7.27	-5.28	2	-5.91	0.10	11.26	8.23	2	19.11	0.32	3.91	0.065
	14 a	0.76	-1.89	-2.22	-2.66	1	-5.48	0.09	5.54	4.86	2	5.59	0.09	-1.89	0.031
Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	10 b	-2.52	-2.61	-4.66	-5.59	1	-14.62	0.25	2.45	2.20	2	-3.76	0.06	-7.07	0.118
	11 b	-0.22	0.16	-3.81	-2.95	2	-5.18	0.09	4.19	3.22	2	5.62	0.09	-0.04	0.001
	12 b	-4.31	-0.97	-5.71	-3.84	2	-14.55	0.24	4.69	3.47	2	-0.51	0.01	-6.84	0.114
	13 b	0.53	0.42	-3.65	-2.58	2	-3.63	0.06	5.93	4.36	2	9.30	0.16	1.30	0.022
	14 b	-0.19	-1.02	-0.93	-1.12	1	-3.27	0.05	2.94	2.60	2	2.20	0.04	-1.77	0.029

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]SummaryRFLegal

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 2 - HL93-TANDEM					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.41	Top Slab Centerline	**1.41**	2.31	2.45	2.49

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]SummaryASLegal

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 2 - HL93-TANDEM	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.43	0.23

URS

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 2 **Truck 2 - HL93-TANDEM**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 c	0.55	-0.34	0.10	4.66	-0.79	4.60	-0.60	2	2	14.63	-9.80	2.27	9.49
3 c	0.34	-0.14	0.11	4.86	-0.65	4.70	-0.46	2	2	14.63	-9.80	2.17	11.59
4 c	1.64	-0.15	0.33	6.46	-0.34	5.63	-0.23	2	2	14.63	-9.80	1.41	26.38
5 c	1.11	-0.12	0.17	4.59	-0.58	4.52	-0.42	2	2	14.63	-9.80	2.13	14.37

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 b	0.39	-0.17	0.07	3.50	-1.31	4.13	-0.59	1	2	14.63	-22.90	2.57	13.14
3 b	-0.64	-0.15	-0.10	3.54	-1.47	3.92	-1.34	1	2	14.63	-22.90	2.98	10.95
4 b	-2.09	-0.66	-0.12	4.15	-4.24	4.15	-3.37	1	2	14.63	-22.90	3.28	3.34
5 b	0.99	-0.15	0.12	3.92	-1.18	4.31	-0.70	1	2	14.63	-22.90	2.31	15.13

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 a	-3.08	0.11	-0.48	-0.07	-7.53	-0.08	-7.26	1	2	16.78	-60.03	490.60	5.47
3 a	-5.51	-0.17	-0.95	0.73	-9.19	0.88	-8.58	1	2	16.78	-60.03	21.42	4.15
4 a	-9.68	-1.20	-1.19	2.80	-13.42	1.43	-11.04	2	2	16.78	-60.03	8.59	2.45
5 a	-2.26	-0.18	-0.43	0.18	-6.76	0.22	-6.94	1	1	16.78	-60.03	70.37	6.01

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
1 b	-6.45	-4.16	-1.30	0.12	-12.66	0.00	-13.02	2	1	16.78	-60.04	203.85	2.49
6 a	-2.60	-2.15	-0.40	0.17	-5.79	0.00	-5.41	2	2	16.78	-60.03	103.95	6.77

Project: Triple Cell- Five Web Box, 87.34' Wide (Case IV-A) | Design: PT | Date: 1/27/09

Portion: Superstructure - Transverse Analysis - Cline Avenue | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]Stre

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles: LLMultiple

One vehicle with HL93: LLHL93

One or two vehicles: LLSingle

SW, WS, Barrier: DC&PTBrug

Truck ID 2 **Truck 2 - HL93-TANDEM**

Combine trucks? N

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.20				1.00	1.20					
	LF =	1.25	1.50	1.35	Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	10 a	-3.36	-4.79	-8.58	-10.30	1	-25.29	0.43	4.81	4.20	2	-4.89	0.08	-11.39	0.191
	11 a	-0.62	0.48	-7.04	-5.93	2	-9.56	0.16	7.81	6.46	2	10.49	0.18	-0.06	0.001
	12 a	-6.68	-1.77	-9.82	-7.43	2	-24.27	0.41	7.61	6.14	2	-0.74	0.01	-11.01	0.184
	13 a	2.08	0.87	-7.23	-5.88	2	-5.85	0.10	9.18	7.00	2	16.30	0.27	3.91	0.065
	14 a	0.76	-1.89	-1.82	-2.18	1	-4.84	0.08	5.32	4.72	2	5.29	0.09	-1.89	0.031
Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	10 b	-2.52	-2.61	-4.13	-4.96	1	-13.76	0.23	2.39	2.10	2	-3.84	0.06	-7.07	0.118
	11 b	-0.22	0.16	-3.31	-2.60	2	-4.51	0.08	3.56	2.78	2	4.77	0.08	-0.04	0.001
	12 b	-4.31	-0.97	-4.85	-3.50	2	-13.39	0.22	3.90	2.95	2	-1.58	0.03	-6.84	0.114
	13 b	0.53	0.42	-3.45	-2.69	2	-3.36	0.06	4.69	3.56	2	7.63	0.13	1.30	0.022
	14 b	-0.19	-1.02	-0.76	-0.91	1	-3.00	0.05	2.68	2.38	2	1.85	0.03	-1.77	0.029

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]SummaryRFLegal

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 3 - R1					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.53	Top Slab Centerline	**1.53**	2.26	2.26	2.47

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]SummaryASLegal

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 3 - R1	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.49	0.27

URS

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 3 **Truck 3 - R1**

Combine trucks? N

					One or two vehicles		One vehicle							
			MPF =		1.00	1.00	1.20	1.20						
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35			Allowable		Rating Factor	
	SECTION	Selfweight	Barrier	WS	LL+I (Max.)	LL+I (Min)	LL+I (Max.)	LL+I (Min)	Controlling # vehicles		Mn** (kip-ft)		RF	RF
		kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	LL+I (Max.)	LL+I (Min)	Max.	Min.	(Max Live Load)	(Min. Live Load)
Top Slab Centerline	2 c	0.55	-0.34	0.10	4.34	-1.12	4.18	-0.84	2	2	14.63	-9.80	2.44	6.69
	3 c	0.34	-0.14	0.11	4.71	-0.98	4.37	-0.68	2	2	14.63	-9.80	2.24	7.69
	4 c	1.64	-0.15	0.33	5.95	-0.42	5.09	-0.35	2	2	14.63	-9.80	1.53	21.36
	5 c	1.11	-0.12	0.17	4.63	-0.79	4.34	-0.59	2	2	14.63	-9.80	2.11	10.55
	SECTION	Selfweight	Barrier	WS	LL+I (Max.)	LL+I (Min)	LL+I (Max.)	LL+I (Min)	Controlling # vehicles		Mn** (kip-ft)		RF	RF
		kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	LL+I (Max.)	LL+I (Min)	Max.	Min.	(Max Live Load)	(Min. Live Load)
Top Slab Thickness Change (Between Webs)	2 b	0.39	-0.17	0.07	3.97	-1.26	4.22	-0.25	1	2	14.63	-22.90	2.51	13.66
	3 b	-0.64	-0.15	-0.10	3.64	-1.83	3.86	-1.31	1	2	14.63	-22.90	3.03	8.80
	4 b	-2.09	-0.66	-0.12	5.02	-5.46	4.57	-3.49	2	2	14.63	-22.90	2.72	2.60
	5 b	0.99	-0.15	0.12	4.40	-1.05	4.40	-0.79	1	2	14.63	-22.90	2.26	17.00
	SECTION	Selfweight	Barrier	WS	LL+I (Max.)	LL+I (Min)	LL+I (Max.)	LL+I (Min)	Controlling # vehicles		Mn** (kip-ft)		RF	RF
		kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	LL+I (Max.)	LL+I (Min)	Max.	Min.	(Max Live Load)	(Min. Live Load)
Top Slab at Web	2 a	-3.08	0.11	-0.48	1.38	-6.06	1.66	-5.64	1	2	16.78	-60.03	9.47	6.80
	3 a	-5.51	-0.17	-0.95	2.43	-8.76	1.62	-7.76	2	2	16.78	-60.03	7.72	4.35
	4 a	-9.68	-1.20	-1.19	5.42	-14.51	3.48	-10.30	2	2	16.78	-60.03	4.44	2.26
	5 a	-2.26	-0.18	-0.43	1.93	-4.72	2.32	-5.66	1	1	16.78	-60.03	6.56	7.36
	SECTION	Selfweight	Barrier	WS	LL+I (Max.)	LL+I (Min)	LL+I (Max.)	LL+I (Min)	Controlling # vehicles		Mn** (kip-ft)		RF	RF
		kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	LL+I (Max.)	LL+I (Min)	Max.	Min.	(Max Live Load)	(Min. Live Load)
Top Slab at Cantilever	1 b	-6.45	-4.16	-1.30	0.07	-11.65	-0.01	-13.12	2	1	16.78	-60.04	349.46	2.47
	6 a	-2.60	-2.15	-0.40	0.09	-4.13	-0.01	-4.34	2	1	16.78	-60.03	196.35	9.03

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]Stre

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 3 **Truck 3 - R1**

Combine trucks? N

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.20				1.00	1.20					
	LF =	1.25	1.50	1.35	Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	10 a	-3.36	-4.79	-10.89	-13.07	1	-29.03	0.49	5.27	4.74	2	-4.27	0.07	-11.39	0.191
	11 a	-0.62	0.48	-9.24	-7.08	2	-12.53	0.21	10.73	8.02	2	14.43	0.24	-0.06	0.001
	12 a	-6.68	-1.77	-13.13	-8.78	2	-28.74	0.49	10.33	7.62	2	2.93	0.05	-11.01	0.184
	13 a	2.08	0.87	-8.44	-5.94	2	-7.48	0.12	13.33	9.77	2	21.90	0.37	3.91	0.065
	14 a	0.76	-1.89	-2.62	-3.14	1	-6.13	0.10	6.38	5.66	2	6.72	0.11	-1.89	0.031
Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	10 b	-2.52	-2.61	-5.65	-6.78	1	-16.22	0.27	2.96	2.66	2	-3.07	0.05	-7.07	0.118
	11 b	-0.22	0.16	-4.62	-3.59	2	-6.27	0.10	5.08	3.90	2	6.82	0.11	-0.04	0.001
	12 b	-4.31	-0.97	-6.95	-4.68	2	-16.22	0.27	5.70	4.21	2	0.85	0.01	-6.84	0.114
	13 b	0.53	0.42	-4.43	-3.14	2	-4.68	0.08	7.21	5.30	2	11.03	0.18	1.30	0.022
	14 b	-0.19	-1.02	-1.13	-1.36	1	-3.60	0.06	3.57	3.16	2	3.05	0.05	-1.77	0.029

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]SummaryRFLegal

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 4 - R2					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.60	Top Slab Centerline	**1.60**	2.31	2.59	3.06

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]SummaryASLegal

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 4 - R2	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.45	0.26

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 4 **Truck 4 - R2**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 c	0.55	-0.34	0.10	4.13	-0.95	4.06	-0.71	2	2	14.63	-9.80	2.57	7.89
3 c	0.34	-0.14	0.11	4.50	-0.91	4.26	-0.60	2	2	14.63	-9.80	2.35	8.28
4 c	1.64	-0.15	0.33	5.71	-0.38	4.91	-0.30	2	2	14.63	-9.80	1.60	23.60
5 c	1.11	-0.12	0.17	4.39	-0.70	4.22	-0.49	2	2	14.63	-9.80	2.22	11.90

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 b	0.39	-0.17	0.07	3.89	-1.21	4.14	-0.08	1	2	14.63	-22.90	2.56	14.22
3 b	-0.64	-0.15	-0.10	3.56	-1.77	3.83	-1.21	1	2	14.63	-22.90	3.06	9.10
4 b	-2.09	-0.66	-0.12	4.95	-5.24	4.54	-3.28	2	2	14.63	-22.90	2.75	2.70
5 b	0.99	-0.15	0.12	4.19	-0.89	4.31	-0.64	1	2	14.63	-22.90	2.31	20.06

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 a	-3.08	0.11	-0.48	1.93	-5.20	2.32	-4.60	1	2	16.78	-60.03	6.77	7.93
3 a	-5.51	-0.17	-0.95	2.62	-7.59	1.99	-6.52	2	2	16.78	-60.03	7.16	5.02
4 a	-9.68	-1.20	-1.19	5.60	-12.68	3.78	-8.77	2	2	16.78	-60.03	4.29	2.59
5 a	-2.26	-0.18	-0.43	2.32	-3.82	2.78	-4.58	1	1	16.78	-60.03	5.46	9.10

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
1 b	-6.45	-4.16	-1.30	0.04	-9.39	-0.01	-10.60	2	1	16.78	-60.04	611.55	3.06
6 a	-2.60	-2.15	-0.40	0.03	-3.44	-0.01	-3.67	2	1	16.78	-60.03	589.06	10.68

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]Stre

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 4 **Truck 4 - R2**

Combine trucks? N

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.20				1.00	1.20					
	LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	10 a	-3.36	-4.79	-9.47	-11.36	1	-26.73	0.45	4.52	3.91	2	-5.28	0.09	-11.39	0.191
	11 a	-0.62	0.48	-8.15	-6.18	2	-11.06	0.19	9.61	7.09	2	12.92	0.22	-0.06	0.001
	12 a	-6.68	-1.77	-11.71	-7.79	2	-26.82	0.45	9.36	6.78	2	1.62	0.03	-11.01	0.184
	13 a	2.08	0.87	-7.08	-4.96	2	-5.65	0.09	12.31	8.87	2	20.53	0.35	3.91	0.065
	14 a	0.76	-1.89	-2.36	-2.83	1	-5.71	0.10	5.47	4.80	2	5.50	0.09	-1.89	0.031

Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	10 b	-2.52	-2.61	-4.91	-5.89	1	-15.02	0.25	2.45	2.21	2	-3.76	0.06	-7.07	0.118
	11 b	-0.22	0.16	-4.07	-3.13	2	-5.53	0.09	4.53	3.43	2	6.08	0.10	-0.04	0.001
	12 b	-4.31	-0.97	-6.20	-4.16	2	-15.21	0.26	5.16	3.77	2	0.12	0.00	-6.84	0.114
	13 b	0.53	0.42	-3.72	-2.64	2	-3.72	0.06	6.67	4.82	2	10.30	0.17	1.30	0.022
	14 b	-0.19	-1.02	-1.01	-1.21	1	-3.40	0.06	3.06	2.69	2	2.36	0.04	-1.77	0.029

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]SummaryRFLegal

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 5 - R3					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.68	Top Slab Centerline	**1.68**	2.15	2.25	3.03

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]SummaryASLegal

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 5 - R3	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.49	0.28

Project: Triple Cell- Five Web Box, 87.34' Wide (Case IV-A) | Design: PT | Date: 1/27/09

Portion: Superstructure - Transverse Analysis - Cline Avenue | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I | **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 5 **Truck 5 - R3**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 c	0.55	-0.34	0.10	3.91	-0.84	3.78	-0.61	2	2	14.63	-9.80	2.71	8.92
3 c	0.34	-0.14	0.11	4.40	-1.03	4.06	-0.64	2	2	14.63	-9.80	2.40	7.32
4 c	1.64	-0.15	0.33	5.43	-0.38	4.64	-0.30	2	2	14.63	-9.80	1.68	23.60
5 c	1.11	-0.12	0.17	4.40	-0.71	4.06	-0.46	2	2	14.63	-9.80	2.22	11.74

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 b	0.39	-0.17	0.07	3.87	-1.45	4.15	-0.91	1	2	14.63	-22.90	2.55	11.87
3 b	-0.64	-0.15	-0.10	3.63	-2.03	3.86	-1.39	1	2	14.63	-22.90	3.03	7.93
4 b	-2.09	-0.66	-0.12	5.52	-6.59	4.73	-4.01	2	2	14.63	-22.90	2.47	2.15
5 b	0.99	-0.15	0.12	4.38	-0.92	4.36	-0.59	2	2	14.63	-22.90	2.27	19.40

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 a	-3.08	0.11	-0.48	2.08	-5.81	2.50	-4.92	1	2	16.78	-60.03	6.28	7.09
3 a	-5.51	-0.17	-0.95	2.86	-8.33	2.16	-6.84	2	2	16.78	-60.03	6.56	4.58
4 a	-9.68	-1.20	-1.19	6.84	-14.62	4.42	-9.44	2	2	16.78	-60.03	3.52	2.25
5 a	-2.26	-0.18	-0.43	2.18	-3.79	2.62	-4.55	1	1	16.78	-60.03	5.81	9.17

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
1 b	-6.45	-4.16	-1.30	0.02	-9.88	-0.01	-10.70	2	1	16.78	-60.04	1223.11	3.03
6 a	-2.60	-2.15	-0.40	0.02	-4.03	-0.01	-4.03	2	1	16.78	-60.03	883.59	9.73

Project: Triple Cell- Five Web Box, 87.34' Wide (Case IV-A) | Design: PT | Date: 1/27/09

Portion: Superstructure - Transverse Analysis - Cline Avenue | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]Stre

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles: LLMultiple

One vehicle with HL93: LLHL93

One or two vehicles: LLSingle

SW, WS, Barrier: DC&PTBrug

Truck ID 5 **Truck 5 - R3**

Combine trucks? N

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.20				1.00	1.20					
LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
10 a	-3.36	-4.79	-9.77	-11.72	1	-27.21	0.46	4.68	3.71	2	-5.07	0.08	-11.39	0.191
11 a	-0.62	0.48	-8.63	-6.44	2	-11.71	0.20	10.53	7.61	2	14.16	0.24	-0.06	0.001
12 a	-6.68	-1.77	-13.27	-8.45	2	-28.93	0.49	11.00	7.63	2	3.84	0.06	-11.01	0.184
13 a	2.08	0.87	-7.10	-4.73	2	-5.68	0.09	14.42	10.10	2	23.38	0.40	3.91	0.065
14 a	0.76	-1.89	-2.40	-2.88	1	-5.78	0.10	5.51	4.69	2	5.55	0.09	-1.89	0.031

Calculate Area of Steel Required at Top of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
10 b	-2.52	-2.61	-4.90	-5.88	1	-15.01	0.25	2.42	2.02	2	-3.80	0.06	-7.07	0.118
11 b	-0.22	0.16	-4.21	-3.18	2	-5.72	0.10	4.81	3.55	2	6.46	0.11	-0.04	0.001
12 b	-4.31	-0.97	-7.07	-4.46	2	-16.39	0.28	5.84	4.13	2	1.04	0.02	-6.84	0.114
13 b	0.53	0.42	-3.77	-2.46	2	-3.79	0.06	7.74	5.41	2	11.75	0.20	1.30	0.022
14 b	-0.19	-1.02	-1.00	-1.20	1	-3.39	0.06	3.00	2.58	2	2.28	0.04	-1.77	0.029

Calculate Area of Steel Required at Middle of Webs

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]SummaryRFLegal

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 12 - R4 + HL93					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.40	Top Slab Centerline	**1.40**	2.01	1.94	2.96

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]SummaryASLegal

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 12 - R4 + HL93	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.49	0.27

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 12 **Truck 12 - R4 + HL93**

Combine trucks? Y

					One or two vehicles		One vehicle							
			MPF =		1.00	1.00	1.00	1.00						
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35			Allowable		Rating Factor	
	SECTION	Selfweight	Barrier	WS	LL+I (Max.)	LL+I (Min)	LL+I (Max.)	LL+I (Min)	Controlling # vehicles		Mn** (kip-ft)		RF	RF
		kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	LL+I (Max.)	LL+I (Min)	Max.	Min.	(Max Live Load)	(Min. Live Load)
Top Slab Centerline	2 c	0.55	-0.34	0.10	4.84	-1.03	3.22	-0.69	2	2	14.63	-9.80	2.19	7.28
	3 c	0.34	-0.14	0.11	5.27	-1.04	3.46	-0.64	2	2	14.63	-9.80	2.00	7.25
	4 c	1.64	-0.15	0.33	6.50	-0.47	3.90	-0.32	2	2	14.63	-9.80	1.40	19.08
	5 c	1.11	-0.12	0.17	5.14	-0.79	3.53	-0.50	2	2	14.63	-9.80	1.90	10.55
	SECTION	Selfweight	Barrier	WS	LL+I (Max.)	LL+I (Min)	LL+I (Max.)	LL+I (Min)	Controlling # vehicles		Mn** (kip-ft)		RF	RF
		kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	LL+I (Max.)	LL+I (Min)	Max.	Min.	(Max Live Load)	(Min. Live Load)
Top Slab Thickness Change (Between Webs)	2 b	0.39	-0.17	0.07	4.55	-2.07	3.69	-0.10	2	2	14.63	-22.90	2.33	8.31
	3 b	-0.64	-0.15	-0.10	4.10	-2.29	3.34	-1.23	2	2	14.63	-22.90	2.85	7.03
	4 b	-2.09	-0.66	-0.12	5.85	-6.55	4.26	-3.78	2	2	14.63	-22.90	2.33	2.16
	5 b	0.99	-0.15	0.12	4.95	-1.19	3.84	-0.59	2	2	14.63	-22.90	2.01	15.00
	SECTION	Selfweight	Barrier	WS	LL+I (Max.)	LL+I (Min)	LL+I (Max.)	LL+I (Min)	Controlling # vehicles		Mn** (kip-ft)		RF	RF
		kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	LL+I (Max.)	LL+I (Min)	Max.	Min.	(Max Live Load)	(Min. Live Load)
Top Slab at Web	2 a	-3.08	0.11	-0.48	3.41	-8.09	3.41	-3.57	1	2	16.78	-60.03	4.60	5.09
	3 a	-5.51	-0.17	-0.95	3.65	-10.34	2.76	-5.66	2	2	16.78	-60.03	5.14	3.69
	4 a	-9.68	-1.20	-1.19	6.98	-16.90	4.91	-8.33	2	2	16.78	-60.03	3.44	1.94
	5 a	-2.26	-0.18	-0.43	3.56	-3.36	3.56	-3.36	1	1	16.78	-60.03	4.27	12.41
	SECTION	Selfweight	Barrier	WS	LL+I (Max.)	LL+I (Min)	LL+I (Max.)	LL+I (Min)	Controlling # vehicles		Mn** (kip-ft)		RF	RF
		kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	LL+I (Max.)	LL+I (Min)	Max.	Min.	(Max Live Load)	(Min. Live Load)
Top Slab at Cantilever	1 b	-6.45	-4.16	-1.30	0.35	-10.95	0.23	-9.05	2	2	16.78	-60.04	69.89	2.96
	6 a	-2.60	-2.15	-0.40	0.25	-4.56	0.25	-2.71	1	2	16.78	-60.03	70.69	8.60

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]Stre

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 12 **Truck 12 - R4 + HL93**

Combine trucks? Y

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.00				1.00	1.00					
	LF =	1.25	1.50	1.35	Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	10 a	-3.36	-4.79	-11.34	-11.34	1	-26.69	0.45	5.37	3.52	2	-4.14	0.07	-11.39	0.191
	11 a	-0.62	0.48	-9.11	-6.21	2	-12.35	0.21	10.79	7.32	2	14.51	0.24	-0.06	0.001
	12 a	-6.68	-1.77	-13.37	-8.15	2	-29.06	0.49	10.70	7.09	2	3.43	0.06	-11.01	0.184
	13 a	2.08	0.87	-8.55	-4.68	2	-7.63	0.13	13.85	9.35	2	22.61	0.38	3.91	0.065
	14 a	0.76	-1.89	-2.99	-2.99	1	-5.92	0.10	6.38	4.41	2	6.72	0.11	-1.89	0.031
Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	10 b	-2.52	-2.61	-5.99	-5.99	1	-15.15	0.25	2.73	2.09	2	-3.38	0.06	-7.07	0.118
	11 b	-0.22	0.16	-4.57	-3.22	2	-6.21	0.10	5.09	3.58	2	6.83	0.11	-0.04	0.001
	12 b	-4.31	-0.97	-7.05	-4.43	2	-16.36	0.27	5.82	4.02	2	1.02	0.02	-6.84	0.114
	13 b	0.53	0.42	-4.25	-2.57	2	-4.44	0.07	7.60	5.30	2	11.56	0.19	1.30	0.022
	14 b	-0.19	-1.02	-1.29	-1.29	1	-3.51	0.06	3.43	2.66	2	2.86	0.05	-1.77	0.029

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]SummaryRFLegal

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 13 - R5 + HL93					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.37	Top Slab Centerline	**1.37**	1.95	1.92	2.36

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]SummaryASLegal

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 13 - R5 + HL93	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.51	0.28

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 13 **Truck 13 - R5 + HL93**

Combine trucks? y

					One or two vehicles		One vehicle							
			MPF =		1.00	1.00	1.00	1.00						
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35			Allowable		Rating Factor	
	SECTION	Selfweight	Barrier	WS	LL+I (Max.)	LL+I (Min)	LL+I (Max.)	LL+I (Min)	Controlling # vehicles		Mn** (kip-ft)		RF	RF
		kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	LL+I (Max.)	LL+I (Min)	Max.	Min.	(Max Live Load)	(Min. Live Load)
Top Slab Centerline	2 c	0.55	-0.34	0.10	5.02	-1.14	3.43	-0.80	2	2	14.63	-9.80	2.11	6.57
	3 c	0.34	-0.14	0.11	5.44	-1.05	3.68	-0.71	2	2	14.63	-9.80	1.94	7.18
	4 c	1.64	-0.15	0.33	6.66	-0.50	4.24	-0.35	2	2	14.63	-9.80	1.37	17.94
	5 c	1.11	-0.12	0.17	5.33	-0.81	3.75	-0.56	2	2	14.63	-9.80	1.83	10.29
Top Slab Thickness Change (Between Webs)	SECTION	Selfweight	Barrier	WS	LL+I (Max.)	LL+I (Min)	LL+I (Max.)	LL+I (Min)	Controlling # vehicles		Mn** (kip-ft)		RF	RF
		kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	LL+I (Max.)	LL+I (Min)	Max.	Min.	(Max Live Load)	(Min. Live Load)
	2 b	0.39	-0.17	0.07	4.51	-2.07	3.88	-0.11	2	2	14.63	-22.90	2.35	8.31
	3 b	-0.64	-0.15	-0.10	4.14	-2.26	3.47	-1.28	2	2	14.63	-22.90	2.83	7.12
	4 b	-2.09	-0.66	-0.12	5.78	-6.62	4.35	-3.93	2	2	14.63	-22.90	2.36	2.14
	5 b	0.99	-0.15	0.12	5.10	-1.31	4.02	-0.71	2	2	14.63	-22.90	1.95	13.63
Top Slab at Web	SECTION	Selfweight	Barrier	WS	LL+I (Max.)	LL+I (Min)	LL+I (Max.)	LL+I (Min)	Controlling # vehicles		Mn** (kip-ft)		RF	RF
		kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	LL+I (Max.)	LL+I (Min)	Max.	Min.	(Max Live Load)	(Min. Live Load)
	2 a	-3.08	0.11	-0.48	2.47	-8.06	2.47	-4.97	1	2	16.78	-60.03	6.35	5.11
	3 a	-5.51	-0.17	-0.95	3.08	-10.32	2.19	-7.21	2	2	16.78	-60.03	6.09	3.69
	4 a	-9.68	-1.20	-1.19	6.45	-17.09	4.38	-10.05	2	2	16.78	-60.03	3.73	1.92
	5 a	-2.26	-0.18	-0.43	2.83	-4.83	2.83	-4.83	1	1	16.78	-60.03	5.37	8.63
Top Slab at Cantilever	SECTION	Selfweight	Barrier	WS	LL+I (Max.)	LL+I (Min)	LL+I (Max.)	LL+I (Min)	Controlling # vehicles		Mn** (kip-ft)		RF	RF
		kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	LL+I (Max.)	LL+I (Min)	Max.	Min.	(Max Live Load)	(Min. Live Load)
	1 b	-6.45	-4.16	-1.30	0.11	-13.76	-0.01	-11.95	2	2	16.78	-60.04	222.38	2.36
	6 a	-2.60	-2.15	-0.40	0.16	-4.95	-0.01	-3.66	2	2	16.78	-60.03	110.45	7.92

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]Stre

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 13 **Truck 13 - R5 + HL93**

Combine trucks? Y

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.00				1.00	1.00					
	LF =	1.25	1.50	1.35	Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	10 a	-3.36	-4.79	-13.03	-13.03	1	-28.98	0.49	5.70	4.39	2	-3.69	0.06	-11.39	0.191
	11 a	-0.62	0.48	-10.05	-7.15	2	-13.62	0.23	11.74	8.27	2	15.79	0.27	-0.06	0.001
	12 a	-6.68	-1.77	-13.96	-9.13	2	-29.86	0.51	11.41	7.98	2	4.39	0.07	-11.01	0.184
	13 a	2.08	0.87	-8.88	-5.64	2	-8.08	0.13	14.89	10.49	2	24.01	0.41	3.91	0.065
	14 a	0.76	-1.89	-3.25	-3.25	1	-6.28	0.10	6.93	5.44	2	7.47	0.12	-1.89	0.031

Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	10 b	-2.52	-2.61	-6.82	-6.82	1	-16.28	0.27	3.15	2.51	2	-2.82	0.05	-7.07	0.118
	11 b	-0.22	0.16	-4.99	-3.64	2	-6.77	0.11	5.52	4.01	2	7.41	0.12	-0.04	0.001
	12 b	-4.31	-0.97	-7.39	-4.88	2	-16.82	0.28	6.24	4.44	2	1.58	0.03	-6.84	0.114
	13 b	0.53	0.42	-4.50	-3.00	2	-4.78	0.08	8.04	5.74	2	12.15	0.20	1.30	0.022
	14 b	-0.19	-1.02	-1.41	-1.41	1	-3.67	0.06	3.86	3.09	2	3.44	0.06	-1.77	0.029

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]SummaryRFLegal

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 14 - S1 + HL93					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.30	Top Slab Centerline	**1.30**	1.76	1.67	2.36

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]SummaryASLegal

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 14 - S1 + HL93	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.56	0.31

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 14 **Truck 14 - S1 + HL93**

Combine trucks? y

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.00	1.00
	LF =	1.25	1.50	1.50		1.35	1.35	1.35	1.35

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Allowable Mn** (kip-ft) Max.	Min.	Rating Factor RF (Max Live Load)	RF (Min. Live Load)
Top Slab Centerline	2 c	0.55	-0.34	0.10		5.09	-1.04	4.15	-0.70	2	2	14.63	-9.80	2.08	7.21
	3 c	0.34	-0.14	0.11		5.63	-1.25	4.52	-0.82	2	2	14.63	-9.80	1.88	6.03
	4 c	1.64	-0.15	0.33		7.00	-0.54	5.14	-0.39	2	2	14.63	-9.80	1.30	16.61
	5 c	1.11	-0.12	0.17		5.56	-0.92	4.59	-0.56	2	2	14.63	-9.80	1.76	9.06
Top Slab Thickness Change (Between Webs)	2 b	0.39	-0.17	0.07		4.95	-2.17	4.72	-1.04	2	2	14.63	-22.90	2.14	7.93
	3 b	-0.64	-0.15	-0.10		4.79	-2.60	4.45	-1.56	2	2	14.63	-22.90	2.44	6.19
	4 b	-2.09	-0.66	-0.12		6.64	-8.03	5.58	-5.18	2	2	14.63	-22.90	2.05	1.76
	5 b	0.99	-0.15	0.12		5.35	-1.32	4.96	-0.72	2	2	14.63	-22.90	1.86	13.52
Top Slab at Web	2 a	-3.08	0.11	-0.48		3.32	-8.62	3.32	-5.45	1	2	16.78	-60.03	4.72	4.78
	3 a	-5.51	-0.17	-0.95		3.80	-11.03	2.91	-7.59	2	2	16.78	-60.03	4.94	3.46
	4 a	-9.68	-1.20	-1.19		7.95	-19.68	5.88	-11.35	2	2	16.78	-60.03	3.02	1.67
	5 a	-2.26	-0.18	-0.43		3.20	-4.69	3.20	-4.69	1	1	16.78	-60.03	4.75	8.89
Top Slab at Cantilever	1 b	-6.45	-4.16	-1.30		0.10	-13.74	-0.02	-11.93	2	2	16.78	-60.04	244.62	2.36
	6 a	-2.60	-2.15	-0.40		0.15	-5.67	-0.02	-4.39	2	2	16.78	-60.03	117.81	6.92

Project: Triple Cell- Five Web Box, 87.34' Wide (Case IV-A) | Design: PT | Date: 1/27/09

Portion: Superstructure - Transverse Analysis - Cline Avenue | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]Stre

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles: LLMultiple

One vehicle with HL93: LLHL93

One or two vehicles: LLSingle

SW, WS, Barrier: DC&PTBrug

Truck ID 14 **Truck 14 - S1 + HL93**

Combine trucks? Y

		two vehicles	One Vehicle		One or two vehicles	One Vehicle
	MPF =	1.00	1.00		1.00	1.00
LF =	1.25	1.50	1.35	Minimum Live Load Moment	1.35	Maximum Live Load Moment

Calculate Area of Steel Required at Top of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
10 a	-3.36	-4.79	-13.66	-13.66	1	-29.83	0.51	5.91	4.20	2	-3.41	0.06	-11.39	0.191
11 a	-0.62	0.48	-10.34	-7.44	2	-14.02	0.24	12.45	8.98	2	16.75	0.28	-0.06	0.001
12 a	-6.68	-1.77	-15.99	-10.41	2	-32.60	0.56	12.90	9.47	2	6.40	0.11	-11.01	0.184
13 a	2.08	0.87	-9.67	-5.37	2	-9.15	0.15	16.94	12.54	2	26.78	0.45	3.91	0.065
14 a	0.76	-1.89	-3.15	-3.15	1	-6.14	0.10	6.81	5.32	2	7.31	0.12	-1.89	0.031

Calculate Area of Steel Required at Middle of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
10 b	-2.52	-2.61	-6.88	-6.88	1	-16.36	0.27	2.96	2.30	2	-3.07	0.05	-7.07	0.118
11 b	-0.22	0.16	-5.05	-3.70	2	-6.85	0.11	5.71	4.20	2	7.67	0.13	-0.04	0.001
12 b	-4.31	-0.97	-8.44	-5.51	2	-18.24	0.31	6.94	5.14	2	2.53	0.04	-6.84	0.114
13 b	0.53	0.42	-4.82	-2.83	2	-5.21	0.09	9.06	6.76	2	13.53	0.23	1.30	0.022
14 b	-0.19	-1.02	-1.29	-1.29	1	-3.51	0.06	3.74	2.97	2	3.28	0.05	-1.77	0.029

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]SummaryRFLegal

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 15 - S2 + HL93					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.32	Top Slab Centerline	**1.32**	1.77	1.67	2.42

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]SummaryASLegal

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 15 - S2 + HL93	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.55	0.31

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 15 **Truck 15 - S2 + HL93**

Combine trucks? y

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.00	1.00
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 c	0.55	-0.34	0.10	5.06	-1.04	3.92	-0.70	2	2	14.63	-9.80	2.09	7.21
3 c	0.34	-0.14	0.11	5.60	-1.25	4.29	-0.81	2	2	14.63	-9.80	1.89	6.03
4 c	1.64	-0.15	0.33	6.91	-0.54	4.87	-0.39	2	2	14.63	-9.80	1.32	16.61
5 c	1.11	-0.12	0.17	5.54	-0.92	4.38	-0.55	2	2	14.63	-9.80	1.76	9.06

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 b	0.39	-0.17	0.07	4.71	-2.13	4.48	-1.00	2	2	14.63	-22.90	2.25	8.08
3 b	-0.64	-0.15	-0.10	4.57	-2.57	4.23	-1.44	2	2	14.63	-22.90	2.56	6.26
4 b	-2.09	-0.66	-0.12	6.61	-8.00	5.37	-5.15	2	2	14.63	-22.90	2.06	1.77
5 b	0.99	-0.15	0.12	5.29	-1.32	4.71	-0.72	2	2	14.63	-22.90	1.88	13.52

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 a	-3.08	0.11	-0.48	3.41	-8.57	3.41	-5.21	1	2	16.78	-60.03	4.60	4.81
3 a	-5.51	-0.17	-0.95	3.87	-10.95	2.98	-7.33	2	2	16.78	-60.03	4.85	3.48
4 a	-9.68	-1.20	-1.19	8.02	-19.62	5.95	-11.28	2	2	16.78	-60.03	3.00	1.67
5 a	-2.26	-0.18	-0.43	3.24	-4.39	3.24	-4.39	1	1	16.78	-60.03	4.69	9.50

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
1 b	-6.45	-4.16	-1.30	0.10	-13.40	-0.02	-11.59	2	2	16.78	-60.04	244.62	2.42
6 a	-2.60	-2.15	-0.40	0.15	-5.29	-0.02	-4.01	2	2	16.78	-60.03	117.81	7.41

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]Stre

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 15 **Truck 15 - S2 + HL93**

Combine trucks? Y

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.00				1.00	1.00					
	LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	10 a	-3.36	-4.79	-13.48	-13.48	1	-29.58	0.50	5.88	4.16	2	-3.45	0.06	-11.39	0.191
	11 a	-0.62	0.48	-10.25	-7.35	2	-13.89	0.23	12.35	8.88	2	16.62	0.28	-0.06	0.001
	12 a	-6.68	-1.77	-15.95	-10.37	2	-32.55	0.55	12.84	9.41	2	6.32	0.11	-11.01	0.184
	13 a	2.08	0.87	-9.63	-5.35	2	-9.09	0.15	16.83	12.43	2	26.63	0.45	3.91	0.065
	14 a	0.76	-1.89	-3.06	-3.06	1	-6.02	0.10	6.74	5.25	2	7.21	0.12	-1.89	0.031
Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	10 b	-2.52	-2.61	-6.85	-6.85	1	-16.32	0.27	2.96	2.30	2	-3.07	0.05	-7.07	0.118
	11 b	-0.22	0.16	-5.03	-3.68	2	-6.83	0.11	5.69	4.18	2	7.64	0.13	-0.04	0.001
	12 b	-4.31	-0.97	-8.44	-5.48	2	-18.24	0.31	6.95	5.15	2	2.54	0.04	-6.84	0.114
	13 b	0.53	0.42	-4.82	-2.81	2	-5.21	0.09	9.04	6.74	2	13.50	0.23	1.30	0.022
	14 b	-0.19	-1.02	-1.26	-1.26	1	-3.47	0.06	3.73	2.96	2	3.27	0.05	-1.77	0.029

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]SummaryRFLegal

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 16 - S3 + HL93					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.15	Top Slab Centerline	**1.15**	1.50	1.45	1.89

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]SummaryASLegal

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 16 - S3 + HL93	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.62	0.34

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 16 **Truck 16 - S3 + HL93**

Combine trucks? Y

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.00	1.00
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 c	0.55	-0.34	0.10	5.72	-1.33	4.89	-0.99	2	2	14.63	-9.80	1.85	5.64
3 c	0.34	-0.14	0.11	6.34	-1.47	5.36	-1.06	2	2	14.63	-9.80	1.67	5.13
4 c	1.64	-0.15	0.33	7.92	-0.66	6.08	-0.51	2	2	14.63	-9.80	1.15	13.59
5 c	1.11	-0.12	0.17	6.35	-1.07	5.50	-0.74	2	2	14.63	-9.80	1.54	7.79

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 b	0.39	-0.17	0.07	5.92	-2.48	5.69	-1.35	2	2	14.63	-22.90	1.79	6.94
3 b	-0.64	-0.15	-0.10	5.62	-2.91	5.28	-1.87	2	2	14.63	-22.90	2.08	5.53
4 b	-2.09	-0.66	-0.12	7.80	-9.45	6.81	-6.60	2	2	14.63	-22.90	1.75	1.50
5 b	0.99	-0.15	0.12	6.36	-1.56	5.97	-0.96	2	2	14.63	-22.90	1.56	11.44

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 a	-3.08	0.11	-0.48	4.64	-9.37	4.64	-6.59	1	2	16.78	-60.03	3.38	4.40
3 a	-5.51	-0.17	-0.95	4.90	-12.21	4.01	-9.59	2	2	16.78	-60.03	3.83	3.12
4 a	-9.68	-1.20	-1.19	9.90	-22.60	7.83	-14.77	2	2	16.78	-60.03	2.43	1.45
5 a	-2.26	-0.18	-0.43	4.52	-5.73	4.52	-5.73	1	1	16.78	-60.03	3.36	7.28

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
1 b	-6.45	-4.16	-1.30	0.10	-17.18	-0.02	-15.37	2	2	16.78	-60.04	244.62	1.89
6 a	-2.60	-2.15	-0.40	0.15	-6.22	-0.02	-4.94	2	2	16.78	-60.03	117.81	6.31

Project: Triple Cell- Five Web Box, 87.34' Wide (Case IV-A) | Design: PT | Date: 1/27/09

Portion: Superstructure - Transverse Analysis - Cline Avenue | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]Stre

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles: LLMultiple

One vehicle with HL93: LLHL93

One or two vehicles: LLSingle

SW, WS, Barrier: DC&PTBrug

Truck ID 16 **Truck 16 - S3 + HL93**

Combine trucks? Y

		two vehicles	One Vehicle		One or two vehicles	One Vehicle
MPF =		1.00	1.00		1.00	1.00
LF =	1.25	1.50	1.35		1.35	

Calculate Area of Steel Required at Top of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Minimum Live Load Moment: Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Maximum Live Load Moment: Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Dead Loads: Mu (max) kip-ft	As (min) in^2/ft
10 a	-3.36	-4.79	-18.12	-18.12	1	-35.85	0.61	6.94	5.63	2	-2.02	0.03	-11.39	0.191
11 a	-0.62	0.48	-12.83	-9.93	2	-17.38	0.29	15.36	11.89	2	20.68	0.35	-0.06	0.001
12 a	-6.68	-1.77	-18.71	-13.71	2	-36.27	0.62	15.72	12.29	2	10.21	0.17	-11.01	0.184
13 a	2.08	0.87	-11.06	-7.32	2	-11.02	0.18	20.68	16.28	2	31.83	0.54	3.91	0.065
14 a	0.76	-1.89	-4.26	-4.26	1	-7.64	0.13	8.62	7.13	2	9.75	0.16	-1.89	0.031

Calculate Area of Steel Required at Middle of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
10 b	-2.52	-2.61	-9.35	-9.35	1	-19.69	0.33	3.83	3.19	2	-1.90	0.03	-7.07	0.118
11 b	-0.22	0.16	-6.38	-5.03	2	-8.65	0.14	7.18	5.67	2	9.66	0.16	-0.04	0.001
12 b	-4.31	-0.97	-9.97	-7.32	2	-20.30	0.34	8.60	6.80	2	4.77	0.08	-6.84	0.114
13 b	0.53	0.42	-5.64	-3.91	2	-6.31	0.11	11.20	8.90	2	16.42	0.28	1.30	0.022
14 b	-0.19	-1.02	-1.79	-1.79	1	-4.18	0.07	4.85	4.08	2	4.78	0.08	-1.77	0.029

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]SummaryRFLegal

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 17 - S4 + HL93					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.37	Top Slab Centerline	**1.37**	1.71	1.64	2.76

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]SummaryASLegal

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 17 - S4 + HL93	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.56	0.31

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 17 **Truck 17 - S4 + HL93**

Combine trucks? y

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.00	1.00
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
Top Slab Centerline	2 c	0.55	-0.34	0.10	4.95	-1.01	3.32	-0.66	2	2	14.63	-9.80	2.14	7.42
	3 c	0.34	-0.14	0.11	5.51	-1.29	3.72	-0.85	2	2	14.63	-9.80	1.92	5.84
	4 c	1.64	-0.15	0.33	6.65	-0.56	4.13	-0.41	2	2	14.63	-9.80	1.37	16.02
	5 c	1.11	-0.12	0.17	5.49	-0.95	3.86	-0.57	2	2	14.63	-9.80	1.78	8.77
Top Slab Thickness Change (Between Webs)	2 b	0.39	-0.17	0.07	4.62	-2.21	4.12	-1.08	2	2	14.63	-22.90	2.29	7.79
	3 b	-0.64	-0.15	-0.10	4.51	-2.63	3.85	-1.45	2	2	14.63	-22.90	2.60	6.12
	4 b	-2.09	-0.66	-0.12	6.88	-8.30	5.12	-5.48	2	2	14.63	-22.90	1.98	1.71
	5 b	0.99	-0.15	0.12	5.34	-1.35	4.33	-0.75	2	2	14.63	-22.90	1.86	13.22
Top Slab at Web	2 a	-3.08	0.11	-0.48	4.14	-8.75	4.14	-4.21	1	2	16.78	-60.03	3.79	4.71
	3 a	-5.51	-0.17	-0.95	4.38	-11.23	3.49	-6.35	2	2	16.78	-60.03	4.28	3.40
	4 a	-9.68	-1.20	-1.19	8.67	-20.09	6.60	-11.13	2	2	16.78	-60.03	2.77	1.64
	5 a	-2.26	-0.18	-0.43	3.76	-3.36	3.76	-3.36	1	1	16.78	-60.03	4.04	12.41
Top Slab at Cantilever	1 b	-6.45	-4.16	-1.30	-0.02	-11.74	-0.02	-9.93	1	2	16.78	-60.04	1622.27	2.76
	6 a	-2.60	-2.15	-0.40	-0.02	-4.86	-0.02	-3.25	1	2	16.78	-60.03	1961.21	8.07

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]Stre

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 17 **Truck 17 - S4 + HL93**

Combine trucks? Y

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.00				1.00	1.00					
	LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	10 a	-3.36	-4.79	-12.90	-12.90	1	-28.80	0.49	5.90	3.65	2	-3.42	0.06	-11.39	0.191
	11 a	-0.62	0.48	-9.95	-7.05	2	-13.49	0.23	12.13	8.66	2	16.32	0.27	-0.06	0.001
	12 a	-6.68	-1.77	-16.35	-10.48	2	-33.09	0.56	13.07	9.26	2	6.63	0.11	-11.01	0.184
	13 a	2.08	0.87	-9.75	-5.21	2	-9.25	0.15	16.84	12.44	2	26.64	0.45	3.91	0.065
	14 a	0.76	-1.89	-3.04	-3.04	1	-5.99	0.10	6.33	4.84	2	6.66	0.11	-1.89	0.031
Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	10 b	-2.52	-2.61	-6.65	-6.65	1	-16.05	0.27	3.03	2.12	2	-2.98	0.05	-7.07	0.118
	11 b	-0.22	0.16	-4.94	-3.59	2	-6.71	0.11	5.62	4.11	2	7.55	0.13	-0.04	0.001
	12 b	-4.31	-0.97	-8.69	-5.69	2	-18.57	0.31	6.93	5.13	2	2.51	0.04	-6.84	0.114
	13 b	0.53	0.42	-4.92	-2.87	2	-5.34	0.09	9.12	6.82	2	13.61	0.23	1.30	0.022
	14 b	-0.19	-1.02	-1.25	-1.25	1	-3.46	0.06	3.58	2.81	2	3.07	0.05	-1.77	0.029

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]SummaryRFLegal

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 18 - S5 + HL93					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.20	Top Slab Centerline	**1.20**	1.42	1.40	2.08

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]SummaryASLegal

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 18 - S5 + HL93	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.64	0.35

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 18 **Truck 18 - S5 + HL93**

Combine trucks? y

					One or two vehicles		One vehicle							
			MPF =		1.00	1.00	1.00	1.00						
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35			Allowable		Rating Factor	
	SECTION	Selfweight	Barrier	WS	LL+I (Max.)	LL+I (Min)	LL+I (Max.)	LL+I (Min)	Controlling # vehicles		Mn** (kip-ft)		RF	RF
		kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	LL+I (Max.)	LL+I (Min)	Max.	Min.	(Max Live Load)	(Min. Live Load)
Top Slab Centerline	2 c	0.55	-0.34	0.10	5.46	-1.18	4.63	-0.84	2	2	14.63	-9.80	1.94	6.35
	3 c	0.34	-0.14	0.11	6.14	-1.55	5.16	-1.12	2	2	14.63	-9.80	1.72	4.86
	4 c	1.64	-0.15	0.33	7.63	-0.69	5.79	-0.54	2	2	14.63	-9.80	1.20	13.00
	5 c	1.11	-0.12	0.17	6.18	-1.11	5.33	-0.74	2	2	14.63	-9.80	1.58	7.51
Top Slab Thickness Change (Between Webs)	SECTION	Selfweight	Barrier	WS	LL+I (Max.)	LL+I (Min)	LL+I (Max.)	LL+I (Min)	Controlling # vehicles		Mn** (kip-ft)		RF	RF
		kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	LL+I (Max.)	LL+I (Min)	Max.	Min.	(Max Live Load)	(Min. Live Load)
	2 b	0.39	-0.17	0.07	5.77	-2.47	5.54	-1.34	2	2	14.63	-22.90	1.84	6.97
	3 b	-0.64	-0.15	-0.10	5.60	-2.99	5.26	-1.81	2	2	14.63	-22.90	2.09	5.38
	4 b	-2.09	-0.66	-0.12	7.85	-9.99	6.86	-7.18	2	2	14.63	-22.90	1.74	1.42
	5 b	0.99	-0.15	0.12	6.22	-1.58	5.83	-0.98	2	2	14.63	-22.90	1.60	11.30
Top Slab at Web	SECTION	Selfweight	Barrier	WS	LL+I (Max.)	LL+I (Min)	LL+I (Max.)	LL+I (Min)	Controlling # vehicles		Mn** (kip-ft)		RF	RF
		kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	LL+I (Max.)	LL+I (Min)	Max.	Min.	(Max Live Load)	(Min. Live Load)
	2 a	-3.08	0.11	-0.48	4.93	-9.50	4.93	-6.12	1	2	16.78	-60.03	3.18	4.34
	3 a	-5.51	-0.17	-0.95	5.16	-12.29	4.27	-8.78	2	2	16.78	-60.03	3.64	3.10
	4 a	-9.68	-1.20	-1.19	10.44	-23.53	8.37	-14.66	2	2	16.78	-60.03	2.30	1.40
	5 a	-2.26	-0.18	-0.43	4.40	-4.82	4.40	-4.82	1	1	16.78	-60.03	3.45	8.65
Top Slab at Cantilever	SECTION	Selfweight	Barrier	WS	LL+I (Max.)	LL+I (Min)	LL+I (Max.)	LL+I (Min)	Controlling # vehicles		Mn** (kip-ft)		RF	RF
		kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	LL+I (Max.)	LL+I (Min)	Max.	Min.	(Max Live Load)	(Min. Live Load)
	1 b	-6.45	-4.16	-1.30	0.09	-15.57	-0.03	-13.76	2	2	16.78	-60.04	271.80	2.08
	6 a	-2.60	-2.15	-0.40	0.14	-5.97	-0.03	-4.69	2	2	16.78	-60.03	126.23	6.57

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]Stre

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 18 **Truck 18 - S5 + HL93**

Combine trucks? Y

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.00				1.00	1.00					
	LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	10 a	-3.36	-4.79	-16.94	-16.94	1	-34.25	0.58	6.72	5.03	2	-2.31	0.04	-11.39	0.191
	11 a	-0.62	0.48	-12.13	-9.23	2	-16.43	0.28	14.82	11.35	2	19.95	0.34	-0.06	0.001
	12 a	-6.68	-1.77	-19.55	-13.73	2	-37.41	0.64	15.80	12.37	2	10.32	0.17	-11.01	0.184
	13 a	2.08	0.87	-11.26	-6.75	2	-11.29	0.19	20.83	16.43	2	32.03	0.55	3.91	0.065
	14 a	0.76	-1.89	-3.76	-3.76	1	-6.96	0.12	7.87	6.38	2	8.74	0.15	-1.89	0.031
Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	10 b	-2.52	-2.61	-8.62	-8.62	1	-18.71	0.31	3.42	2.78	2	-2.45	0.04	-7.07	0.118
	11 b	-0.22	0.16	-6.00	-4.65	2	-8.14	0.14	6.84	5.33	2	9.20	0.15	-0.04	0.001
	12 b	-4.31	-0.97	-10.42	-7.44	2	-20.91	0.35	8.58	6.78	2	4.74	0.08	-6.84	0.114
	13 b	0.53	0.42	-5.74	-3.71	2	-6.45	0.11	11.25	8.95	2	16.49	0.28	1.30	0.022
	14 b	-0.19	-1.02	-1.52	-1.52	1	-3.82	0.06	4.43	3.66	2	4.21	0.07	-1.77	0.029

5.6.5 Inventory Rating Evaluations
AASHTO Lanes

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]SummaryRFLegal

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 1 - HL93-TRUCK					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Inventory - Strength I	1.05	Top Slab Centerline	**1.05**	1.60	1.93	2.12

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]SummaryASLegal

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 1 - HL93-TRUCK	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Inventory - Strength I	0.53	0.28

URS

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	5.6.6/3 1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Inventory - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.75	1.75	1.75	1.75

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 c	0.55	-0.34	0.10	4.86	-0.91	4.86	-0.68	1	2	14.63	-9.80	1.68	6.35
3 c	0.34	-0.14	0.11	5.16	-0.80	5.02	-0.55	2	2	14.63	-9.80	1.58	7.27
4 c	1.64	-0.15	0.33	6.72	-0.34	5.86	-0.28	2	2	14.63	-9.80	1.05	20.35
5 c	1.11	-0.12	0.17	4.91	-0.64	4.87	-0.48	2	2	14.63	-9.80	1.53	10.04

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Mn** (kip-ft) Max.	Mn** (kip-ft) Min.	RF (Max Live Load)	RF (Min. Live Load)
2 b	0.39	-0.17	0.07	4.09	-1.32	4.63	-0.23	1	2	14.63	-22.90	1.76	10.06
3 b	-0.64	-0.15	-0.10	3.96	-1.97	4.34	-1.56	1	2	14.63	-22.90	2.08	6.30
4 b	-2.09	-0.66	-0.12	5.04	-5.05	4.86	-3.48	2	2	14.63	-22.90	2.09	2.16
5 b	0.99	-0.15	0.12	4.40	-1.11	4.81	-0.67	1	2	14.63	-22.90	1.60	12.41

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Mn** (kip-ft) Max.	Mn** (kip-ft) Min.	RF (Max Live Load)	RF (Min. Live Load)
2 a	-3.08	0.11	-0.48	1.05	-6.37	1.26	-6.04	1	2	16.78	-60.03	9.60	4.99
3 a	-5.51	-0.17	-0.95	1.92	-8.73	1.24	-7.78	2	2	16.78	-60.03	7.54	3.37
4 a	-9.68	-1.20	-1.19	4.36	-13.16	2.75	-9.12	2	2	16.78	-60.03	4.25	1.93
5 a	-2.26	-0.18	-0.43	1.63	-5.07	1.96	-5.63	1	1	16.78	-60.03	5.99	5.72

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Mn** (kip-ft) Max.	Mn** (kip-ft) Min.	RF (Max Live Load)	RF (Min. Live Load)
1 b	-6.45	-4.16	-1.30	0.06	-11.01	-0.01	-11.83	2	1	16.78	-60.04	314.51	2.12
6 a	-2.60	-2.15	-0.40	0.08	-4.76	-0.01	-4.78	2	1	16.78	-60.03	170.41	6.34

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Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	1/27/09 5.6.6/ 4
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]Stre

Area of Steel Required at Webs due to Transverse Bending

Inventory - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

	two vehicles	One Vehicle	One or two vehicles	One Vehicle
MPF =	1.00	1.20	1.00	1.20

LF =	1.25	1.50	1.75		Minimum Live Load Moment			1.75		Maximum Live Load Moment			Dead Loads	
SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
Calculate Area of Steel Required at Top of Webs														
10 a	-3.36	-4.79	-9.35	-11.22	1	-31.02	0.53	4.65	4.09	2	-3.25	0.05	-11.39	0.191
11 a	-0.62	0.48	-7.92	-6.02	2	-13.92	0.23	9.13	6.79	2	15.92	0.27	-0.06	0.001
12 a	-6.68	-1.77	-11.10	-7.52	2	-30.44	0.52	8.81	6.46	2	4.40	0.07	-11.01	0.184
13 a	2.08	0.87	-7.27	-5.28	2	-8.81	0.15	11.26	8.23	2	23.61	0.40	3.91	0.065
14 a	0.76	-1.89	-2.22	-2.66	1	-6.55	0.11	5.54	4.86	2	7.81	0.13	-1.89	0.031
Calculate Area of Steel Required at Middle of Webs														
SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
10 b	-2.52	-2.61	-4.66	-5.59	1	-16.85	0.28	2.45	2.20	2	-2.78	0.05	-7.07	0.118
11 b	-0.22	0.16	-3.81	-2.95	2	-6.70	0.11	4.19	3.22	2	7.30	0.12	-0.04	0.001
12 b	-4.31	-0.97	-5.71	-3.84	2	-16.83	0.28	4.69	3.47	2	1.37	0.02	-6.84	0.114
13 b	0.53	0.42	-3.65	-2.58	2	-5.09	0.08	5.93	4.36	2	11.68	0.20	1.30	0.022
14 b	-0.19	-1.02	-0.93	-1.12	1	-3.72	0.06	2.94	2.60	2	3.38	0.06	-1.77	0.029

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]SummaryRFLegal

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 2 - HL93-TANDEM					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Inventory - Strength I	1.09	Top Slab Centerline	**1.09**	1.78	1.89	1.92

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]SummaryASLegal

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 2 - HL93-TANDEM	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Inventory - Strength I	0.50	0.26

URS

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	5.6.6/7 1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Inventory - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 2 **Truck 2 - HL93-TANDEM**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.75	1.75	1.75	1.75

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 c	0.55	-0.34	0.10	4.66	-0.79	4.60	-0.60	2	2	14.63	-9.80	1.75	7.32
3 c	0.34	-0.14	0.11	4.86	-0.65	4.70	-0.46	2	2	14.63	-9.80	1.68	8.94
4 c	1.64	-0.15	0.33	6.46	-0.34	5.63	-0.23	2	2	14.63	-9.80	1.09	20.35
5 c	1.11	-0.12	0.17	4.59	-0.58	4.52	-0.42	2	2	14.63	-9.80	1.64	11.08

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 b	0.39	-0.17	0.07	3.50	-1.31	4.13	-0.59	1	2	14.63	-22.90	1.98	10.13
3 b	-0.64	-0.15	-0.10	3.54	-1.47	3.92	-1.34	1	2	14.63	-22.90	2.30	8.45
4 b	-2.09	-0.66	-0.12	4.15	-4.24	4.15	-3.37	1	2	14.63	-22.90	2.53	2.58
5 b	0.99	-0.15	0.12	3.92	-1.18	4.31	-0.70	1	2	14.63	-22.90	1.78	11.67

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 a	-3.08	0.11	-0.48	-0.07	-7.53	-0.08	-7.26	1	2	16.78	-60.03	378.46	4.22
3 a	-5.51	-0.17	-0.95	0.73	-9.19	0.88	-8.58	1	2	16.78	-60.03	16.52	3.20
4 a	-9.68	-1.20	-1.19	2.80	-13.42	1.43	-11.04	2	2	16.78	-60.03	6.62	1.89
5 a	-2.26	-0.18	-0.43	0.18	-6.76	0.22	-6.94	1	1	16.78	-60.03	54.29	4.64

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
1 b	-6.45	-4.16	-1.30	0.12	-12.66	0.00	-13.02	2	1	16.78	-60.04	157.26	1.92
6 a	-2.60	-2.15	-0.40	0.17	-5.79	0.00	-5.41	2	2	16.78	-60.03	80.19	5.23

URS

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	1/27/09 5.6.6/ 8
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL IVA.XLS]Stre

Area of Steel Required at Webs due to Transverse Bending

Inventory - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Truck ID 2 **Truck 2 - HL93-TANDEM**

Combine trucks? N

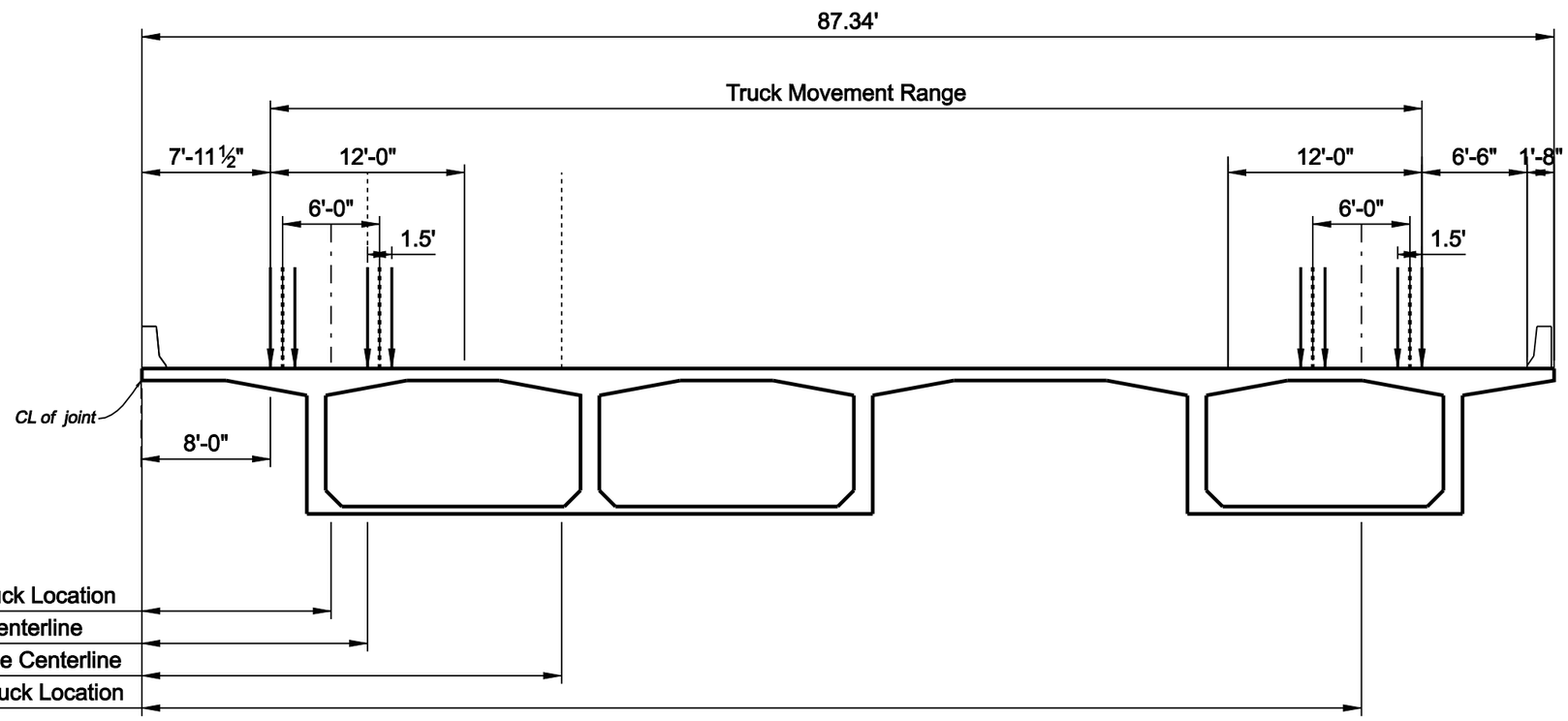
Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

				two vehicles	One Vehicle				One or two vehicles	One Vehicle					
			MPF =	1.00	1.20				1.00	1.20					
	LF =	1.25	1.50	1.75		Minimum Live Load Moment			1.75		Maximum Live Load Moment			Dead Loads	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	10 a	-3.36	-4.79	-8.58	-10.30	1	-29.40	0.50	4.81	4.20	2	-2.97	0.05	-11.39	0.191
	11 a	-0.62	0.48	-7.04	-5.93	2	-12.38	0.21	7.81	6.46	2	13.61	0.23	-0.06	0.001
	12 a	-6.68	-1.77	-9.82	-7.43	2	-28.20	0.48	7.61	6.14	2	2.30	0.04	-11.01	0.184
	13 a	2.08	0.87	-7.23	-5.88	2	-8.74	0.15	9.18	7.00	2	19.97	0.34	3.91	0.065
	14 a	0.76	-1.89	-1.82	-2.18	1	-5.71	0.10	5.32	4.72	2	7.42	0.12	-1.89	0.031
Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	10 b	-2.52	-2.61	-4.13	-4.96	1	-15.74	0.26	2.39	2.10	2	-2.89	0.05	-7.07	0.118
	11 b	-0.22	0.16	-3.31	-2.60	2	-5.83	0.10	3.56	2.78	2	6.19	0.10	-0.04	0.001
	12 b	-4.31	-0.97	-4.85	-3.50	2	-15.33	0.26	3.90	2.95	2	-0.02	0.00	-6.84	0.114
	13 b	0.53	0.42	-3.45	-2.69	2	-4.74	0.08	4.69	3.56	2	9.51	0.16	1.30	0.022
	14 b	-0.19	-1.02	-0.76	-0.91	1	-3.36	0.06	2.68	2.38	2	2.92	0.05	-1.77	0.029

5.6.6 Striped Lanes Location

TRUCK LOCATION - NO TRAFFIC ON SHOULDERS



Design by: PT 9/09
Independent Check by: RJB 9/09

HALF SIZE PRINT - 11x17

No.	Date	App.	Revisions

Designed by -
Drawn by R.V.A.
Checked by -
DRAWING SCALE:

URS Corporation Southern
7650 Corporate Center Drive
Suite 400
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Tel: (305) 262-7466
C.A. No. EB 00000002

TYPICAL SECTION - Transverse Analysis

SECTION IVA

DRAWING NO. -
SHEET NO. -

5.6.6/1

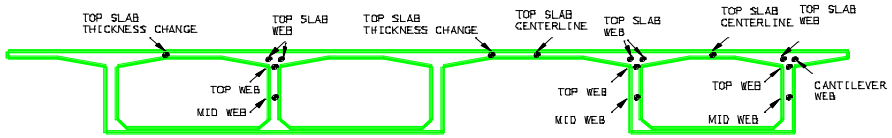
5.6.7 Rating Summary Striped Lanes

URS

PROJECT: Triple Cell- Five Web Box, 87.34' Wide (Case IV-A) CALCS BY: PT DATE: 08/09

ESCRIPTION: **Striped Lanes - Transverse Analysis - Cline Avenue** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length



Cline Avenue			Inventory	Operating										
			LFR Design Loads	LFR Design Loads	INDOT Legal Loads*			INDOT Permit Loads						
			HL93 or Tandem*	Hl93 or Tandem*	Single Vehicle (SV)			Super Loads						
					R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Gross Vehicle Weight (tons)			32	32	45	45	63	67	67.1	129	133.5	175	152.5	240
Longitudinal	Factored	Flexure												
		Shear												
	Service	Flexure												
		Principal Stress												
Transverse	Factored	Top Slab Centerline	1.05	1.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Top Slab Thickness Change	1.60	2.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Top Slab Webs & Cantilever	1.89	2.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Overall Rating Factor	1.05	1.36	0.00	0.00
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)		43.45	0.00	0.00

* Max number of lanes loaded = 2

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section IVA EL STRIPED LANES.XLS]Truck Data

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)**

DESCRIPTION: **Striped Lanes - Transverse Analysis - Cline Avenue**

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Summary of Rating Factors:

Import Brug Data | Delete Load Rating Factors | Calculate Load Rating Factors | Print Load Rating Results | View Single LC Results

CALCS BY: PT DATE: 08/09

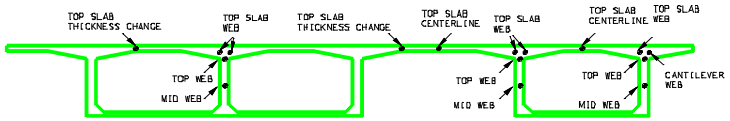
CHECKED BY: IC by RJB DATE: 08/09

	Combine Trucks?	Truck Description		Operating - Strength I		View Single LC Results	Operating - Strength I						AS required - With Live Load		PRINT	Calculate Rating Factors
	Y or N	Rating Truck ID	Truck Name	Brug File with 2 or more vehicles	Brug File with a single vehicle	Y or N	RF	RF Controlling Location	Top Slab Centerline	Top Slab (Thickness Change Section)	Top Slab Webs	Cantilever at Webs	Top of Web	Middle of Web	Y or N	Y or N
HL93- DESIGN LOADS	N	1	HL93-TRUCK	_A_SL_HL93_TRUCK_EL.OU	IV_A_SL_HL93_TRUCK_EL.OU	N	1.36	Top Slab Centerline	1.36	2.07	2.50	8.32	0.44	0.24	N	Y
	N	2	HL93-TANDEM	A_SL_HL93_TANDEM_EL.C	V_A_SL_HL93_TANDEM_EL.O	N	1.41	Top Slab Centerline	1.41	2.31	2.45	6.50	0.41	0.22	N	Y
INDOT DESIGN LOADS	N	3	R1	IV_A_SL_R1_EL.OUT	1_IV_A_SL_R1_EL.OUT	N									N	N
	N	4	R2	IV_A_SL_R2_EL.OUT	1_IV_A_SL_R2_EL.OUT	N									N	N
	N	5	R3	IV_A_SL_R3_EL.OUT	1_IV_A_SL_R3_EL.OUT	N									N	N
	N	6	NOT USED	n/a	n/a	N									N	N
	N	7	NOT USED	n/a	n/a	N									N	N
	N	8	NOT USED	n/a	n/a	N									N	N
	N	9	NOT USED	n/a	n/a	N									N	N
	N	10	NOT USED	n/a	n/a	N									N	N
	N	11	NOT USED	n/a	n/a	N									N	N
INDOT DESIGN LOADS	Y	12	R4 + HL93	IV_A_SL_R4_EL.OUT	1_IV_A_SL_R4_EL.OUT	N									N	N
	Y	13	R5 + HL93	IV_A_SL_R5_EL.OUT	1_IV_A_SL_R5_EL.OUT	N									N	N
INDOT PERMIT LOADS	Y	14	S1 + HL93	IV_A_SL_S1_EL.OUT	1_IV_A_SL_S1_EL.OUT	N									N	N
	Y	15	S2 + HL93	IV_A_SL_S2_EL.OUT	1_IV_A_SL_S2_EL.OUT	N									N	N
	Y	16	S3 + HL93	IV_A_SL_S3_EL.OUT	1_IV_A_SL_S3_EL.OUT	N									N	N
	Y	17	S4 + HL93	IV_A_SL_S4_EL.OUT	1_IV_A_SL_S4_EL.OUT	N									N	N
	Y	18	S5 + HL93	IV_A_SL_S5_EL.OUT	1_IV_A_SL_S5_EL.OUT	N									N	N
	N	19	NOT USED	n/a	n/a	N									N	N
	N	20	NOT USED	n/a	n/a	N									N	N
	N	21	NOT USED	n/a	n/a	N									N	N
	N	22	NOT USED	n/a	n/a	N									N	N
	N	23	NOT USED	n/a	n/a	N									N	N
	N	24	NOT USED	n/a	n/a	N									N	N
	N	25	NOT USED	n/a	n/a	N									N	N
	N	26	NOT USED	n/a	n/a	N									N	N

LRFR Load Factors For Segmental Bridges				Multiple Presence Factor	
LOAD CASE	DL	SDL	LL	one lane	two lanes
Operating - Strength I	1.25	1.50	1.35	1.20	1.00

Brug plates with reversed moment sign and reversed LL Max/Min
11
12
14

	Multiple Presence Factor	
LOAD CASE	one lane	two lanes
Operating - Strength I	1.00	1.00



URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section IVA EL STRIPED LANES.XLS]Truck Data

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)**

DESCRIPTION: **Striped Lanes - Transverse Analysis - Cline Avenue**

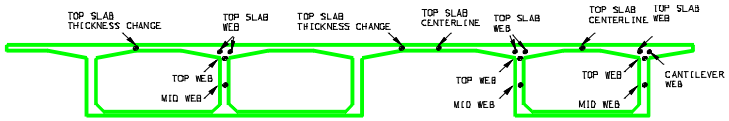
Import Brug Data | Delete Load Rating Factors | Calculate Load Rating Factors | Print Load Rating Results | View Single LC Results

CALCS BY: PT DATE: 08/09

CHECKED BY: IC by RJB DATE: 08/09

	Combine Trucks?	Truck Description		Inventory - Strength I		PRINT	Operating - Strength I						AS required		PRINT	Calculate Rating Factors
	Y or N	Rating Truck ID	Truck Name	RF	RF Controlling Location	Y or N	RF	RF Controlling Location	Top Slab Centerline	Top Slab (Thickness Change Section)	Top Slab Webs	Cantilever at Webs	Top of Web	Middle of Web	Y or N	Y or N
HS20- DESIGN LOADS	N	1	HL93-TRUCK	_A_SL_HL93_TRUCK_EL.OU	IV_A_SL_HL93_TRUCK_EL.OU	N	1.05	Top Slab Centerline	1.05	1.60	1.93	6.42	0.52	0.28	Y	Y
	N	2	HL93-TANDEM	A_SL_HL93_TANDEM_EL.C	V_A_SL_HL93_TANDEM_EL.O	Y	1.09	Top Slab Centerline	1.09	1.78	1.89	5.02	0.48	0.26	N	Y

LFR Load Factors For Segmental Bridges - NC DOT				Multiple Presence Factor	
LOAD CASE	DL	SDL	LL	one lane	two lanes
Inventory - Strength I	1.25	1.50	1.75	1.20	1.00

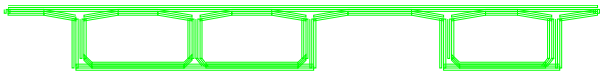


URS

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Striped Lanes - Transverse Analysis - Cline Avenue** CHECKED BY: IC by RJB DATE: 08/09

Area of Steel Requirements



LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

			Middle of Web		Top of Web	
Section	Inventory / Operating	Combined Name	A_b req'd (in^2/ft)	$A_{b\ Dead}$ req'd	A_b req'd (in^2/ft)	$A_{b\ Dead}$ req'd (in^2/ft)
HL-93	Inventory	HL-93 Inventory	0.28	0.12	0.52	0.19
HL-93	Operating	HL-93 Operating	0.24	0.12	0.44	0.19
HL-93-s	Operating	HL-93-s Operating	0.24	0.12	0.44	0.19

5.6.8 Load Summary Striped Lanes

URS

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spre

Project Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)

Portion

MAXIMUM loads for section(s) 11 12 14 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces st

SERVICE FORCES **Live Load Loading (1 or 2 Vehicles)**

	Truck 1 - HL93-TRUCK		Truck 1 - HL93-TRUCK		Truck 2 - HL93-TANDEM		Truck 2 - HL93-TANDEM	
	Maximum		Minimum		Maximum		Minimum	
GTSTRUDL	Positive Moment		Negative Moment		Positive Moment		Negative Moment	
SECTION NODE NO.	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)
1 a	0.00	0.87	0.00	-0.28	0.00	0.56	0.00	-0.53
1 b	0.00	0.06	0.00	-3.90	0.00	0.12	0.00	-4.99
2 a	0.00	-0.11	0.00	-6.37	0.00	-0.07	0.00	-7.62
2 b	0.00	3.86	0.00	-1.32	0.00	3.44	0.00	-1.13
2 c	0.00	4.86	0.00	-0.49	0.00	4.66	0.00	-0.42
3 a	0.00	1.63	0.00	-8.73	0.00	0.21	0.00	-9.19
3 b	0.00	3.83	0.00	-1.97	0.00	3.37	0.00	-1.47
3 c	0.00	5.16	0.00	-0.80	0.00	4.86	0.00	-0.65
4 a	0.00	4.36	0.00	-13.16	0.00	2.80	0.00	-13.42
4 b	0.00	5.04	0.00	-5.05	0.00	4.15	0.00	-4.24
4 c	0.00	6.72	0.00	-0.24	0.00	6.46	0.00	-0.21
5 a	0.00	1.63	0.00	-4.69	0.00	0.18	0.00	-6.61
5 b	0.00	4.40	0.00	-0.87	0.00	3.92	0.00	-0.92
5 c	0.00	4.82	0.00	-0.64	0.00	4.51	0.00	-0.58
6 a	0.00	0.08	0.00	-1.18	0.00	0.17	0.00	-1.83
7 a	0.00	0.64	0.00	-0.67	0.00	0.46	0.00	-0.49
7 b	0.00	0.55	0.00	-0.58	0.00	0.39	0.00	-0.42
7 c	0.00	0.03	0.00	-0.05	0.00	0.02	0.00	-0.04
8 a	0.00	1.11	0.00	-0.90	0.00	0.85	0.00	-0.66
8 b	0.00	0.94	0.00	-0.78	0.00	0.69	0.00	-0.57
8 c	0.00	0.05	0.00	-0.07	0.00	0.04	0.00	-0.06
9 a	0.00	0.66	0.00	-0.43	0.00	0.61	0.00	-0.35
9 b	0.00	0.53	0.00	-0.36	0.00	0.45	0.00	-0.27
9 c	0.00	0.04	0.00	-0.08	0.00	0.03	0.00	-0.06
10 a	0.00	4.65	0.00	-2.32	0.00	4.81	0.00	-1.58
10 b	0.00	2.45	0.00	-1.03	0.00	2.39	0.00	-0.71
11 a	0.00	9.11	0.00	-7.92	0.00	7.94	0.00	-7.04
11 b	0.00	4.18	0.00	-3.81	0.00	3.56	0.00	-3.31
12 a	0.00	8.81	0.00	-11.10	0.00	7.61	0.00	-9.82
12 b	0.00	4.69	0.00	-5.71	0.00	3.90	0.00	-4.85
13 a	0.00	8.45	0.00	-7.27	0.00	6.78	0.00	-7.23
13 b	0.00	4.68	0.00	-3.65	0.00	3.63	0.00	-3.45
14 a	0.00	5.54	0.00	-0.10	0.00	5.32	0.00	-0.11
14 b	0.00	2.94	0.00	-0.16	0.00	2.68	0.00	-0.15

URS

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spre

Project Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)

Portion

MAXIMUM loads for section(s) 11 12 14 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces st

SERVICE FORCES **Live Load Loading (1 Vehicle Only)**

	Truck 1 - HL93-TRUCK		Truck 1 - HL93-TRUCK		Truck 2 - HL93-TANDEM		Truck 2 - HL93-TANDEM	
	Maximum		Minimum		Maximum		Minimum	
GTSTRUDL	Positive Moment		Negative Moment		Positive Moment		Negative Moment	
SECTION NODE NO.	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)
1 a	0.00	0.85	0.00	-0.26	0.00	0.52	0.00	-0.48
1 b	0.00	-0.01	0.00	-3.09	0.00	0.00	0.00	-3.62
2 a	0.00	-0.11	0.00	-5.03	0.00	-0.07	0.00	-6.05
2 b	0.00	3.86	0.00	-0.84	0.00	3.44	0.00	-0.82
2 c	0.00	4.05	0.00	-0.34	0.00	3.83	0.00	-0.29
3 a	0.00	1.03	0.00	-6.48	0.00	0.21	0.00	-7.15
3 b	0.00	3.62	0.00	-1.30	0.00	3.27	0.00	-1.12
3 c	0.00	4.18	0.00	-0.46	0.00	3.92	0.00	-0.38
4 a	0.00	2.29	0.00	-7.60	0.00	1.30	0.00	-9.20
4 b	0.00	4.05	0.00	-2.90	0.00	3.46	0.00	-2.81
4 c	0.00	4.88	0.00	-0.23	0.00	4.69	0.00	-0.19
5 a	0.00	1.63	0.00	-4.69	0.00	0.18	0.00	-5.78
5 b	0.00	4.01	0.00	-0.23	0.00	3.59	0.00	-0.15
5 c	0.00	4.06	0.00	-0.40	0.00	3.77	0.00	-0.35
6 a	0.00	0.07	0.00	-1.05	0.00	0.14	0.00	-1.64
7 a	0.00	0.64	0.00	-0.37	0.00	0.46	0.00	-0.27
7 b	0.00	0.54	0.00	-0.32	0.00	0.39	0.00	-0.23
7 c	0.00	0.00	0.00	-0.04	0.00	0.00	0.00	-0.03
8 a	0.00	0.61	0.00	-0.48	0.00	0.50	0.00	-0.36
8 b	0.00	0.51	0.00	-0.42	0.00	0.38	0.00	-0.31
8 c	0.00	0.03	0.00	-0.05	0.00	0.02	0.00	-0.04
9 a	0.00	0.39	0.00	-0.43	0.00	0.38	0.00	-0.35
9 b	0.00	0.31	0.00	-0.36	0.00	0.27	0.00	-0.27
9 c	0.00	0.02	0.00	-0.06	0.00	0.02	0.00	-0.05
10 a	0.00	3.41	0.00	-2.32	0.00	3.50	0.00	-1.58
10 b	0.00	1.83	0.00	-1.03	0.00	1.75	0.00	-0.71
11 a	0.00	5.66	0.00	-5.02	0.00	5.38	0.00	-4.94
11 b	0.00	2.68	0.00	-2.46	0.00	2.32	0.00	-2.17
12 a	0.00	5.38	0.00	-6.27	0.00	5.12	0.00	-6.19
12 b	0.00	2.89	0.00	-3.20	0.00	2.46	0.00	-2.92
13 a	0.00	6.86	0.00	-4.40	0.00	5.83	0.00	-4.90
13 b	0.00	3.63	0.00	-2.15	0.00	2.97	0.00	-2.24
14 a	0.00	4.05	0.00	-0.05	0.00	3.93	0.00	-0.08
14 b	0.00	2.17	0.00	-0.09	0.00	1.98	0.00	-0.10

URS

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	08/09
Portion	Striped Lanes - Transverse Analysis - Cline Avenue	Check	IC by RJB	Date	08/09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section IVA EL STRIPED LANES

SERVICE FORCES

MAXIMUM loads for section(s) 11 12 14 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SECTION	GTStrudl NODE NO.	Selfweight F (Kip)	Selfweight M (Kip-ft)	Surcharge (WS) F (Kip)	Surcharge (WS) M (Kip-ft)	Surcharge (Barrier) F (Kip)	Surcharge (Barrier) M (Kip-ft)
1 a		0.00	-3.30	0.00	-0.74	0.00	-3.07
1 b		0.00	-6.45	0.00	-1.30	0.00	-4.16
2 a		0.00	-3.08	0.00	-0.48	0.00	0.11
2 b		0.00	0.39	0.00	0.07	0.00	-0.17
2 c		0.00	0.55	0.00	0.10	0.00	-0.34
3 a		0.00	-5.51	0.00	-0.95	0.00	-0.17
3 b		0.00	-0.64	0.00	-0.10	0.00	-0.15
3 c		0.00	0.34	0.00	0.11	0.00	-0.14
4 a		0.00	-9.68	0.00	-1.19	0.00	-1.20
4 b		0.00	-2.09	0.00	-0.12	0.00	-0.66
4 c		0.00	1.64	0.00	0.33	0.00	-0.15
5 a		0.00	-2.26	0.00	-0.43	0.00	-0.18
5 b		0.00	0.99	0.00	0.12	0.00	-0.15
5 c		0.00	1.11	0.00	0.17	0.00	-0.12
6 a		0.00	-2.60	0.00	-0.40	0.00	-2.15
7 a		0.00	-0.95	0.00	0.07	0.00	0.37
7 b		0.00	-0.44	0.00	0.07	0.00	0.33
7 c		0.00	0.90	0.00	0.00	0.00	0.02
8 a		0.00	-2.07	0.00	-0.08	0.00	-0.05
8 b		0.00	-1.41	0.00	-0.07	0.00	-0.04
8 c		0.00	0.92	0.00	0.00	0.00	0.01
9 a		0.00	-1.25	0.00	0.03	0.00	-0.22
9 b		0.00	-0.72	0.00	0.02	0.00	-0.19
9 c		0.00	0.76	0.00	0.00	0.00	0.01
10 a		0.00	-3.36	0.00	-0.77	0.00	-4.03
10 b		0.00	-2.52	0.00	-0.42	0.00	-2.20
11 a		0.00	-0.62	0.00	-0.07	0.00	0.55
11 b		0.00	-0.22	0.00	-0.03	0.00	0.19
12 a		0.00	-6.68	0.00	-0.77	0.00	-1.01
12 b		0.00	-4.31	0.00	-0.41	0.00	-0.56
13 a		0.00	2.08	0.00	-0.10	0.00	0.97
13 b		0.00	0.53	0.00	-0.05	0.00	0.47
14 a		0.00	0.76	0.00	0.18	0.00	-2.07
14 b		0.00	-0.19	0.00	0.09	0.00	-1.11

5.6.9 Operating Rating Evaluations
Striped Lanes

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section IVA EL STRIPED LANES.XLS]Summar

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Striped Lanes - Transverse Analysis - Cline Avenue** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 1 - HL93-TRUCK					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.36	Top Slab Centerline	**1.36**	2.07	2.50	8.32

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section IVA EL STRIPED LANES.XLS]SummaryA:

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Striped Lanes - Transverse Analysis - Cline Avenue** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 1 - HL93-TRUCK	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.44	0.24

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	08/09
Portion	Striped Lanes - Transverse Analysis - Cline Avenue	Check	IC by RJB	Date	08/09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section IVA EL STRIPED LANES.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50		1.35	1.35	1.35	1.35

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Allowable Mn** (kip-ft) Max.	Min.	Rating Factor RF (Max Live Load)	RF (Min. Live Load)
2 c	0.55	-0.34	0.10		4.86	-0.49	4.86	-0.41	1	2	14.63	-9.80	2.18	15.30
3 c	0.34	-0.14	0.11		5.16	-0.80	5.02	-0.55	2	2	14.63	-9.80	2.05	9.42
4 c	1.64	-0.15	0.33		6.72	-0.24	5.86	-0.28	2	1	14.63	-9.80	1.36	32.50
5 c	1.11	-0.12	0.17		4.82	-0.64	4.87	-0.48	1	2	14.63	-9.80	2.00	13.02

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
2 b	0.39	-0.17	0.07		3.86	-1.32	4.63	-1.01	1	2	14.63	-22.90	2.29	13.04
3 b	-0.64	-0.15	-0.10		3.83	-1.97	4.34	-1.56	1	2	14.63	-22.90	2.69	8.17
4 b	-2.09	-0.66	-0.12		5.04	-5.05	4.86	-3.48	2	2	14.63	-22.90	2.71	2.81
5 b	0.99	-0.15	0.12		4.40	-0.87	4.81	-0.28	1	2	14.63	-22.90	2.07	20.52

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
2 a	-3.08	0.11	-0.48		-0.11	-6.37	-0.13	-6.04	1	2	16.78	-60.03	312.20	6.47
3 a	-5.51	-0.17	-0.95		1.63	-8.73	1.24	-7.78	2	2	16.78	-60.03	11.51	4.37
4 a	-9.68	-1.20	-1.19		4.36	-13.16	2.75	-9.12	2	2	16.78	-60.03	5.51	2.50
5 a	-2.26	-0.18	-0.43		1.63	-4.69	1.96	-5.63	1	1	16.78	-60.03	7.77	7.41

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
1 b	-6.45	-4.16	-1.30		0.06	-3.90	-0.01	-3.71	2	2	16.78	-60.04	407.70	8.32
6 a	-2.60	-2.15	-0.40		0.08	-1.18	0.08	-1.26	1	1	16.78	-60.03	210.38	31.13

URS

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	08/09
Portion	Striped Lanes - Transverse Analysis - Cline Avenue	Check	IC by RJB	Date	08/09

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section IVA EL STRIPED LANES.XLS]StrengthI(W)L

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles: LLMultiple

One vehicle with HL93: LLHL93

One or two vehicles: LLSingle

SW, WS, Barrier: DC&PTBrug

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

	two vehicles	One Vehicle	One or two vehicles	One Vehicle
MPF =	1.00	1.20	1.00	1.20

LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Load Moment	
SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
Calculate Area of Steel Required at Top of Webs														
10 a	-3.36	-4.79	-2.32	-2.78	1	-15.14	0.25	4.65	4.09	2	-5.11	0.09	-11.39	0.191
11 a	-0.62	0.48	-7.92	-6.02	2	-10.75	0.18	9.11	6.79	2	12.24	0.21	-0.06	0.001
12 a	-6.68	-1.77	-11.10	-7.52	2	-26.00	0.44	8.81	6.46	2	0.88	0.01	-11.01	0.184
13 a	2.08	0.87	-7.27	-5.28	2	-5.91	0.10	8.45	8.23	2	15.32	0.26	3.91	0.065
14 a	0.76	-1.89	-0.10	-0.06	2	-2.02	0.03	5.54	4.86	2	5.59	0.09	-1.89	0.031
Calculate Area of Steel Required at Middle of Webs														
SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
10 b	-2.52	-2.61	-1.03	-1.24	1	-8.74	0.15	2.45	2.20	2	-3.76	0.06	-7.07	0.118
11 b	-0.22	0.16	-3.81	-2.95	2	-5.18	0.09	4.18	3.22	2	5.61	0.09	-0.04	0.001
12 b	-4.31	-0.97	-5.71	-3.84	2	-14.55	0.24	4.69	3.47	2	-0.51	0.01	-6.84	0.114
13 b	0.53	0.42	-3.65	-2.58	2	-3.63	0.06	4.68	4.36	2	7.62	0.13	1.30	0.022
14 b	-0.19	-1.02	-0.16	-0.11	2	-1.98	0.03	2.94	2.60	2	2.20	0.04	-1.77	0.029

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section IVA EL STRIPED LANES.XLS]Summar

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Striped Lanes - Transverse Analysis - Cline Avenue** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 2 - HL93-TANDEM					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.41	Top Slab Centerline	**1.41**	2.31	2.45	6.50

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section IVA EL STRIPED LANES.XLS]SummaryA:

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Striped Lanes - Transverse Analysis - Cline Avenue** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 2 - HL93-TANDEM	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.41	0.22

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	08/09
Portion	Striped Lanes - Transverse Analysis - Cline Avenue	Check	IC by RJB	Date	08/09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section IVA EL STRIPED LANES.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 2 **Truck 2 - HL93-TANDEM**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 c	0.55	-0.34	0.10	4.66	-0.42	4.60	-0.35	2	2	14.63	-9.80	2.27	17.85
3 c	0.34	-0.14	0.11	4.86	-0.65	4.70	-0.46	2	2	14.63	-9.80	2.17	11.59
4 c	1.64	-0.15	0.33	6.46	-0.21	5.63	-0.23	2	1	14.63	-9.80	1.41	39.34
5 c	1.11	-0.12	0.17	4.51	-0.58	4.52	-0.42	1	2	14.63	-9.80	2.16	14.37

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 b	0.39	-0.17	0.07	3.44	-1.13	4.13	-0.98	1	2	14.63	-22.90	2.57	15.23
3 b	-0.64	-0.15	-0.10	3.37	-1.47	3.92	-1.34	1	2	14.63	-22.90	2.98	10.95
4 b	-2.09	-0.66	-0.12	4.15	-4.24	4.15	-3.37	1	2	14.63	-22.90	3.28	3.34
5 b	0.99	-0.15	0.12	3.92	-0.92	4.31	-0.18	1	2	14.63	-22.90	2.31	19.40

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 a	-3.08	0.11	-0.48	-0.07	-7.62	-0.08	-7.26	1	2	16.78	-60.03	490.60	5.41
3 a	-5.51	-0.17	-0.95	0.21	-9.19	0.25	-8.58	1	2	16.78	-60.03	74.46	4.15
4 a	-9.68	-1.20	-1.19	2.80	-13.42	1.56	-11.04	2	2	16.78	-60.03	8.59	2.45
5 a	-2.26	-0.18	-0.43	0.18	-6.61	0.22	-6.94	1	1	16.78	-60.03	70.37	6.01

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
1 b	-6.45	-4.16	-1.30	0.12	-4.99	0.00	-4.34	2	2	16.78	-60.04	203.85	6.50
6 a	-2.60	-2.15	-0.40	0.17	-1.83	0.17	-1.97	2	1	16.78	-60.03	103.95	19.93

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	08/09
Portion	Striped Lanes - Transverse Analysis - Cline Avenue	Check	IC by RJB	Date	08/09

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Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 2 **Truck 2 - HL93-TANDEM**

Combine trucks? N

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.20				1.00	1.20					
	LF =	1.25	1.50	1.35	Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Load Moment	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	10 a	-3.36	-4.79	-1.58	-1.90	1	-13.95	0.23	4.81	4.20	2	-4.89	0.08	-11.39	0.191
	11 a	-0.62	0.48	-7.04	-5.93	2	-9.56	0.16	7.94	6.46	2	10.66	0.18	-0.06	0.001
	12 a	-6.68	-1.77	-9.82	-7.43	2	-24.27	0.41	7.61	6.14	2	-0.74	0.01	-11.01	0.184
	13 a	2.08	0.87	-7.23	-5.88	2	-5.85	0.10	6.78	7.00	1	13.35	0.22	3.91	0.065
	14 a	0.76	-1.89	-0.11	-0.10	2	-2.04	0.03	5.32	4.72	2	5.29	0.09	-1.89	0.031
Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	10 b	-2.52	-2.61	-0.71	-0.85	1	-8.22	0.14	2.39	2.10	2	-3.84	0.06	-7.07	0.118
	11 b	-0.22	0.16	-3.31	-2.60	2	-4.51	0.08	3.56	2.78	2	4.77	0.08	-0.04	0.001
	12 b	-4.31	-0.97	-4.85	-3.50	2	-13.39	0.22	3.90	2.95	2	-1.58	0.03	-6.84	0.114
	13 b	0.53	0.42	-3.45	-2.69	2	-3.36	0.06	3.63	3.56	2	6.20	0.10	1.30	0.022
	14 b	-0.19	-1.02	-0.15	-0.12	2	-1.97	0.03	2.68	2.38	2	1.85	0.03	-1.77	0.029

5.6.10 Inventory Rating Evaluations
Striped Lanes

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section IVA EL STRIPED LANES.XLS]Summar

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Striped Lanes - Transverse Analysis - Cline Avenue** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 1 - HL93-TRUCK					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Inventory - Strength I	1.05	Top Slab Centerline	**1.05**	1.60	1.93	6.42

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section IVA EL STRIPED LANES.XLS]SummaryA:

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Striped Lanes - Transverse Analysis - Cline Avenue** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 1 - HL93-TRUCK	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Inventory - Strength I	0.52	0.28

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	08/09
Portion	Striped Lanes - Transverse Analysis - Cline Avenue	Check	IC by RJB	Date	08/09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section IVA EL STRIPED LANES.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Inventory - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.75	1.75	1.75	1.75

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 c	0.55	-0.34	0.10	4.86	-0.49	4.86	-0.41	1	2	14.63	-9.80	1.68	11.80
3 c	0.34	-0.14	0.11	5.16	-0.80	5.02	-0.55	2	2	14.63	-9.80	1.58	7.27
4 c	1.64	-0.15	0.33	6.72	-0.24	5.86	-0.28	2	1	14.63	-9.80	1.05	25.07
5 c	1.11	-0.12	0.17	4.82	-0.64	4.87	-0.48	1	2	14.63	-9.80	1.55	10.04

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 b	0.39	-0.17	0.07	3.86	-1.32	4.63	-1.01	1	2	14.63	-22.90	1.76	10.06
3 b	-0.64	-0.15	-0.10	3.83	-1.97	4.34	-1.56	1	2	14.63	-22.90	2.08	6.30
4 b	-2.09	-0.66	-0.12	5.04	-5.05	4.86	-3.48	2	2	14.63	-22.90	2.09	2.16
5 b	0.99	-0.15	0.12	4.40	-0.87	4.81	-0.28	1	2	14.63	-22.90	1.60	15.83

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 a	-3.08	0.11	-0.48	-0.11	-6.37	-0.13	-6.04	1	2	16.78	-60.03	240.84	4.99
3 a	-5.51	-0.17	-0.95	1.63	-8.73	1.24	-7.78	2	2	16.78	-60.03	8.88	3.37
4 a	-9.68	-1.20	-1.19	4.36	-13.16	2.75	-9.12	2	2	16.78	-60.03	4.25	1.93
5 a	-2.26	-0.18	-0.43	1.63	-4.69	1.96	-5.63	1	1	16.78	-60.03	5.99	5.72

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
1 b	-6.45	-4.16	-1.30	0.06	-3.90	-0.01	-3.71	2	2	16.78	-60.04	314.51	6.42
6 a	-2.60	-2.15	-0.40	0.08	-1.18	0.08	-1.26	1	1	16.78	-60.03	162.29	24.01

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	08/09
Portion	Striped Lanes - Transverse Analysis - Cline Avenue	Check	IC by RJB	Date	08/09

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Area of Steel Required at Webs due to Transverse Bending

Inventory - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

	two vehicles	One Vehicle	One or two vehicles	One Vehicle
MPF =	1.00	1.20	1.00	1.20

LF =	1.25	1.50	1.75		Minimum Live Load Moment			1.75		Maximum Live Load Moment			Dead Load Moment	
SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
Calculate Area of Steel Required at Top of Webs														
10 a	-3.36	-4.79	-2.32	-2.78	1	-16.26	0.27	4.65	4.09	2	-3.25	0.05	-11.39	0.191
11 a	-0.62	0.48	-7.92	-6.02	2	-13.92	0.23	9.11	6.79	2	15.89	0.27	-0.06	0.001
12 a	-6.68	-1.77	-11.10	-7.52	2	-30.44	0.52	8.81	6.46	2	4.40	0.07	-11.01	0.184
13 a	2.08	0.87	-7.27	-5.28	2	-8.81	0.15	8.45	8.23	2	18.70	0.31	3.91	0.065
14 a	0.76	-1.89	-0.10	-0.06	2	-2.06	0.03	5.54	4.86	2	7.81	0.13	-1.89	0.031
Calculate Area of Steel Required at Middle of Webs														
SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
10 b	-2.52	-2.61	-1.03	-1.24	1	-9.23	0.15	2.45	2.20	2	-2.78	0.05	-7.07	0.118
11 b	-0.22	0.16	-3.81	-2.95	2	-6.70	0.11	4.18	3.22	2	7.28	0.12	-0.04	0.001
12 b	-4.31	-0.97	-5.71	-3.84	2	-16.83	0.28	4.69	3.47	2	1.37	0.02	-6.84	0.114
13 b	0.53	0.42	-3.65	-2.58	2	-5.09	0.08	4.68	4.36	2	9.49	0.16	1.30	0.022
14 b	-0.19	-1.02	-0.16	-0.11	2	-2.05	0.03	2.94	2.60	2	3.38	0.06	-1.77	0.029

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PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Striped Lanes - Transverse Analysis - Cline Avenue** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 2 - HL93-TANDEM					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Inventory - Strength I	1.09	Top Slab Centerline	**1.09**	1.78	1.89	5.02

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section IVA EL STRIPED LANES.XLS]SummaryA:

PROJECT: **Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Striped Lanes - Transverse Analysis - Cline Avenue** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 2 - HL93-TANDEM	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Inventory - Strength I	0.48	0.26

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	08/09
Portion	Striped Lanes - Transverse Analysis - Cline Avenue	Check	IC by RJB	Date	08/09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section IVA EL STRIPED LANES.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Inventory - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 2 **Truck 2 - HL93-TANDEM**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.75	1.75	1.75	1.75

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 c	0.55	-0.34	0.10	4.66	-0.42	4.60	-0.35	2	2	14.63	-9.80	1.75	13.77
3 c	0.34	-0.14	0.11	4.86	-0.65	4.70	-0.46	2	2	14.63	-9.80	1.68	8.94
4 c	1.64	-0.15	0.33	6.46	-0.21	5.63	-0.23	2	1	14.63	-9.80	1.09	30.35
5 c	1.11	-0.12	0.17	4.51	-0.58	4.52	-0.42	1	2	14.63	-9.80	1.66	11.08

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 b	0.39	-0.17	0.07	3.44	-1.13	4.13	-0.98	1	2	14.63	-22.90	1.98	11.75
3 b	-0.64	-0.15	-0.10	3.37	-1.47	3.92	-1.34	1	2	14.63	-22.90	2.30	8.45
4 b	-2.09	-0.66	-0.12	4.15	-4.24	4.15	-3.37	1	2	14.63	-22.90	2.53	2.58
5 b	0.99	-0.15	0.12	3.92	-0.92	4.31	-0.18	1	2	14.63	-22.90	1.78	14.97

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 a	-3.08	0.11	-0.48	-0.07	-7.62	-0.08	-7.26	1	2	16.78	-60.03	378.46	4.17
3 a	-5.51	-0.17	-0.95	0.21	-9.19	0.25	-8.58	1	2	16.78	-60.03	57.44	3.20
4 a	-9.68	-1.20	-1.19	2.80	-13.42	1.56	-11.04	2	2	16.78	-60.03	6.62	1.89
5 a	-2.26	-0.18	-0.43	0.18	-6.61	0.22	-6.94	1	1	16.78	-60.03	54.29	4.64

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
1 b	-6.45	-4.16	-1.30	0.12	-4.99	0.00	-4.34	2	2	16.78	-60.04	157.26	5.02
6 a	-2.60	-2.15	-0.40	0.17	-1.83	0.17	-1.97	2	1	16.78	-60.03	80.19	15.38

Project	Triple Cell- Five Web Box, 87.34' Wide (Case IV-A)	Design	PT	Date	08/09
Portion	Striped Lanes - Transverse Analysis - Cline Avenue	Check	IC by RJB	Date	08/09

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section IVA EL STRIPED LANES.XLS]StrengthI(W)L

Area of Steel Required at Webs due to Transverse Bending

Inventory - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 2 **Truck 2 - HL93-TANDEM**

Combine trucks? N

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.20				1.00	1.20					
	LF =	1.25	1.50	1.75		Minimum Live Load Moment			1.75		Maximum Live Load Moment			Dead Load Moment	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	10 a	-3.36	-4.79	-1.58	-1.90	1	-14.70	0.25	4.81	4.20	2	-2.97	0.05	-11.39	0.191
	11 a	-0.62	0.48	-7.04	-5.93	2	-12.38	0.21	7.94	6.46	2	13.84	0.23	-0.06	0.001
	12 a	-6.68	-1.77	-9.82	-7.43	2	-28.20	0.48	7.61	6.14	2	2.30	0.04	-11.01	0.184
	13 a	2.08	0.87	-7.23	-5.88	2	-8.74	0.15	6.78	7.00	1	16.15	0.27	3.91	0.065
	14 a	0.76	-1.89	-0.11	-0.10	2	-2.08	0.03	5.32	4.72	2	7.42	0.12	-1.89	0.031

Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	10 b	-2.52	-2.61	-0.71	-0.85	1	-8.56	0.14	2.39	2.10	2	-2.89	0.05	-7.07	0.118
	11 b	-0.22	0.16	-3.31	-2.60	2	-5.83	0.10	3.56	2.78	2	6.19	0.10	-0.04	0.001
	12 b	-4.31	-0.97	-4.85	-3.50	2	-15.33	0.26	3.90	2.95	2	-0.02	0.00	-6.84	0.114
	13 b	0.53	0.42	-3.45	-2.69	2	-4.74	0.08	3.63	3.56	2	7.65	0.13	1.30	0.022
	14 b	-0.19	-1.02	-0.15	-0.12	2	-2.03	0.03	2.68	2.38	2	2.92	0.05	-1.77	0.029

5.7 Section VA

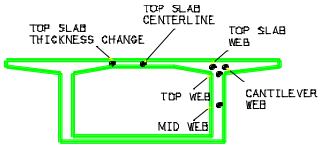
5.7.1 Rating Summary AASHTO Lanes

URS

PROJECT: Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A) CALCS BY: PT DATE: 1/27/09

ESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP- IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length



Cline Avenue			Inventory	Operating											
			LFR Design Loads	LFR Design Loads	INDOT Legal Loads*			INDOT Permit Loads						
			HL93 or Tandem*	HI93 or Tandem*	Single Vehicle (SV)			Super Loads						
					R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Gross Vehicle Weight (tons)			32	32	45	45	63	67	67.1	129	133.5	175	152.5	240
Longitudinal	Factored	Flexure												
		Shear												
	Service	Flexure												
		Principal Stress												
Transverse	Factored	Top Slab Centerline	1.07	1.39	1.80	1.86	1.97	1.48	1.45	1.41	1.42	1.36	1.46	1.41
		Top Slab Thickness Change	1.41	1.82	2.29	2.29	2.40	2.82	2.74	2.25	2.43	2.04	2.93	2.38
		Top Slab Webs & Cantilever	2.60	3.37	4.38	5.24	4.77	3.98	3.36	3.19	3.33	2.83	3.82	3.40

Overall Rating Factor	1.07	1.39	1.80	1.36
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)		44.38	81.01	91.22

* Max number of lanes loaded = 2

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]Truck Data

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)**

Import Brug Data | Delete Load Rating Factors | Calculate Load Rating Factors | Print Load Rating Results | View Single LC Results

CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue**

CHECKED BY: TSP - IC RJE DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

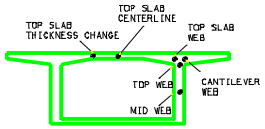
Summary of Rating Factors:

	Combine Trucks?	Truck Description		Operating - Strength I		View Single LC Results	Operating - Strength I						AS required - With Live Load		PRINT	Calculate Rating Factors
	Y or N	Rating Truck ID	Truck Name	Brug File with 2 or more vehicles	Brug File with a single vehicle	Y or N	RF	RF Controlling Location	Top Slab Centerline	Top Slab (Thickness Change Section)	Top Slab Webs	Cantilever at Webs	Top of Web	Middle of Web	Y or N	Y or N
HL93- DESIGN LOADS	N	1	HL93-TRUCK	V_A_HL93_TRUCK_EL.OUT	1V_A_HL93_TRUCK_EL.OUT	Y	1.39	Top Slab Centerline	1.39	1.82	3.89	5.34	0.09	0.05	N	Y
	N	2	HL93-TANDEM	/_A_HL93_TANDEM_EL.OU	1V_A_HL93_TANDEM_EL.OUT	N	1.50	Top Slab Centerline	1.50	2.18	3.37	4.78	0.08	0.05	N	Y
INDOT DESIGN LOADS	N	3	R1	V_A_R1_EL.OUT	1V_A_R1_EL.OUT	N	1.80	Top Slab Centerline	1.80	2.29	4.38	6.07	0.10	0.06	N	Y
	N	4	R2	V_A_R2_EL.OUT	1V_A_R2_EL.OUT	N	1.86	Top Slab Centerline	1.86	2.29	5.24	7.05	0.10	0.06	N	Y
	N	5	R3	V_A_R3_EL.OUT	1V_A_R3_EL.OUT	N	1.97	Top Slab Centerline	1.97	2.40	4.77	6.49	0.10	0.06	N	Y
	N	6	NOT USED	n/a	n/a	N									N	N
	N	7	NOT USED	n/a	n/a	N									N	N
	N	8	NOT USED	n/a	n/a	N									N	N
	N	9	NOT USED	n/a	n/a	N									N	N
	N	10	NOT USED	n/a	n/a	N									N	N
	N	11	NOT USED	n/a	n/a	N									N	N
INDOT DESIGN LOADS	Y	12	R4 + HL93	V_A_R4_EL.OUT	1V_A_R4_EL.OUT	N	1.48	Top Slab Centerline	1.48	2.82	3.98	5.75	0.10	0.06	N	Y
	Y	13	R5 + HL93	V_A_R5_EL.OUT	1V_A_R5_EL.OUT	N	1.45	Top Slab Centerline	1.45	2.74	3.36	5.43	0.11	0.06	N	Y
INDOT PERMIT LOADS	Y	14	S1 + HL93	V_A_S1_EL.OUT	1V_A_S1_EL.OUT	N	1.41	Top Slab Centerline	1.41	2.25	3.19	4.87	0.10	0.06	N	Y
	Y	15	S2 + HL93	V_A_S2_EL.OUT	1V_A_S2_EL.OUT	N	1.42	Top Slab Centerline	1.42	2.43	3.33	5.15	0.10	0.06	N	Y
	Y	16	S3 + HL93	V_A_S3_EL.OUT	1V_A_S3_EL.OUT	N	1.36	Top Slab Centerline	1.36	2.04	2.83	4.47	0.13	0.06	N	Y
	Y	17	S4 + HL93	V_A_S4_EL.OUT	1V_A_S4_EL.OUT	N	1.46	Top Slab Centerline	1.46	2.93	3.82	5.35	0.09	0.05	N	Y
	Y	18	S5 + HL93	V_A_S5_EL.OUT	1V_A_S5_EL.OUT	N	1.41	Top Slab Centerline	1.41	2.38	3.40	4.92	0.09	0.05	N	Y
	N	19	NOT USED	n/a	n/a	N									N	N
	N	20	NOT USED	n/a	n/a	N									N	N
	N	21	NOT USED	n/a	n/a	N									N	N
	N	22	NOT USED	n/a	n/a	N									N	N
	N	23	NOT USED	n/a	n/a	N									N	N
	N	24	NOT USED	n/a	n/a	N									N	N
	N	25	NOT USED	n/a	n/a	N									N	N
	N	26	NOT USED	n/a	n/a	N									N	N

LRFR Load Factors For Segmental Bridges				Multiple Presence Factor	
LOAD CASE	DL	SDL	LL	one lane	two lanes
Operating - Strength I	1.25	1.50	1.35	1.20	1.00

Brug plates with reversed moment sign and reversed LL Max/Min
6

	Multiple Presence Factor	
LOAD CASE	one lane	two lanes
Operating - Strength I	1.00	1.00



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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]Truck Data

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)**

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue**

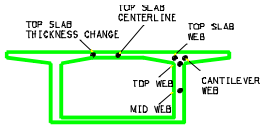
Import Brug Data | Delete Load Rating Factors | Calculate Load Rating Factors | Print Load Rating Results | View Single LC Results

CALCS BY: PT DATE: 1/27/09

CHECKED BY: TSP - IC RJE DATE: Jan 09 - Aug 09

	Combine Trucks?	Truck Description		Inventory - Strength I		PRINT	Operating - Strength I						AS required		PRINT	Calculate Rating Factors
	Y or N	Rating Truck ID	Truck Name	RF	RF Controlling Location	Y or N	RF	RF Controlling Location	Top Slab Centerline	Top Slab (Thickness Change Section)	Top Slab Webs	Cantilever at Webs	Top of Web	Middle of Web	Y or N	Y or N
HS20- DESIGN LOADS	N	1	HL93-TRUCK	V_A_HL93_TRUCK_EL.OUT	1V_A_HL93_TRUCK_EL.OUT	N	1.07	Top Slab Centerline	1.07	1.41	3.00	4.12	0.12	0.06	Y	Y
	N	2	HL93-TANDEM	V_A_HL93_TANDEM_EL.OUT	1V_A_HL93_TANDEM_EL.OUT	Y	1.16	Top Slab Centerline	1.16	1.68	2.60	3.69	0.12	0.05	N	Y

LFR Load Factors For Segmental Bridges - NC DOT				Multiple Presence Factor	
LOAD CASE	DL	SDL	LL	one lane	two lanes
Inventory - Strength I	1.25	1.50	1.75	1.20	1.00



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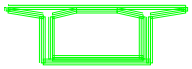
PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)**
DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue**
Area of Steel Requirements

CALCS BY: PT DATE: 1/27/09
CHECKED BY: TSP- IC RJB DATE: Jan 09 - Aug 09



LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

			Middle of Web		Top of Web	
Section	Inventory / Operating	Combined Name	A_b req'd (in^2/ft)	$A_{b\ Dead}$ req'd	A_b req'd (in^2/ft)	$A_{b\ Dead}$ req'd (in^2/ft)
HL-93	Inventory	HL-93 Inventory	0.06	0.04	0.12	0.04
HL-93	Operating	HL-93 Operating	0.05	0.04	0.09	0.04
HL-93-s	Operating	HL-93-s Operating	0.05	0.04	0.09	0.04
R1	Operating	R1 Operating	0.06	0.04	0.10	0.04
R1-s	Operating	R1-s Operating	0.06	0.04	0.10	0.04
R2	Operating	R2 Operating	0.06	0.04	0.10	0.04
R2-s	Operating	R2-s Operating	0.06	0.04	0.10	0.04
R3	Operating	R3 Operating	0.06	0.04	0.10	0.04
R3-s	Operating	R3-s Operating	0.06	0.04	0.10	0.04
R4	Operating	R4 Operating	0.06	0.04	0.10	0.04
R4-s	Operating	R4-s Operating	0.06	0.04	0.10	0.04
R5	Operating	R5 Operating	0.06	0.04	0.11	0.04
R5-s	Operating	R5-s Operating	0.06	0.04	0.11	0.04
S1	Operating	S1 Operating	0.06	0.04	0.10	0.04
S1-s	Operating	S1-s Operating	0.06	0.04	0.10	0.04
S2	Operating	S2 Operating	0.06	0.04	0.10	0.04
S2-s	Operating	S2-s Operating	0.06	0.04	0.10	0.04
S3	Operating	S3 Operating	0.06	0.04	0.13	0.04
S3-s	Operating	S3-s Operating	0.06	0.04	0.13	0.04
S4	Operating	S4 Operating	0.05	0.04	0.09	0.04
S4-s	Operating	S4-s Operating	0.05	0.04	0.09	0.04
S5	Operating	S5 Operating	0.05	0.04	0.09	0.04
S5-s	Operating	S5-s Operating	0.05	0.04	0.09	0.04

5.7.2 General Data AASHTO Lanes

URS

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]General Data

GENERAL DATA:

Concrete Strength, F'c, final conditions: 5500 psi

Width of Section, b: 1.00 ft

Steel Strength, Fsy: 60,000 psi

Rating Action	Description
0	No Action
1	Calculate Area of Steel Required at Top of Webs
2	Calculate Area of Steel Required at Middle of Webs
3	Calculate Rating Factor - Top Slab Centerline
4	Calculate Rating Factor - Top Slab Thickness Change (Between Webs)
5	Calculate Rating Factor - Top Slab at Web
6	Calculate Rating Factor - Top Slab at Cantilever

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

*** Clear Cover, longitudinal bars are below top steel and above bottom steel

Ref: Sheet 104, 102 (Ramp A)

Initialize Spreadsheet

Calculate Mn

SECTION	GTSTRUDL NODE NO.	Rating Action	Calculate Moment Capacity	Depth (ft)	*** Cover - at (in)	dt (in)	Regular Reinforcement (Top) Size of Bar	Regular Reinforcement (Top) No. of Bars	*** Cover - ab (in)	db (in)	Regular Reinforcement (Bot) Size of Bar	Regular Reinforcement (Bot) No. of Bars	fc'= 5500 ϕ Mn ** (Kip-ft) MAX.	MIN.
1 a		0	Y	0.971	1.50	9.90	4	2.40	1.00	10.40	4	1.20	11.09	-20.82
1 b		0	Y	1.178	1.50	12.39	4	3.06	1.00	12.89	4	1.20	13.78	-33.22
1 c		6	Y	1.500	1.50	16.25	4	3.06	1.00	16.75	4	1.20	17.95	-43.85
2 a		5	Y	1.500	1.50	16.25	4	3.06	1.00	16.75	4	1.20	17.95	-43.85
2 b		4	Y	0.750	1.50	7.25	4	1.20	1.00	7.75	4	1.53	10.45	-7.69
2 c		3	Y	0.750	1.50	7.25	4	1.20	1.00	7.75	4	1.53	10.45	-7.69
3 a		6	Y	1.500	1.50	16.25	4	3.06	1.00	16.75	4	1.20	17.95	-43.85
3 b		0	Y	1.178	1.50	12.39	4	3.06	1.00	12.89	4	1.20	13.78	-33.22
3 c		0	Y	0.971	1.50	9.90	4	2.40	1.00	10.40	4	1.20	11.09	-20.82
4 a		0	Y	0.667	1.00	6.75	4	1.20	1.00	6.75	4	1.20	7.15	-7.15
4 b		0	Y	0.667	1.00	6.75	4	1.20	1.00	6.75	4	1.20	7.15	-7.15
4 c		0	Y	0.667	1.00	6.75	4	1.20	1.00	6.75	4	1.20	7.15	-7.15
5 a		1	Y	1.292	1.00	14.19	5	1.20	1.00	14.19	5	1.20	23.42	-23.42
5 b		2	Y	1.292	1.00	14.19	5	1.20	1.00	14.19	5	1.20	23.42	-23.42
5 c		0	Y	1.292	1.00	14.19	5	1.20	1.00	14.19	5	1.20	23.42	-23.42
6 a		1	Y	1.292	1.00	14.19	5	1.20	1.00	14.19	5	1.20	23.42	-23.42
6 b		2	Y	1.292	1.00	14.19	5	1.20	1.00	14.19	5	1.20	23.42	-23.42
6 c		0	Y	1.292	1.00	14.19	5	1.20	1.00	14.19	5	1.20	23.42	-23.42

5.7.3 Load Summary AASHTO Lanes

URS

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]LLMul

Project: Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A) | Design: PT | Date: 1/27/09

Portion: Superstructure - Transverse Analysis - Cline Avenue | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 6 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 or 2 Vehicles)**

SECTION NO.	GTSTRUDL NODE	Truck 1 - HL93-TRUCK Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 1 - HL93-TRUCK Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 2 - HL93-TANDEM Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 2 - HL93-TANDEM Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 3 - R1 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 3 - R1 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 4 - R2 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 4 - R2 Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	0.32	0.00	-0.06	0.00	0.25	0.00	-0.12	0.00	0.12	0.00	-0.05	0.00	0.17	0.00	-0.03
1 b		0.00	1.41	0.00	-0.23	0.00	0.80	0.00	-0.40	0.00	0.49	0.00	-0.15	0.00	0.82	0.00	-0.11
1 c		0.00	-0.10	0.00	-4.88	0.00	-0.18	0.00	-5.71	0.00	-0.07	0.00	-4.11	0.00	0.06	0.00	-3.52
2 a		0.00	-1.87	0.00	-7.50	0.00	-2.38	0.00	-8.65	0.00	-1.05	0.00	-6.66	0.00	-0.72	0.00	-5.57
2 b		0.00	3.57	0.00	-1.68	0.00	2.98	0.00	-1.29	0.00	2.84	0.00	-1.37	0.00	2.84	0.00	-1.29
2 c		0.00	5.02	0.00	0.26	0.00	4.69	0.00	0.38	0.00	3.94	0.00	0.35	0.00	3.77	0.00	0.24
3 a		0.00	-0.10	0.00	-4.88	0.00	-0.18	0.00	-5.71	0.00	-0.07	0.00	-4.11	0.00	0.06	0.00	-3.52
3 b		0.00	1.41	0.00	-0.23	0.00	0.80	0.00	-0.40	0.00	0.49	0.00	-0.15	0.00	0.82	0.00	-0.11
3 c		0.00	0.32	0.00	-0.06	0.00	0.25	0.00	-0.12	0.00	0.12	0.00	-0.05	0.00	0.17	0.00	-0.03
4 a		0.00	0.71	0.00	-0.71	0.00	0.56	0.00	-0.54	0.00	0.87	0.00	-0.87	0.00	0.79	0.00	-0.79
4 b		0.00	0.00	0.00	-0.09	0.00	-0.01	0.00	-0.08	0.00	0.00	0.00	-0.11	0.00	0.00	0.00	-0.09
4 c		0.00	0.71	0.00	-0.71	0.00	0.56	0.00	-0.54	0.00	0.87	0.00	-0.87	0.00	0.79	0.00	-0.79
5 a		0.00	6.16	0.00	-2.18	0.00	6.25	0.00	-1.75	0.00	6.73	0.00	-2.58	0.00	5.71	0.00	-2.33
5 b		0.00	2.59	0.00	-0.76	0.00	2.60	0.00	-0.61	0.00	3.12	0.00	-0.92	0.00	2.58	0.00	-0.83
5 c		0.00	0.65	0.00	-0.63	0.00	0.51	0.00	-0.48	0.00	0.79	0.00	-0.77	0.00	0.72	0.00	-0.70
6 a		0.00	6.16	0.00	-2.18	0.00	6.25	0.00	-1.75	0.00	6.73	0.00	-2.58	0.00	5.70	0.00	-2.33
6 b		0.00	2.59	0.00	-0.76	0.00	2.60	0.00	-0.61	0.00	3.12	0.00	-0.92	0.00	2.58	0.00	-0.83
6 c		0.00	0.65	0.00	-0.63	0.00	0.51	0.00	-0.48	0.00	0.79	0.00	-0.77	0.00	0.72	0.00	-0.70

URS tiple

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL V

Project: Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 6 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 or 2 Vehicles)**

	Truck 5 - R3		Truck 5 - R3		Truck 6 - NOT USED		Truck 6 - NOT USED		Truck 7 - NOT USED		Truck 7 - NOT USED		Truck 8 - NOT USED		Truck 8 - NOT USED	
	Maximum		Minimum		Maximum		Minimum		Maximum		Minimum		Maximum		Minimum	
GTSTRUDL	Positive Moment		Negative Moment		Positive Moment		Negative Moment		Positive Moment		Negative Moment		Positive Moment		Negative Moment	
SECTION NODE NO.	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)
1 a	0.00	0.17	0.00	-0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 b	0.00	0.59	0.00	-0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 c	0.00	-0.12	0.00	-4.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 a	0.00	-1.03	0.00	-6.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 b	0.00	2.71	0.00	-1.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 c	0.00	3.58	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 a	0.00	-0.12	0.00	-4.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 b	0.00	0.59	0.00	-0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 c	0.00	0.18	0.00	-0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 a	0.00	0.80	0.00	-0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 b	0.00	0.00	0.00	-0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 c	0.00	0.80	0.00	-0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 a	0.00	5.61	0.00	-2.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 b	0.00	2.42	0.00	-0.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 c	0.00	0.73	0.00	-0.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 a	0.00	5.61	0.00	-2.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 b	0.00	2.42	0.00	-0.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 c	0.00	0.73	0.00	-0.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project: Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 6 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 or 2 Vehicles)**

	Truck 9 - NOT USED		Truck 9 - NOT USED		Truck 10 - NOT USED		Truck 10 - NOT USED		Truck 11 - NOT USED		Truck 11 - NOT USED		Truck 12 - R4 + HL93		Truck 12 - R4 + HL93	
	Maximum		Minimum		Maximum		Minimum		Maximum		Minimum		Maximum		Minimum	
GTSTRUDL	Positive Moment		Negative Moment		Positive Moment		Negative Moment		Positive Moment		Negative Moment		Positive Moment		Negative Moment	
SECTION NODE NO.	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)
1 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	-0.01
1 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.52	0.00	-0.02
1 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.00	-2.89
2 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.00	-5.34
2 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.77	0.00	-1.44
2 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.27	0.00	0.25
3 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.00	-2.89
3 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.52	0.00	-0.02
3 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	-0.01
4 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.03	0.00	-1.03
4 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.10
4 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.03	0.00	-1.03
5 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.12	0.00	-2.97
5 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.88	0.00	-1.07
5 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.93	0.00	-0.92
6 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.11	0.00	-2.97
6 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.88	0.00	-1.07
6 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.93	0.00	-0.92

Project: Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 6 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 or 2 Vehicles)**

SECTION	GTSTRUDL NODE NO.	Truck 13 - R5 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 13 - R5 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 14 - S1 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 14 - S1 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 15 - S2 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 15 - S2 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 16 - S3 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 16 - S3 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	0.04	0.00	-0.05	0.00	0.22	0.00	-0.08	0.00	0.16	0.00	-0.08	0.00	0.14	0.00	-0.09
1 b		0.00	0.11	0.00	-0.28	0.00	0.75	0.00	-0.27	0.00	0.63	0.00	-0.25	0.00	0.59	0.00	-0.28
1 c		0.00	-0.08	0.00	-4.08	0.00	-0.14	0.00	-5.31	0.00	-0.13	0.00	-4.77	0.00	-0.14	0.00	-5.74
2 a		0.00	-0.44	0.00	-7.18	0.00	-1.52	0.00	-8.09	0.00	-1.24	0.00	-7.46	0.00	-1.44	0.00	-9.21
2 b		0.00	2.85	0.00	-1.60	0.00	3.47	0.00	-1.71	0.00	3.21	0.00	-1.53	0.00	3.83	0.00	-1.84
2 c		0.00	3.66	0.00	0.41	0.00	4.71	0.00	0.39	0.00	4.43	0.00	0.39	0.00	5.37	0.00	0.50
3 a		0.00	-0.08	0.00	-4.08	0.00	-0.14	0.00	-5.31	0.00	-0.13	0.00	-4.77	0.00	-0.14	0.00	-5.74
3 b		0.00	0.11	0.00	-0.28	0.00	0.75	0.00	-0.27	0.00	0.63	0.00	-0.25	0.00	0.59	0.00	-0.28
3 c		0.00	0.04	0.00	-0.05	0.00	0.22	0.00	-0.08	0.00	0.16	0.00	-0.08	0.00	0.14	0.00	-0.09
4 a		0.00	1.10	0.00	-1.10	0.00	0.99	0.00	-0.99	0.00	0.94	0.00	-0.94	0.00	1.18	0.00	-1.18
4 b		0.00	0.00	0.00	-0.12	0.00	-0.01	0.00	-0.11	0.00	-0.01	0.00	-0.11	0.00	-0.01	0.00	-0.14
4 c		0.00	1.10	0.00	-1.10	0.00	0.99	0.00	-0.99	0.00	0.94	0.00	-0.94	0.00	1.18	0.00	-1.18
5 a		0.00	7.51	0.00	-3.21	0.00	7.40	0.00	-2.94	0.00	7.16	0.00	-2.78	0.00	9.18	0.00	-3.49
5 b		0.00	3.54	0.00	-1.16	0.00	3.21	0.00	-1.05	0.00	3.21	0.00	-1.00	0.00	4.24	0.00	-1.26
5 c		0.00	1.00	0.00	-0.98	0.00	0.91	0.00	-0.88	0.00	0.86	0.00	-0.83	0.00	1.07	0.00	-1.05
6 a		0.00	7.51	0.00	-3.21	0.00	7.40	0.00	-2.94	0.00	7.16	0.00	-2.78	0.00	9.18	0.00	-3.49
6 b		0.00	3.54	0.00	-1.16	0.00	3.21	0.00	-1.05	0.00	3.21	0.00	-1.00	0.00	4.24	0.00	-1.26
6 c		0.00	1.00	0.00	-0.98	0.00	0.91	0.00	-0.88	0.00	0.86	0.00	-0.83	0.00	1.07	0.00	-1.05

Project: Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 6 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 or 2 Vehicles)**

SECTION NO.	GTSTRUDL NODE	Truck 17 - S4 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 17 - S4 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 18 - S5 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 18 - S5 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 19 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 19 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 20 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 20 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	0.13	0.00	-0.05	0.00	0.24	0.00	-0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 b		0.00	0.51	0.00	-0.16	0.00	1.01	0.00	-0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 c		0.00	-0.08	0.00	-3.77	0.00	-0.16	0.00	-5.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 a		0.00	-0.84	0.00	-5.94	0.00	-2.24	0.00	-8.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 b		0.00	2.66	0.00	-1.30	0.00	3.28	0.00	-1.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 c		0.00	3.57	0.00	0.30	0.00	4.93	0.00	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 a		0.00	-0.08	0.00	-3.77	0.00	-0.16	0.00	-5.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 b		0.00	0.51	0.00	-0.16	0.00	1.01	0.00	-0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 c		0.00	0.13	0.00	-0.05	0.00	0.24	0.00	-0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 a		0.00	0.82	0.00	-0.82	0.00	0.66	0.00	-0.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 b		0.00	0.00	0.00	-0.09	0.00	0.00	0.00	-0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 c		0.00	0.82	0.00	-0.82	0.00	0.66	0.00	-0.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 a		0.00	5.93	0.00	-2.41	0.00	6.49	0.00	-2.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 b		0.00	2.69	0.00	-0.86	0.00	2.79	0.00	-0.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 c		0.00	0.75	0.00	-0.73	0.00	0.60	0.00	-0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 a		0.00	5.93	0.00	-2.41	0.00	6.49	0.00	-2.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 b		0.00	2.69	0.00	-0.86	0.00	2.79	0.00	-0.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 c		0.00	0.75	0.00	-0.73	0.00	0.60	0.00	-0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

URS

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]LLSing

Project: Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A) | Design: PT | Date: 1/27/09

Portion: Superstructure - Transverse Analysis - Cline Avenue | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 6 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 Vehicle Only)**

SECTION	GTSTRUDL NODE NO.	Truck 1 - HL93-TRUCK Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 1 - HL93-TRUCK Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 2 - HL93-TANDEM Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 2 - HL93-TANDEM Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 3 - R1 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 3 - R1 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 4 - R2 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 4 - R2 Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	0.32	0.00	-0.06	0.00	0.25	0.00	-0.11	0.00	0.12	0.00	-0.04	0.00	0.17	0.00	-0.03
1 b		0.00	1.41	0.00	-0.20	0.00	0.80	0.00	-0.37	0.00	0.49	0.00	-0.14	0.00	0.82	0.00	-0.10
1 c		0.00	-0.10	0.00	-4.26	0.00	-0.18	0.00	-4.71	0.00	-0.07	0.00	-3.75	0.00	0.06	0.00	-3.23
2 a		0.00	-1.87	0.00	-5.95	0.00	-2.38	0.00	-5.94	0.00	-1.05	0.00	-5.47	0.00	-0.72	0.00	-4.61
2 b		0.00	3.57	0.00	-1.68	0.00	2.98	0.00	-1.29	0.00	2.84	0.00	-1.37	0.00	2.84	0.00	-1.29
2 c		0.00	4.27	0.00	0.26	0.00	3.94	0.00	0.38	0.00	3.29	0.00	0.35	0.00	3.19	0.00	0.24
3 a		0.00	-0.10	0.00	-4.26	0.00	-0.18	0.00	-4.71	0.00	-0.07	0.00	-3.75	0.00	0.06	0.00	-3.23
3 b		0.00	1.41	0.00	-0.20	0.00	0.80	0.00	-0.37	0.00	0.49	0.00	-0.14	0.00	0.82	0.00	-0.10
3 c		0.00	0.32	0.00	-0.06	0.00	0.25	0.00	-0.11	0.00	0.12	0.00	-0.04	0.00	0.17	0.00	-0.03
4 a		0.00	0.71	0.00	-0.71	0.00	0.56	0.00	-0.54	0.00	0.87	0.00	-0.87	0.00	0.79	0.00	-0.79
4 b		0.00	0.00	0.00	-0.08	0.00	-0.01	0.00	-0.07	0.00	0.00	0.00	-0.09	0.00	0.00	0.00	-0.08
4 c		0.00	0.71	0.00	-0.71	0.00	0.56	0.00	-0.54	0.00	0.87	0.00	-0.87	0.00	0.79	0.00	-0.79
5 a		0.00	4.45	0.00	-2.18	0.00	4.54	0.00	-1.75	0.00	5.05	0.00	-2.58	0.00	4.23	0.00	-2.33
5 b		0.00	1.98	0.00	-0.76	0.00	1.94	0.00	-0.61	0.00	2.39	0.00	-0.92	0.00	1.98	0.00	-0.83
5 c		0.00	0.65	0.00	-0.63	0.00	0.51	0.00	-0.48	0.00	0.79	0.00	-0.77	0.00	0.72	0.00	-0.70
6 a		0.00	4.45	0.00	-2.18	0.00	4.54	0.00	-1.75	0.00	5.05	0.00	-2.58	0.00	4.23	0.00	-2.33
6 b		0.00	1.98	0.00	-0.76	0.00	1.94	0.00	-0.61	0.00	2.39	0.00	-0.92	0.00	1.98	0.00	-0.83
6 c		0.00	0.65	0.00	-0.63	0.00	0.51	0.00	-0.48	0.00	0.79	0.00	-0.77	0.00	0.72	0.00	-0.70

URS gle

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL V

Project: Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 6 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 Vehicle Only)**

	Truck 5 - R3		Truck 5 - R3		Truck 6 - NOT USED		Truck 6 - NOT USED		Truck 7 - NOT USED		Truck 7 - NOT USED		Truck 8 - NOT USED		Truck 8 - NOT USED	
	Maximum		Minimum		Maximum		Minimum		Maximum		Minimum		Maximum		Minimum	
GTSTRUDL	Positive Moment		Negative Moment		Positive Moment		Negative Moment		Positive Moment		Negative Moment		Positive Moment		Negative Moment	
SECTION NODE NO.	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)
1 a	0.00	0.17	0.00	-0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 b	0.00	0.59	0.00	-0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 c	0.00	-0.12	0.00	-3.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 a	0.00	-1.03	0.00	-4.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 b	0.00	2.71	0.00	-1.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 c	0.00	3.00	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 a	0.00	-0.12	0.00	-3.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 b	0.00	0.59	0.00	-0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 c	0.00	0.18	0.00	-0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 a	0.00	0.80	0.00	-0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 b	0.00	0.00	0.00	-0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 c	0.00	0.80	0.00	-0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 a	0.00	4.15	0.00	-2.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 b	0.00	1.84	0.00	-0.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 c	0.00	0.73	0.00	-0.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 a	0.00	4.15	0.00	-2.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 b	0.00	1.83	0.00	-0.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 c	0.00	0.73	0.00	-0.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project: Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 6 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 Vehicle Only)**

	Truck 9 - NOT USED		Truck 9 - NOT USED		Truck 10 - NOT USED		Truck 10 - NOT USED		Truck 11 - NOT USED		Truck 11 - NOT USED		Truck 12 - R4 + HL93		Truck 12 - R4 + HL93	
	Maximum		Minimum		Maximum		Minimum		Maximum		Minimum		Maximum		Minimum	
GTSTRUDL	Positive Moment		Negative Moment		Positive Moment		Negative Moment		Positive Moment		Negative Moment		Positive Moment		Negative Moment	
SECTION NODE NO.	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)
1 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	-0.01
1 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.52	0.00	-0.01
1 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.00	-2.85
2 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.00	-4.61
2 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.77	0.00	-1.44
2 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.75	0.00	0.25
3 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.00	-2.85
3 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.52	0.00	-0.01
3 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	-0.01
4 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.03	0.00	-1.03
4 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.09
4 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.03	0.00	-1.03
5 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.61	0.00	-2.97
5 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.23	0.00	-1.07
5 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.93	0.00	-0.92
6 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.61	0.00	-2.97
6 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.23	0.00	-1.07
6 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.93	0.00	-0.92

Project: Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 6 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 Vehicle Only)**

SECTION	GTSTRUDL NODE NO.	Truck 13 - R5 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 13 - R5 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 14 - S1 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 14 - S1 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 15 - S2 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 15 - S2 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 16 - S3 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 16 - S3 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	0.04	0.00	-0.04	0.00	0.22	0.00	-0.07	0.00	0.16	0.00	-0.07	0.00	0.14	0.00	-0.08
1 b		0.00	0.11	0.00	-0.18	0.00	0.75	0.00	-0.24	0.00	0.63	0.00	-0.22	0.00	0.59	0.00	-0.25
1 c		0.00	-0.08	0.00	-3.76	0.00	-0.14	0.00	-4.61	0.00	-0.13	0.00	-4.18	0.00	-0.14	0.00	-5.11
2 a		0.00	-0.44	0.00	-5.97	0.00	-1.52	0.00	-6.44	0.00	-1.24	0.00	-6.06	0.00	-1.44	0.00	-7.58
2 b		0.00	2.85	0.00	-1.60	0.00	3.47	0.00	-1.71	0.00	3.21	0.00	-1.53	0.00	3.83	0.00	-1.84
2 c		0.00	3.02	0.00	0.41	0.00	3.95	0.00	0.39	0.00	3.70	0.00	0.39	0.00	4.47	0.00	0.50
3 a		0.00	-0.08	0.00	-3.76	0.00	-0.14	0.00	-4.61	0.00	-0.13	0.00	-4.18	0.00	-0.14	0.00	-5.11
3 b		0.00	0.11	0.00	-0.18	0.00	0.75	0.00	-0.25	0.00	0.63	0.00	-0.22	0.00	0.59	0.00	-0.25
3 c		0.00	0.04	0.00	-0.04	0.00	0.22	0.00	-0.07	0.00	0.16	0.00	-0.07	0.00	0.14	0.00	-0.08
4 a		0.00	1.10	0.00	-1.10	0.00	0.99	0.00	-0.99	0.00	0.94	0.00	-0.94	0.00	1.18	0.00	-1.18
4 b		0.00	0.00	0.00	-0.10	0.00	-0.01	0.00	-0.09	0.00	-0.01	0.00	-0.09	0.00	-0.01	0.00	-0.12
4 c		0.00	1.10	0.00	-1.10	0.00	0.99	0.00	-0.99	0.00	0.94	0.00	-0.94	0.00	1.18	0.00	-1.18
5 a		0.00	5.69	0.00	-3.21	0.00	5.46	0.00	-2.94	0.00	5.32	0.00	-2.78	0.00	6.88	0.00	-3.49
5 b		0.00	2.71	0.00	-1.16	0.00	2.44	0.00	-1.05	0.00	2.44	0.00	-1.00	0.00	3.23	0.00	-1.26
5 c		0.00	1.00	0.00	-0.98	0.00	0.91	0.00	-0.88	0.00	0.86	0.00	-0.83	0.00	1.07	0.00	-1.05
6 a		0.00	5.69	0.00	-3.21	0.00	5.46	0.00	-2.94	0.00	5.32	0.00	-2.78	0.00	6.88	0.00	-3.49
6 b		0.00	2.71	0.00	-1.16	0.00	2.44	0.00	-1.05	0.00	2.44	0.00	-1.00	0.00	3.22	0.00	-1.26
6 c		0.00	1.00	0.00	-0.98	0.00	0.91	0.00	-0.88	0.00	0.86	0.00	-0.83	0.00	1.07	0.00	-1.05

Project: Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 6 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 Vehicle Only)**

SECTION NO.	GTSTRUDL NODE	Truck 17 - S4 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 17 - S4 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 18 - S5 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 18 - S5 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 19 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 19 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 20 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 20 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	0.13	0.00	-0.04	0.00	0.24	0.00	-0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 b		0.00	0.51	0.00	-0.14	0.00	1.01	0.00	-0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 c		0.00	-0.08	0.00	-3.37	0.00	-0.16	0.00	-4.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 a		0.00	-0.84	0.00	-4.93	0.00	-2.24	0.00	-5.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 b		0.00	2.66	0.00	-1.30	0.00	3.28	0.00	-1.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 c		0.00	2.98	0.00	0.30	0.00	4.16	0.00	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 a		0.00	-0.08	0.00	-3.37	0.00	-0.16	0.00	-4.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 b		0.00	0.51	0.00	-0.14	0.00	1.01	0.00	-0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 c		0.00	0.13	0.00	-0.04	0.00	0.24	0.00	-0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 a		0.00	0.82	0.00	-0.82	0.00	0.66	0.00	-0.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 b		0.00	0.00	0.00	-0.08	0.00	0.00	0.00	-0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 c		0.00	0.82	0.00	-0.82	0.00	0.66	0.00	-0.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 a		0.00	4.43	0.00	-2.41	0.00	4.74	0.00	-2.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 b		0.00	2.05	0.00	-0.86	0.00	2.10	0.00	-0.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 c		0.00	0.75	0.00	-0.73	0.00	0.60	0.00	-0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 a		0.00	4.43	0.00	-2.41	0.00	4.74	0.00	-2.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 b		0.00	2.05	0.00	-0.86	0.00	2.10	0.00	-0.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 c		0.00	0.75	0.00	-0.73	0.00	0.60	0.00	-0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

URS

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]DC&PTBrug

SERVICE FORCES

MAXIMUM loads for section(s) 6 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SECTION	GTStrudl NODE NO.	Selfweight F (Kip)	Selfweight M (Kip-ft)	Surcharge (WS) F (Kip)	Surcharge (WS) M (Kip-ft)	Surcharge (Barrier) F (Kip)	Surcharge (Barrier) M (Kip-ft)
1 a		0.00	-0.15	0.00	-0.04	0.00	-0.41
1 b		0.00	-0.71	0.00	-0.13	0.00	-1.10
1 c		0.00	-2.49	0.00	-0.40	0.00	-2.17
2 a		0.00	-2.70	0.00	-0.47	0.00	-0.25
2 b		0.00	0.18	0.00	0.05	0.00	-0.26
2 c		0.00	0.78	0.00	0.17	0.00	-0.26
3 a		0.00	-2.49	0.00	-0.40	0.00	-2.17
3 b		0.00	-0.71	0.00	-0.13	0.00	-1.10
3 c		0.00	-0.15	0.00	-0.04	0.00	-0.41
4 a		0.00	-1.14	0.00	0.00	0.00	0.05
4 b		0.00	1.56	0.00	0.00	0.00	0.05
4 c		0.00	-1.14	0.00	0.00	0.00	0.05
5 a		0.00	0.09	0.00	0.09	0.00	-1.99
5 b		0.00	-0.71	0.00	0.05	0.00	-1.05
5 c		0.00	-1.56	0.00	0.00	0.00	-0.05
6 a		0.00	0.09	0.00	0.09	0.00	-1.99
6 b		0.00	-0.71	0.00	0.05	0.00	-1.05
6 c		0.00	-1.56	0.00	0.00	0.00	-0.05

5.7.4 Operating Rating Evaluations
AASHTO Lanes

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]SummaryRFLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 1 - HL93-TRUCK					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.39	Top Slab Centerline	**1.39**	1.82	3.89	5.34

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 1 - HL93-TRUCK	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.09	0.05

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I

Rating Factors

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 c	0.78	-0.26	0.17	5.02	0.26	5.12	0.31	1	1	10.45	-7.69	1.39	22.78

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 b	0.18	-0.26	0.05	3.57	-1.68	4.28	-2.02	1	1	10.45	-7.69	1.82	2.79

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 a	-2.70	-0.25	-0.47	-1.87	-7.50	-2.24	-7.14	1	2	17.95	-43.85	13.00	3.89

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
1 c	-2.49	-2.17	-0.40	-0.10	-4.88	-0.12	-5.11	1	1	17.95	-43.85	227.65	5.34
3 a	-2.49	-2.17	-0.40	-0.10	-4.88	-0.12	-5.11	1	1	17.95	-43.85	227.66	5.34

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]Strer

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

	two vehicles	One Vehicle	One or two vehicles	One Vehicle
MPF =	1.00	1.20	1.00	1.20

LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
Calculate Area of Steel Required at Top of Webs														
5 a	0.09	-1.90	-2.18	-2.62	1	-6.27	0.09	6.16	5.34	2	5.57	0.08	-2.74	0.041
6 a	0.09	-1.90	-2.18	-2.62	1	-6.27	0.09	6.16	5.34	2	5.58	0.08	-2.74	0.041
Calculate Area of Steel Required at Middle of Webs														
SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
5 b	-0.71	-1.01	-0.76	-0.91	1	-3.63	0.05	2.59	2.38	2	1.10	0.02	-2.39	0.036
6 b	-0.71	-1.01	-0.76	-0.91	1	-3.63	0.05	2.59	2.38	2	1.10	0.02	-2.39	0.036

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]SummaryRFLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 2 - HL93-TANDEM					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.50	Top Slab Centerline	**1.50**	2.18	3.37	4.78

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 2 - HL93-TANDEM	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.08	0.05

URS

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I

Rating Factors

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 2 **Truck 2 - HL93-TANDEM**

Combine trucks? N

					One or two vehicles		One vehicle							
			MPF =		1.00	1.00	1.20	1.20						
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35			Allowable		Rating Factor	
	SECTION	Selfweight	Barrier	WS	LL+I (Max.)	LL+I (Min)	LL+I (Max.)	LL+I (Min)	Controlling # vehicles		Mn** (kip-ft)		RF	RF
		kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	LL+I (Max.)	LL+I (Min)	Max.	Min.	(Max Live Load)	(Min. Live Load)
Top Slab Centerline	2 c	0.78	-0.26	0.17	4.69	0.38	4.73	0.46	1	1	10.45	-7.69	1.50	15.59
Top Slab Thickness Change (Between Webs)	2 b	0.18	-0.26	0.05	2.98	-1.29	3.58	-1.55	1	1	10.45	-7.69	2.18	3.64
Top Slab at Web	2 a	-2.70	-0.25	-0.47	-2.38	-8.65	-2.86	-7.13	1	2	17.95	-43.85	10.21	3.37
Top Slab at Cantilever	1 c	-2.49	-2.17	-0.40	-0.18	-5.71	-0.22	-5.65	1	2	17.95	-43.85	126.47	4.78
	3 a	-2.49	-2.17	-0.40	-0.18	-5.71	-0.22	-5.65	1	2	17.95	-43.85	126.48	4.78

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]Strer

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 2 **Truck 2 - HL93-TANDEM**

Combine trucks? N

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.20				1.00	1.20					
LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	

Calculate Area of Steel Required at Top of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
5 a	0.09	-1.90	-1.75	-2.10	1	-5.58	0.08	6.25	5.45	2	5.70	0.08	-2.74	0.041
6 a	0.09	-1.90	-1.75	-2.10	1	-5.58	0.08	6.25	5.45	2	5.70	0.08	-2.74	0.041

Calculate Area of Steel Required at Middle of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
5 b	-0.71	-1.01	-0.61	-0.73	1	-3.38	0.05	2.60	2.33	2	1.12	0.02	-2.39	0.036
6 b	-0.71	-1.01	-0.61	-0.73	1	-3.38	0.05	2.60	2.33	2	1.12	0.02	-2.39	0.036

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]SummaryRFLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 3 - R1					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.80	Top Slab Centerline	**1.80**	2.29	4.38	6.07

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 3 - R1	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.10	0.06

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I

Rating Factors

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 3 **Truck 3 - R1**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
Top Slab Centerline	2 c	0.78	-0.26	0.17	3.94	0.35	3.95	0.42	1	1	10.45	-7.69	1.80	16.92
Top Slab Thickness Change (Between Webs)	2 b	0.18	-0.26	0.05	2.84	-1.37	3.41	-1.64	1	1	10.45	-7.69	2.29	3.42
Top Slab at Web	2 a	-2.70	-0.25	-0.47	-1.05	-6.66	-1.26	-6.56	1	2	17.95	-43.85	23.15	4.38
Top Slab at Cantilever	1 c	-2.49	-2.17	-0.40	-0.07	-4.11	-0.08	-4.50	1	1	17.95	-43.85	325.22	6.07
	3 a	-2.49	-2.17	-0.40	-0.07	-4.11	-0.08	-4.50	1	1	17.95	-43.85	325.23	6.07

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]Strer

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 3 **Truck 3 - R1**

Combine trucks? N

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.20				1.00	1.20					
	LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 a	0.09	-1.90	-2.58	-3.10	1	-6.92	0.10	6.73	6.06	2	6.34	0.09	-2.74	0.041
	6 a	0.09	-1.90	-2.58	-3.10	1	-6.92	0.10	6.73	6.06	2	6.35	0.09	-2.74	0.041

Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 b	-0.71	-1.01	-0.92	-1.10	1	-3.88	0.06	3.12	2.87	2	1.82	0.03	-2.39	0.036
	6 b	-0.71	-1.01	-0.92	-1.10	1	-3.88	0.06	3.12	2.87	2	1.82	0.03	-2.39	0.036

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]SummaryRFLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 4 - R2					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.86	Top Slab Centerline	**1.86**	2.29	5.24	7.05

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 4 - R2	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.10	0.06

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I

Rating Factors

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 4 **Truck 4 - R2**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
Top Slab Centerline	2 c	0.78	-0.26	0.17	3.77	0.24	3.83	0.29	1	1	10.45	-7.69	1.86	24.68
Top Slab Thickness Change (Between Webs)	2 b	0.18	-0.26	0.05	2.84	-1.29	3.41	-1.55	1	1	10.45	-7.69	2.29	3.64
Top Slab at Web	2 a	-2.70	-0.25	-0.47	-0.72	-5.57	-0.86	-5.53	1	2	17.95	-43.85	33.76	5.24
Top Slab at Cantilever	1 c	-2.49	-2.17	-0.40	0.06	-3.52	0.07	-3.88	1	1	17.95	-43.85	256.41	7.05
	3 a	-2.49	-2.17	-0.40	0.06	-3.52	0.07	-3.88	1	1	17.95	-43.85	256.40	7.05

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]Strer

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 4 **Truck 4 - R2**

Combine trucks? N

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.20				1.00	1.20					
LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	

Calculate Area of Steel Required at Top of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
5 a	0.09	-1.90	-2.33	-2.80	1	-6.52	0.10	5.71	5.08	2	4.97	0.07	-2.74	0.041
6 a	0.09	-1.90	-2.33	-2.80	1	-6.51	0.10	5.70	5.08	2	4.96	0.07	-2.74	0.041

Calculate Area of Steel Required at Middle of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
5 b	-0.71	-1.01	-0.83	-1.00	1	-3.74	0.06	2.58	2.38	2	1.09	0.02	-2.39	0.036
6 b	-0.71	-1.01	-0.83	-1.00	1	-3.74	0.06	2.58	2.38	2	1.09	0.02	-2.39	0.036

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]SummaryRFLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 5 - R3					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.97	Top Slab Centerline	**1.97**	2.40	4.77	6.49

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 5 - R3	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.10	0.06

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 5 **Truck 5 - R3**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
Top Slab Centerline	2 c	0.78	-0.26	0.17	3.58	0.29	3.60	0.35	1	1	10.45	-7.69	1.97	20.42
Top Slab Thickness Change (Between Webs)	2 b	0.18	-0.26	0.05	2.71	-1.36	3.25	-1.63	1	1	10.45	-7.69	2.40	3.45
Top Slab at Web	2 a	-2.70	-0.25	-0.47	-1.03	-6.11	-1.24	-5.92	1	2	17.95	-43.85	23.60	4.77
Top Slab at Cantilever	1 c	-2.49	-2.17	-0.40	-0.12	-4.06	-0.14	-4.21	1	1	17.95	-43.85	189.71	6.49
	3 a	-2.49	-2.17	-0.40	-0.12	-4.06	-0.14	-4.21	1	1	17.95	-43.85	189.72	6.49

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]Strer

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 5 **Truck 5 - R3**

Combine trucks? N

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.20				1.00	1.20					
	LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 a	0.09	-1.90	-2.35	-2.82	1	-6.55	0.10	5.61	4.98	2	4.83	0.07	-2.74	0.041
	6 a	0.09	-1.90	-2.35	-2.82	1	-6.55	0.10	5.61	4.98	2	4.83	0.07	-2.74	0.041

Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 b	-0.71	-1.01	-0.84	-1.01	1	-3.75	0.06	2.42	2.21	2	0.87	0.01	-2.39	0.036
	6 b	-0.71	-1.01	-0.84	-1.01	1	-3.75	0.06	2.42	2.20	2	0.87	0.01	-2.39	0.036

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]SummaryRFLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 12 - R4 + HL93					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.48	Top Slab Centerline	**1.48**	2.82	3.98	5.75

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 12 - R4 + HL93	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.10	0.06

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I

Rating Factors

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 12 **Truck 12 - R4 + HL93**

Combine trucks? Y

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.00	1.00
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 c	0.78	-0.26	0.17	4.79	0.25	2.75	0.25	2	1	10.45	-7.69	1.48	28.43

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 b	0.18	-0.26	0.05	2.77	-1.44	2.77	-1.44	1	1	10.45	-7.69	2.82	3.91

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 a	-2.70	-0.25	-0.47	0.30	-7.32	0.30	-4.61	1	2	17.95	-43.85	55.37	3.98

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
1 c	-2.49	-2.17	-0.40	0.18	-4.75	0.18	-2.85	1	2	17.95	-43.85	102.56	5.75
3 a	-2.49	-2.17	-0.40	0.18	-4.75	0.18	-2.85	1	2	17.95	-43.85	102.56	5.75

Project: Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A) | Design: PT | Date: 1/27/09

Portion: Superstructure - Transverse Analysis - Cline Avenue | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]Strer

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles: LLMultiple

One vehicle with HL93: LLHL93

One or two vehicles: LLSingle

SW, WS, Barrier: DC&PTBrug

Truck ID 12 **Truck 12 - R4 + HL93**

Combine trucks? Y

		two vehicles	One Vehicle		One or two vehicles	One Vehicle
MPF =		1.00	1.00		1.00	1.00
LF =	1.25	1.50	1.35	Minimum Live Load Moment	1.35	Maximum Live Load Moment

Calculate Area of Steel Required at Top of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
													Dead Loads	
5 a	0.09	-1.90	-2.97	-2.97	1	-6.75	0.10	6.32	4.61	2	5.79	0.09	-2.74	0.041
6 a	0.09	-1.90	-2.97	-2.97	1	-6.75	0.10	6.32	4.61	2	5.79	0.09	-2.74	0.041

Calculate Area of Steel Required at Middle of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
5 b	-0.71	-1.01	-1.07	-1.07	1	-3.84	0.06	2.89	2.23	2	1.51	0.02	-2.39	0.036
6 b	-0.71	-1.01	-1.07	-1.07	1	-3.84	0.06	2.89	2.23	2	1.51	0.02	-2.39	0.036

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]SummaryRFLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 13 - R5 + HL93					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.45	Top Slab Centerline	**1.45**	2.74	3.36	5.43

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 13 - R5 + HL93	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.11	0.06

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 13 **Truck 13 - R5 + HL93**

Combine trucks? Y

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.00	1.00
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Allowable Mn** (kip-ft) Max.	Min.	Rating Factor RF (Max Live Load)	RF (Min. Live Load)
2 c	0.78	-0.26	0.17		4.91	0.41	3.02	0.41	2	1	10.45	-7.69	1.45	17.33

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Allowable Mn** (kip-ft) Max.	Min.	Rating Factor RF (Max Live Load)	RF (Min. Live Load)
2 b	0.18	-0.26	0.05		2.85	-1.60	2.85	-1.60	1	1	10.45	-7.69	2.74	3.52

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Allowable Mn** (kip-ft) Max.	Min.	Rating Factor RF (Max Live Load)	RF (Min. Live Load)
2 a	-2.70	-0.25	-0.47		-0.44	-8.68	-0.44	-5.97	1	2	17.95	-43.85	66.29	3.36

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Allowable Mn** (kip-ft) Max.	Min.	Rating Factor RF (Max Live Load)	RF (Min. Live Load)
1 c	-2.49	-2.17	-0.40		-0.08	-5.03	-0.08	-3.76	1	2	17.95	-43.85	341.48	5.43
3 a	-2.49	-2.17	-0.40		-0.08	-5.03	-0.08	-3.76	1	2	17.95	-43.85	341.49	5.43

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]Strer

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 13 **Truck 13 - R5 + HL93**

Combine trucks? y

	two vehicles	One Vehicle	One or two vehicles	One Vehicle
MPF =	1.00	1.00	1.00	1.00

LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
Calculate Area of Steel Required at Top of Webs														
5 a	0.09	-1.90	-3.21	-3.21	1	-7.07	0.11	7.40	5.69	2	7.25	0.11	-2.74	0.041
6 a	0.09	-1.90	-3.21	-3.21	1	-7.07	0.11	7.40	5.69	2	7.25	0.11	-2.74	0.041
Calculate Area of Steel Required at Middle of Webs														
SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
5 b	-0.71	-1.01	-1.16	-1.16	1	-3.96	0.06	3.37	2.71	2	2.16	0.03	-2.39	0.036
6 b	-0.71	-1.01	-1.16	-1.16	1	-3.96	0.06	3.37	2.71	2	2.16	0.03	-2.39	0.036

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]SummaryRFLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 14 - S1 + HL93					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.41	Top Slab Centerline	**1.41**	2.25	3.19	4.87

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 14 - S1 + HL93	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.10	0.06

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I

Rating Factors

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 14 **Truck 14 - S1 + HL93**

Combine trucks? y

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.00	1.00
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
Top Slab Centerline	2 c	0.78	-0.26	0.17	5.03	0.39	3.95	0.39	2	1	10.45	-7.69	1.41	18.22
Top Slab Thickness Change (Between Webs)	2 b	0.18	-0.26	0.05	3.47	-1.71	3.47	-1.71	1	1	10.45	-7.69	2.25	3.29
Top Slab at Web	2 a	-2.70	-0.25	-0.47	-1.52	-9.15	-1.52	-6.44	1	2	17.95	-43.85	19.19	3.19
Top Slab at Cantilever	1 c	-2.49	-2.17	-0.40	-0.14	-5.61	-0.14	-4.61	1	2	17.95	-43.85	195.13	4.87
	3 a	-2.49	-2.17	-0.40	-0.14	-5.61	-0.14	-4.61	1	2	17.95	-43.85	195.14	4.87

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]Strer

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 14 **Truck 14 - S1 + HL93**

Combine trucks? Y

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.00				1.00	1.00					
LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
Calculate Area of Steel Required at Top of Webs														
5 a	0.09	-1.90	-2.94	-2.94	1	-6.71	0.10	7.17	5.46	2	6.94	0.10	-2.74	0.041
6 a	0.09	-1.90	-2.94	-2.94	1	-6.71	0.10	7.17	5.46	2	6.94	0.10	-2.74	0.041
Calculate Area of Steel Required at Middle of Webs														
SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
5 b	-0.71	-1.01	-1.05	-1.05	1	-3.81	0.06	3.10	2.44	2	1.79	0.03	-2.39	0.036
6 b	-0.71	-1.01	-1.05	-1.05	1	-3.81	0.06	3.10	2.44	2	1.79	0.03	-2.39	0.036

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]SummaryRFLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 15 - S2 + HL93					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.42	Top Slab Centerline	**1.42**	2.43	3.33	5.15

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 15 - S2 + HL93	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.10	0.06

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I

Rating Factors

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 15 **Truck 15 - S2 + HL93**

Combine trucks? Y

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.00	1.00
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
Top Slab Centerline	2 c	0.78	-0.26	0.17	5.00	0.39	3.70	0.39	2	1	10.45	-7.69	1.42	18.22
Top Slab Thickness Change (Between Webs)	2 b	0.18	-0.26	0.05	3.21	-1.53	3.21	-1.53	1	1	10.45	-7.69	2.43	3.68
Top Slab at Web	2 a	-2.70	-0.25	-0.47	-1.24	-8.77	-1.24	-6.06	1	2	17.95	-43.85	23.52	3.33
Top Slab at Cantilever	1 c	-2.49	-2.17	-0.40	-0.13	-5.30	-0.13	-4.18	1	2	17.95	-43.85	210.14	5.15
	3 a	-2.49	-2.17	-0.40	-0.13	-5.30	-0.13	-4.18	1	2	17.95	-43.85	210.15	5.15

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]Strer

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 15 **Truck 15 - S2 + HL93**

Combine trucks? y

	two vehicles	One Vehicle	One or two vehicles	One Vehicle
MPF =	1.00	1.00	1.00	1.00

LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
Calculate Area of Steel Required at Top of Webs														
5 a	0.09	-1.90	-2.78	-2.78	1	-6.49	0.10	7.03	5.32	2	6.75	0.10	-2.74	0.041
6 a	0.09	-1.90	-2.78	-2.78	1	-6.49	0.10	7.03	5.32	2	6.75	0.10	-2.74	0.041
Calculate Area of Steel Required at Middle of Webs														
SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
5 b	-0.71	-1.01	-1.00	-1.00	1	-3.74	0.06	3.10	2.44	2	1.79	0.03	-2.39	0.036
6 b	-0.71	-1.01	-1.00	-1.00	1	-3.74	0.06	3.10	2.44	2	1.79	0.03	-2.39	0.036

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]SummaryRFLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 16 - S3 + HL93					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.36	Top Slab Centerline	**1.36**	2.04	2.83	4.47

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 16 - S3 + HL93	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.13	0.06

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I

Rating Factors

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 16 **Truck 16 - S3 + HL93**

Combine trucks? Y

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.00	1.00
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
Top Slab Centerline	2 c	0.78	-0.26	0.17	5.22	0.50	4.47	0.50	2	1	10.45	-7.69	1.36	14.21
Top Slab Thickness Change (Between Webs)	2 b	0.18	-0.26	0.05	3.83	-1.84	3.83	-1.84	1	1	10.45	-7.69	2.04	3.06
Top Slab at Web	2 a	-2.70	-0.25	-0.47	-1.44	-10.29	-1.44	-7.58	1	2	17.95	-43.85	20.26	2.83
Top Slab at Cantilever	1 c	-2.49	-2.17	-0.40	-0.14	-6.11	-0.14	-5.11	1	2	17.95	-43.85	195.13	4.47
	3 a	-2.49	-2.17	-0.40	-0.14	-6.11	-0.14	-5.11	1	2	17.95	-43.85	195.14	4.47

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]Strer

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 16 **Truck 16 - S3 + HL93**

Combine trucks? Y

			two vehicles	One Vehicle				One or two vehicles	One Vehicle						
		MPF =	1.00	1.00				1.00	1.00						
	LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 a	0.09	-1.90	-3.49	-3.49	1	-7.45	0.11	8.59	6.88	2	8.86	0.13	-2.74	0.041
	6 a	0.09	-1.90	-3.49	-3.49	1	-7.45	0.11	8.59	6.88	2	8.86	0.13	-2.74	0.041

Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 b	-0.71	-1.01	-1.26	-1.26	1	-4.10	0.06	3.89	3.23	2	2.86	0.04	-2.39	0.036
	6 b	-0.71	-1.01	-1.26	-1.26	1	-4.10	0.06	3.88	3.22	2	2.84	0.04	-2.39	0.036

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]SummaryRFLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 17 - S4 + HL93					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.46	Top Slab Centerline	**1.46**	2.93	3.82	5.35

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 17 - S4 + HL93	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.09	0.05

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I

Rating Factors

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 17 **Truck 17 - S4 + HL93**

Combine trucks? y

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.00	1.00
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
2 c	0.78	-0.26	0.17		4.86	0.30	2.98	0.30	2	1	10.45	-7.69	1.46	23.69

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
2 b	0.18	-0.26	0.05		2.66	-1.30	2.66	-1.30	1	1	10.45	-7.69	2.93	4.33

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
2 a	-2.70	-0.25	-0.47		-0.84	-7.64	-0.84	-4.93	1	2	17.95	-43.85	34.73	3.82

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
1 c	-2.49	-2.17	-0.40		-0.08	-5.11	-0.08	-3.37	1	2	17.95	-43.85	341.48	5.35
3 a	-2.49	-2.17	-0.40		-0.08	-5.11	-0.08	-3.37	1	2	17.95	-43.85	341.49	5.35

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]Strer

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 17 **Truck 17 - S4 + HL93**

Combine trucks? Y

	two vehicles	One Vehicle	One or two vehicles	One Vehicle
MPF =	1.00	1.00	1.00	1.00

LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
Calculate Area of Steel Required at Top of Webs														
5 a	0.09	-1.90	-2.41	-2.41	1	-5.99	0.09	6.14	4.43	2	5.55	0.08	-2.74	0.041
6 a	0.09	-1.90	-2.41	-2.41	1	-5.99	0.09	6.14	4.43	2	5.55	0.08	-2.74	0.041
Calculate Area of Steel Required at Middle of Webs														
SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
5 b	-0.71	-1.01	-0.86	-0.86	1	-3.56	0.05	2.71	2.05	2	1.26	0.02	-2.39	0.036
6 b	-0.71	-1.01	-0.86	-0.86	1	-3.56	0.05	2.71	2.05	2	1.26	0.02	-2.39	0.036

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]SummaryRFLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 18 - S5 + HL93					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.41	Top Slab Centerline	**1.41**	2.38	3.40	4.92

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 18 - S5 + HL93	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.09	0.05

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I

Rating Factors

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 18 **Truck 18 - S5 + HL93**

Combine trucks? y

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.00	1.00
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
2 c	0.78	-0.26	0.17		5.04	0.36	4.16	0.36	2	1	10.45	-7.69	1.41	19.74

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
2 b	0.18	-0.26	0.05		3.28	-1.35	3.28	-1.35	1	1	10.45	-7.69	2.38	4.17

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
2 a	-2.70	-0.25	-0.47		-2.24	-8.58	-2.24	-5.87	1	2	17.95	-43.85	13.02	3.40

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
1 c	-2.49	-2.17	-0.40		-0.16	-5.55	-0.16	-4.44	1	2	17.95	-43.85	170.74	4.92
3 a	-2.49	-2.17	-0.40		-0.16	-5.55	-0.16	-4.44	1	2	17.95	-43.85	170.74	4.92

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]Strer

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 18 **Truck 18 - S5 + HL93**

Combine trucks? Y

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.00				1.00	1.00					
	LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 a	0.09	-1.90	-2.04	-2.04	1	-5.50	0.08	6.45	4.74	2	5.97	0.09	-2.74	0.041
	6 a	0.09	-1.90	-2.04	-2.04	1	-5.49	0.08	6.45	4.74	2	5.97	0.09	-2.74	0.041
Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 b	-0.71	-1.01	-0.72	-0.72	1	-3.37	0.05	2.76	2.10	2	1.33	0.02	-2.39	0.036
	6 b	-0.71	-1.01	-0.72	-0.72	1	-3.37	0.05	2.76	2.10	2	1.33	0.02	-2.39	0.036

5.7.5 Inventory Rating Evaluations
AASHTO Lanes

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]SummaryRFLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 1 - HL93-TRUCK					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Inventory - Strength I	1.07	Top Slab Centerline	**1.07**	1.41	3.00	4.12

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 1 - HL93-TRUCK	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Inventory - Strength I	0.12	0.06

URS

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Inventory - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.75	1.75	1.75	1.75

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 c	0.78	-0.26	0.17	5.02	0.26	5.12	0.31	1	1	10.45	-7.69	1.07	17.57

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 b	0.18	-0.26	0.05	3.57	-1.68	4.28	-2.02	1	1	10.45	-7.69	1.41	2.15

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 a	-2.70	-0.25	-0.47	-1.87	-7.50	-2.24	-7.14	1	2	17.95	-43.85	10.03	3.00

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
1 c	-2.49	-2.17	-0.40	-0.10	-4.88	-0.12	-5.11	1	1	17.95	-43.85	175.62	4.12
3 a	-2.49	-2.17	-0.40	-0.10	-4.88	-0.12	-5.11	1	1	17.95	-43.85	175.62	4.12

URS

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]Strer

Area of Steel Required at Webs due to Transverse Bending

Inventory - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

	two vehicles	One Vehicle	One or two vehicles	One Vehicle
MPF =	1.00	1.20	1.00	1.20

LF =	1.25	1.50	1.75		Minimum Live Load Moment			1.75		Maximum Live Load Moment			Dead Loads	
SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
Calculate Area of Steel Required at Top of Webs														
5 a	0.09	-1.90	-2.18	-2.62	1	-7.32	0.11	6.16	5.34	2	8.04	0.12	-2.74	0.041
6 a	0.09	-1.90	-2.18	-2.62	1	-7.32	0.11	6.16	5.34	2	8.04	0.12	-2.74	0.041
Calculate Area of Steel Required at Middle of Webs														
SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
5 b	-0.71	-1.01	-0.76	-0.91	1	-3.99	0.06	2.59	2.38	2	2.14	0.03	-2.39	0.036
6 b	-0.71	-1.01	-0.76	-0.91	1	-3.99	0.06	2.59	2.38	2	2.14	0.03	-2.39	0.036

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]SummaryRFLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 2 - HL93-TANDEM					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Inventory - Strength I	1.16	Top Slab Centerline	**1.16**	1.68	2.60	3.69

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 2 - HL93-TANDEM	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Inventory - Strength I	0.12	0.05

URS

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Inventory - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 2 **Truck 2 - HL93-TANDEM**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.75	1.75	1.75	1.75

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
Top Slab Centerline	2 c	0.78	-0.26	0.17	4.69	0.38	4.73	0.46	1	1	10.45	-7.69	1.16	12.02
Top Slab Thickness Change (Between Webs)	2 b	0.18	-0.26	0.05	2.98	-1.29	3.58	-1.55	1	1	10.45	-7.69	1.68	2.81
Top Slab at Web	2 a	-2.70	-0.25	-0.47	-2.38	-8.65	-2.86	-7.13	1	2	17.95	-43.85	7.88	2.60
Top Slab at Cantilever	1 c	-2.49	-2.17	-0.40	-0.18	-5.71	-0.22	-5.65	1	2	17.95	-43.85	97.56	3.69
	3 a	-2.49	-2.17	-0.40	-0.18	-5.71	-0.22	-5.65	1	2	17.95	-43.85	97.57	3.69

URS

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VA.XLS]Strer

Area of Steel Required at Webs due to Transverse Bending

Inventory - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 2 **Truck 2 - HL93-TANDEM**

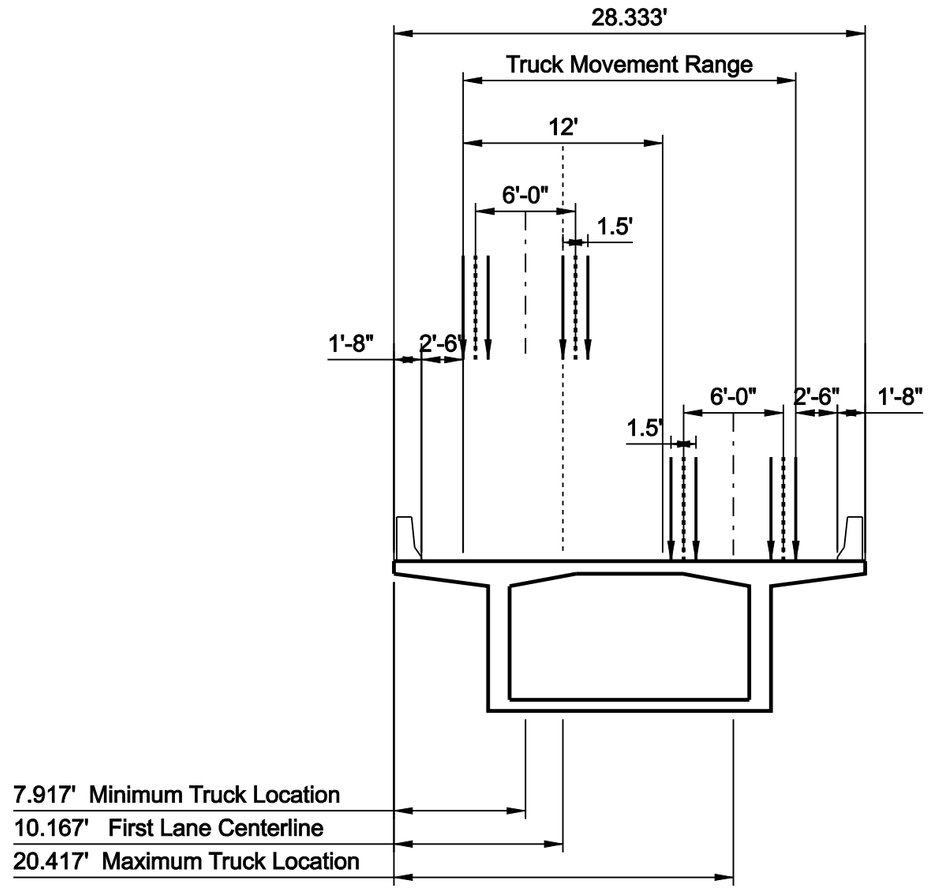
Combine trucks? N

	two vehicles	One Vehicle	One or two vehicles	One Vehicle
MPF =	1.00	1.20	1.00	1.20

LF =	1.25	1.50	1.75		Minimum Live Load Moment			1.75		Maximum Live Load Moment			Dead Loads	
SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
Calculate Area of Steel Required at Top of Webs														
5 a	0.09	-1.90	-1.75	-2.10	1	-6.42	0.10	6.25	5.45	2	8.20	0.12	-2.74	0.041
6 a	0.09	-1.90	-1.75	-2.10	1	-6.42	0.10	6.25	5.45	2	8.20	0.12	-2.74	0.041
Calculate Area of Steel Required at Middle of Webs														
SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
5 b	-0.71	-1.01	-0.61	-0.73	1	-3.68	0.05	2.60	2.33	2	2.16	0.03	-2.39	0.036
6 b	-0.71	-1.01	-0.61	-0.73	1	-3.68	0.05	2.60	2.33	2	2.16	0.03	-2.39	0.036

5.7.6 Striped Lanes Location

TRUCK LOCATION - NO TRAFFIC ON SHOULDERS (ONE LANE ONLY)



Design by: PT 9/09
Independent Check by: RJB 9/09

HALF SIZE PRINT - 11x17

No.	Date	App.	Revisions

Designed by -
Drawn by R.V.A.
Checked by -
DRAWING SCALE

URS Corporation Southern
7650 Corporate Center Drive
Suite 400
Miami, FL 33126-1220
Tel: (305) 262-7466
C.A. No. EB 00000002

TYPICAL SECTION - Transverse Analysis

SECTION VA

DRAWING NO. -
SHEET NO. -

patricia_thweatt 7/02/2009 7:46:12 AM

5.7.6/ 1

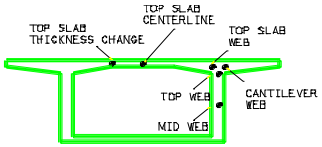
5.7.7 Rating Summary Striped Lanes

URS

PROJECT: Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A) CALCS BY: PT DATE: 08/09

ESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length



Cline Avenue			Inventory	Operating										
			LFR Design Loads	LFR Design Loads	INDOT Legal Loads*			INDOT Permit Loads						
			HL93 or Tandem*	Hl93 or Tandem*	Single Vehicle (SV)			Super Loads						
					R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Gross Vehicle Weight (tons)			32	32	45	45	63	67	67.1	129	133.5	175	152.5	240
Longitudinal	Factored	Flexure												
		Shear												
	Service	Flexure												
		Principal Stress												
Transverse	Factored	Top Slab Centerline	1.07	1.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Top Slab Thickness Change	1.46	1.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Top Slab Webs & Cantilever	3.15	4.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Overall Rating Factor	1.07	1.39	0.00	0.00
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)		44.38	0.00	0.00

* Max number of lanes loaded = 2

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VA EL STRIPED LANES.XLS]Truck Data

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)**

Import Brug Data | Delete Load Rating Factors | Calculate Load Rating Factors | Print Load Rating Results | View Single LC Results

CALCS BY: PT DATE: 08/09

CHECKED BY: IC by RJB DATE: 08/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue**

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

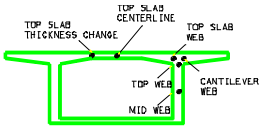
Summary of Rating Factors:

	Combine Trucks?	Truck Description		Operating - Strength I		View Single LC Results	Operating - Strength I						AS required - With Live Load		PRINT	Calculate Rating Factors
	Y or N	Rating Truck ID	Truck Name	Brug File with 2 or more vehicles	Brug File with a single vehicle	Y or N	RF	RF Controlling Location	Top Slab Centerline	Top Slab (Thickness Change Section)	Top Slab Webs	Cantilever at Webs	Top of Web	Middle of Web	Y or N	Y or N
HL93- DESIGN LOADS	N	1	HL93-TRUCK	1V_A_SL_HL93_TRUCK_EL.OUT	1V_A_SL_HL93_TRUCK_EL.OUT	N	1.39	Top Slab Centerline	1.39	1.90	4.09	19.13	0.07	0.03	N	Y
	N	2	HL93-TANDEM	V_A_SL_HL93_TANDEM_EL.OU	1V_A_SL_HL93_TANDEM_EL.OUT	N	1.50	Top Slab Centerline	1.50	2.25	4.09	11.73	0.07	0.03	N	Y
INDOT DESIGN LOADS	N	3	R1	1V_A_SL_R1_EL.OUT	1V_A_SL_R1_EL.OUT	N									N	N
	N	4	R2	1V_A_SL_R2_EL.OUT	1V_A_SL_R2_EL.OUT	N									N	N
	N	5	R3	1V_A_SL_R3_EL.OUT	1V_A_SL_R3_EL.OUT	N									N	N
	N	6	NOT USED	n/a	n/a	N									N	N
	N	7	NOT USED	n/a	n/a	N									N	N
	N	8	NOT USED	n/a	n/a	N									N	N
	N	9	NOT USED	n/a	n/a	N									N	N
	N	10	NOT USED	n/a	n/a	N									N	N
	N	11	NOT USED	n/a	n/a	N									N	N
INDOT DESIGN LOADS	Y	12	R4 + HL93	1V_A_SL_R4_EL.OUT	1V_A_SL_R4_EL.OUT	N									N	N
	Y	13	R5 + HL93	1V_A_SL_R5_EL.OUT	1V_A_SL_R5_EL.OUT	N									N	N
INDOT PERMIT LOADS	Y	14	S1 + HL93	1V_A_SL_S1_EL.OUT	1V_A_SL_S1_EL.OUT	N									N	N
	Y	15	S2 + HL93	1V_A_SL_S2_EL.OUT	1V_A_SL_S2_EL.OUT	N									N	N
	Y	16	S3 + HL93	1V_A_SL_S3_EL.OUT	1V_A_SL_S3_EL.OUT	N									N	N
	Y	17	S4 + HL93	1V_A_SL_S4_EL.OUT	1V_A_SL_S4_EL.OUT	N									N	N
	Y	18	S5 + HL93	1V_A_SL_S5_EL.OUT	1V_A_SL_S5_EL.OUT	N									N	N
	N	19	NOT USED	n/a	n/a	N									N	N
	N	20	NOT USED	n/a	n/a	N									N	N
	N	21	NOT USED	n/a	n/a	N									N	N
	N	22	NOT USED	n/a	n/a	N									N	N
	N	23	NOT USED	n/a	n/a	N									N	N
	N	24	NOT USED	n/a	n/a	N									N	N
	N	25	NOT USED	n/a	n/a	N									N	N
	N	26	NOT USED	n/a	n/a	N									N	N

LRFR Load Factors For Segmental Bridges				Multiple Presence Factor	
LOAD CASE	DL	SDL	LL	one lane	two lanes
Operating - Strength I	1.25	1.50	1.35	1.20	1.00

Brug plates with reversed moment sign and reversed LL Max/Min
6

				Multiple Presence Factor	
LOAD CASE	DL	SDL	LL	one lane	two lanes
Operating - Strength I	1.25	1.50	1.35	1.00	1.00



URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VA EL STRIPED LANES.XLS]Truck Data

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)**

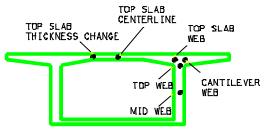
DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue**

Import Brug Data | Delete Load Rating Factors | Calculate Load Rating Factors | Print Load Rating Results | View Single LC Results

CALCS BY: PT DATE: 08/09

CHECKED BY: IC by RJB DATE: 08/09

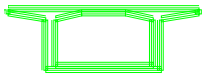
	Combine Trucks?	Truck Description		Inventory - Strength I		PRINT	Operating - Strength I						AS required		PRINT	Calculate Rating Factors	LFR Load Factors For Segmental Bridges - NC DOT				Multiple Presence Factor	
	Y or N	Rating Truck ID	Truck Name	RF	RF Controlling Location	Y or N	RF	RF Controlling Location	Top Slab Centerline	Top Slab (Thickness Change Section)	Top Slab Webs	Cantilever at Webs	Top of Web	Middle of Web	Y or N	Y or N	LOAD CASE	DL	SDL	LL	one lane	two lanes
HS20- DESIGN LOADS	N	1	HL93-TRUCK	1V_A_SL_HL93_TRUCK_EL.OUT	1V_A_SL_HL93_TRUCK_EL.OUT	N	1.07	Top Slab Centerline	1.07	1.46	3.15	14.76	0.10	0.03	Y	Y	Inventory - Strength I	1.25	1.50	1.75	1.20	1.00
	N	2	HL93-TANDEM	V_A_SL_HL93_TANDEM_EL.OU	1V_A_SL_HL93_TANDEM_EL.OUT	Y	1.16	Top Slab Centerline	1.16	1.74	3.16	9.05	0.10	0.03	N	Y						



URS

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)**
DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue**
Area of Steel Requirements

CALCS BY: PT DATE: 08/09
CHECKED BY: IC by RJB DATE: 08/09



LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

			Middle of Web		Top of Web	
Section	Inventory / Operating	Combined Name	A_b req'd (in^2/ft)	$A_{b\ Dead}$ req'd	A_b req'd (in^2/ft)	$A_{b\ Dead}$ req'd (in^2/ft)
HL-93	Inventory	HL-93 Inventory	0.03	0.04	0.10	0.04
HL-93	Operating	HL-93 Operating	0.03	0.04	0.07	0.04
HL-93-s	Operating	HL-93-s Operating	0.03	0.04	0.07	0.04

5.7.8 Load Summary Striped Lanes

URS

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spre

Project Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)

Portion

MAXIMUM loads for section(s) 6 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces st

SERVICE FORCES **Live Load Loading (1 or 2 Vehicles)**

	Truck 1 - HL93-TRUCK		Truck 1 - HL93-TRUCK		Truck 2 - HL93-TANDEM		Truck 2 - HL93-TANDEM	
	Maximum		Minimum		Maximum		Minimum	
GTSTRUDL	Positive Moment		Negative Moment		Positive Moment		Negative Moment	
SECTION NODE	F	M	F	M	F	M	F	M
NO.	(Kip)	(Kip-ft)	(Kip)	(Kip-ft)	(Kip)	(Kip-ft)	(Kip)	(Kip-ft)
1 a	0.00	0.04	0.00	-0.06	0.00	0.03	0.00	-0.11
1 b	0.00	0.58	0.00	-0.20	0.00	0.26	0.00	-0.37
1 c	0.00	-0.10	0.00	-1.19	0.00	-0.72	0.00	-1.94
2 a	0.00	-1.97	0.00	-5.95	0.00	-3.11	0.00	-5.94
2 b	0.00	3.43	0.00	-0.64	0.00	2.89	0.00	-0.50
2 c	0.00	4.27	0.00	0.94	0.00	3.94	0.00	1.02
3 a	0.00	-0.18	0.00	-1.04	0.00	-0.32	0.00	-1.46
3 b	0.00	-0.04	0.00	-0.20	0.00	-0.09	0.00	-0.37
3 c	0.00	-0.01	0.00	-0.06	0.00	-0.03	0.00	-0.11
4 a	0.00	0.62	0.00	-0.35	0.00	0.46	0.00	-0.30
4 b	0.00	-0.03	0.00	-0.08	0.00	-0.03	0.00	-0.07
4 c	0.00	0.17	0.00	-0.67	0.00	0.08	0.00	-0.52
5 a	0.00	4.45	0.00	-0.37	0.00	4.54	0.00	0.24
5 b	0.00	1.98	0.00	0.07	0.00	1.94	0.00	0.24
5 c	0.00	0.62	0.00	-0.19	0.00	0.48	0.00	-0.14
6 a	0.00	4.45	0.00	2.93	0.00	4.54	0.00	2.60
6 b	0.00	1.98	0.00	1.18	0.00	1.94	0.00	1.03
6 c	0.00	0.32	0.00	-0.57	0.00	0.23	0.00	-0.43

URS

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spre

Project Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)

Portion

MAXIMUM loads for section(s) 6 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces st

SERVICE FORCES **Live Load Loading (1 Vehicle Only)**

SECTION	GTSTRUDL NODE NO.	Truck 1 - HL93-TRUCK Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 1 - HL93-TRUCK Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 2 - HL93-TANDEM Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 2 - HL93-TANDEM Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	0.04	0.00	-0.06	0.00	0.03	0.00	-0.11
1 b		0.00	0.58	0.00	-0.20	0.00	0.26	0.00	-0.37
1 c		0.00	-0.10	0.00	-1.19	0.00	-0.72	0.00	-1.94
2 a		0.00	-1.97	0.00	-5.95	0.00	-3.11	0.00	-5.94
2 b		0.00	3.43	0.00	-0.64	0.00	2.89	0.00	-0.50
2 c		0.00	4.27	0.00	0.94	0.00	3.94	0.00	1.02
3 a		0.00	-0.18	0.00	-1.04	0.00	-0.32	0.00	-1.46
3 b		0.00	-0.04	0.00	-0.20	0.00	-0.09	0.00	-0.37
3 c		0.00	-0.01	0.00	-0.06	0.00	-0.03	0.00	-0.11
4 a		0.00	0.62	0.00	-0.35	0.00	0.46	0.00	-0.30
4 b		0.00	-0.03	0.00	-0.08	0.00	-0.03	0.00	-0.07
4 c		0.00	0.17	0.00	-0.67	0.00	0.08	0.00	-0.52
5 a		0.00	4.45	0.00	-0.37	0.00	4.54	0.00	0.24
5 b		0.00	1.98	0.00	0.07	0.00	1.94	0.00	0.24
5 c		0.00	0.62	0.00	-0.19	0.00	0.48	0.00	-0.14
6 a		0.00	4.45	0.00	2.93	0.00	4.54	0.00	2.60
6 b		0.00	1.98	0.00	1.18	0.00	1.94	0.00	1.03
6 c		0.00	0.32	0.00	-0.57	0.00	0.23	0.00	-0.43

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Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	08/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	IC by RJB	Date	08/09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VA EL STRIPED LANES

SERVICE FORCES

MAXIMUM loads for section(s) 6 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SECTION	GTStrudl NODE NO.	Selfweight F (Kip)	Selfweight M (Kip-ft)	Surcharge (WS) F (Kip)	Surcharge (WS) M (Kip-ft)	Surcharge (Barrier) F (Kip)	Surcharge (Barrier) M (Kip-ft)
1 a		0.00	-0.15	0.00	-0.04	0.00	-0.41
1 b		0.00	-0.71	0.00	-0.13	0.00	-1.10
1 c		0.00	-2.49	0.00	-0.40	0.00	-2.17
2 a		0.00	-2.70	0.00	-0.47	0.00	-0.25
2 b		0.00	0.18	0.00	0.05	0.00	-0.26
2 c		0.00	0.78	0.00	0.17	0.00	-0.26
3 a		0.00	-2.49	0.00	-0.40	0.00	-2.17
3 b		0.00	-0.71	0.00	-0.13	0.00	-1.10
3 c		0.00	-0.15	0.00	-0.04	0.00	-0.41
4 a		0.00	-1.14	0.00	0.00	0.00	0.05
4 b		0.00	1.56	0.00	0.00	0.00	0.05
4 c		0.00	-1.14	0.00	0.00	0.00	0.05
5 a		0.00	0.09	0.00	0.09	0.00	-1.99
5 b		0.00	-0.71	0.00	0.05	0.00	-1.05
5 c		0.00	-1.56	0.00	0.00	0.00	-0.05
6 a		0.00	0.09	0.00	0.09	0.00	-1.99
6 b		0.00	-0.71	0.00	0.05	0.00	-1.05
6 c		0.00	-1.56	0.00	0.00	0.00	-0.05

5.7.9 Operating Rating Evaluations
Striped Lanes

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VA EL STRIPED LANES.XLS]Summary

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 1 - HL93-TRUCK					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.39	Top Slab Centerline	**1.39**	1.90	4.09	19.13

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VA EL STRIPED LANES.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 1 - HL93-TRUCK	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.07	0.03

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	08/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	IC by RJB	Date	08/09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VA EL STRIPED LANES.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 c	0.78	-0.26	0.17	4.27	0.94	5.12	1.13	1	1	10.45	-7.69	1.39	6.30

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 b	0.18	-0.26	0.05	3.43	-0.64	4.12	-0.77	1	1	10.45	-7.69	1.90	7.33

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 a	-2.70	-0.25	-0.47	-1.97	-5.95	-2.36	-7.14	1	1	17.95	-43.85	12.34	4.09

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
1 c	-2.49	-2.17	-0.40	-0.10	-1.19	-0.12	-1.43	1	1	17.95	-43.85	227.65	19.13
3 a	-2.49	-2.17	-0.40	-0.18	-1.04	-0.22	-1.25	1	1	17.95	-43.85	126.48	21.89

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	08/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	IC by RJB	Date	08/09

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VA EL STRIPED LANES.XLS]StrengthI(W)L

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

	two vehicles	One Vehicle	One or two vehicles	One Vehicle
MPF =	1.00	1.20	1.00	1.20

LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Load Moment	
SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
Calculate Area of Steel Required at Top of Webs														
5 a	0.09	-1.90	-0.37	-0.44	1	-3.34	0.05	4.45	5.34	1	4.47	0.07	-2.74	0.041
6 a	0.09	-1.90	2.93	3.52	1	2.01	0.03	4.45	5.34	1	4.47	0.07	-2.74	0.041

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
Calculate Area of Steel Required at Middle of Webs														
5 b	-0.71	-1.01	0.07	0.08	1	-2.28	0.03	1.98	2.38	1	0.81	0.01	-2.39	0.036
6 b	-0.71	-1.01	1.18	1.42	1	-0.48	0.01	1.98	2.38	1	0.81	0.01	-2.39	0.036

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VA EL STRIPED LANES.XLS]Summary

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 2 - HL93-TANDEM					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.50	Top Slab Centerline	**1.50**	2.25	4.09	11.73

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VA EL STRIPED LANES.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 2 - HL93-TANDEM	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.07	0.03

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	08/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	IC by RJB	Date	08/09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VA EL STRIPED LANES.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 2 **Truck 2 - HL93-TANDEM**

Combine trucks? N

					One or two vehicles		One vehicle							
			MPF =		1.00	1.00	1.20	1.20						
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35			Allowable		Rating Factor	
	SECTION	Selfweight	Barrier	WS	LL+I (Max.)	LL+I (Min)	LL+I (Max.)	LL+I (Min)	Controlling # vehicles		Mn** (kip-ft)		RF	RF
		kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	LL+I (Max.)	LL+I (Min)	Max.	Min.	(Max Live Load)	(Min. Live Load)
Top Slab Centerline	2 c	0.78	-0.26	0.17	3.94	1.02	4.73	1.22	1	1	10.45	-7.69	1.50	5.81
Top Slab Thickness Change (Between Webs)	2 b	0.18	-0.26	0.05	2.89	-0.50	3.47	-0.60	1	1	10.45	-7.69	2.25	9.38
Top Slab at Web	2 a	-2.70	-0.25	-0.47	-3.11	-5.94	-3.73	-7.13	1	1	17.95	-43.85	7.82	4.09
Top Slab at Cantilever	1 c	-2.49	-2.17	-0.40	-0.72	-1.94	-0.86	-2.33	1	1	17.95	-43.85	31.62	11.73
	3 a	-2.49	-2.17	-0.40	-0.32	-1.46	-0.38	-1.75	1	1	17.95	-43.85	71.14	15.59

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	08/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	IC by RJB	Date	08/09

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VA EL STRIPED LANES.XLS]StrengthI(W)L

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Truck ID 2 **Truck 2 - HL93-TANDEM**

Combine trucks? N

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

			two vehicles	One Vehicle				One or two vehicles	One Vehicle						
		MPF =	1.00	1.20				1.00	1.20						
	LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Load Moment	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 a	0.09	-1.90	0.24	0.29	1	-2.35	0.03	4.54	5.45	1	4.61	0.07	-2.74	0.041
	6 a	0.09	-1.90	2.60	3.12	1	1.47	0.02	4.54	5.45	1	4.61	0.07	-2.74	0.041

Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 b	-0.71	-1.01	0.24	0.29	1	-2.01	0.03	1.94	2.33	1	0.75	0.01	-2.39	0.036
	6 b	-0.71	-1.01	1.03	1.24	1	-0.73	0.01	1.94	2.33	1	0.75	0.01	-2.39	0.036

5.7.10 Inventory Rating Evaluations
Striped Lanes

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VA EL STRIPED LANES.XLS]Summary

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 1 - HL93-TRUCK					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Inventory - Strength I	1.07	Top Slab Centerline	**1.07**	1.46	3.15	14.76

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VA EL STRIPED LANES.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 1 - HL93-TRUCK	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Inventory - Strength I	0.10	0.03

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	08/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	IC by RJB	Date	08/09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VA EL STRIPED LANES.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Inventory - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.75	1.75	1.75	1.75

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 c	0.78	-0.26	0.17	4.27	0.94	5.12	1.13	1	1	10.45	-7.69	1.07	4.86

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 b	0.18	-0.26	0.05	3.43	-0.64	4.12	-0.77	1	1	10.45	-7.69	1.46	5.66

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 a	-2.70	-0.25	-0.47	-1.97	-5.95	-2.36	-7.14	1	1	17.95	-43.85	9.52	3.15

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
1 c	-2.49	-2.17	-0.40	-0.10	-1.19	-0.12	-1.43	1	1	17.95	-43.85	175.62	14.76
3 a	-2.49	-2.17	-0.40	-0.18	-1.04	-0.22	-1.25	1	1	17.95	-43.85	97.57	16.89

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	08/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	IC by RJB	Date	08/09

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VA EL STRIPED LANES.XLS]StrengthI(W)L

Area of Steel Required at Webs due to Transverse Bending

Inventory - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

			two vehicles	One Vehicle				One or two vehicles	One Vehicle						
		MPF =	1.00	1.20				1.00	1.20						
	LF =	1.25	1.50	1.75		Minimum Live Load Moment			1.75		Maximum Live Load Moment			Dead Load Moment	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 a	0.09	-1.90	-0.37	-0.44	1	-3.52	0.05	4.45	5.34	1	6.60	0.10	-2.74	0.041
	6 a	0.09	-1.90	2.93	3.52	1	3.41	0.05	4.45	5.34	1	6.61	0.10	-2.74	0.041

Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 b	-0.71	-1.01	0.07	0.08	1	-2.25	0.03	1.98	2.38	1	1.76	0.03	-2.39	0.036
	6 b	-0.71	-1.01	1.18	1.42	1	0.08	0.00	1.98	2.38	1	1.76	0.03	-2.39	0.036

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VA EL STRIPED LANES.XLS]Summary

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 2 - HL93-TANDEM					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Inventory - Strength I	1.16	Top Slab Centerline	**1.16**	1.74	3.16	9.05

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VA EL STRIPED LANES.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 2 - HL93-TANDEM	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Inventory - Strength I	0.10	0.03

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	08/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	IC by RJB	Date	08/09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VA EL STRIPED LANES.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Inventory - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 2 **Truck 2 - HL93-TANDEM**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.75	1.75	1.75	1.75

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
Top Slab Centerline	2 c	0.78	-0.26	0.17	3.94	1.02	4.73	1.22	1	1	10.45	-7.69	1.16	4.48
Top Slab Thickness Change (Between Webs)	2 b	0.18	-0.26	0.05	2.89	-0.50	3.47	-0.60	1	1	10.45	-7.69	1.74	7.24
Top Slab at Web	2 a	-2.70	-0.25	-0.47	-3.11	-5.94	-3.73	-7.13	1	1	17.95	-43.85	6.03	3.16
Top Slab at Cantilever	1 c	-2.49	-2.17	-0.40	-0.72	-1.94	-0.86	-2.33	1	1	17.95	-43.85	24.39	9.05
	3 a	-2.49	-2.17	-0.40	-0.32	-1.46	-0.38	-1.75	1	1	17.95	-43.85	54.88	12.03

Project	Single Cell - Two Web Box 28.34' Wide (Ramps - Case V-A)	Design	PT	Date	08/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	IC by RJB	Date	08/09

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VA EL STRIPED LANES.XLS]StrengthI(W)L

Area of Steel Required at Webs due to Transverse Bending

Inventory - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Truck ID 2 **Truck 2 - HL93-TANDEM**

Combine trucks? N

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

			two vehicles	One Vehicle				One or two vehicles	One Vehicle						
		MPF =	1.00	1.20				1.00	1.20						
	LF =	1.25	1.50	1.75		Minimum Live Load Moment			1.75		Maximum Live Load Moment			Dead Load Moment	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 a	0.09	-1.90	0.24	0.29	1	-2.24	0.03	4.54	5.45	1	6.79	0.10	-2.74	0.041
	6 a	0.09	-1.90	2.60	3.12	1	2.72	0.04	4.54	5.45	1	6.79	0.10	-2.74	0.041
Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 b	-0.71	-1.01	0.24	0.29	1	-1.89	0.03	1.94	2.33	1	1.68	0.02	-2.39	0.036
	6 b	-0.71	-1.01	1.03	1.24	1	-0.23	0.00	1.94	2.33	1	1.68	0.02	-2.39	0.036

5.8 Section VB

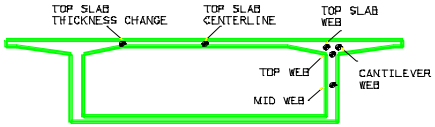
5.8.1 Rating Summary AASHTO Lanes

URS

PROJECT: Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B) CALCS BY: PT DATE: 1/27/09

ESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP- IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length



Cline Avenue			Inventory	Operating											
			LFR Design Loads	LFR Design Loads	INDOT Legal Loads*			INDOT Permit Loads							
			HL93 or Tandem*	Hl93 or Tandem*	Single Vehicle (SV)			Super Loads							
					R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Gross Vehicle Weight (tons)			32	32	45	45	63	67	67.1	129	133.5	175	152.5	240
Longitudinal	Factored	Flexure												
		Shear												
	Service	Flexure												
		Principal Stress												
Transverse	Factored	Top Slab Centerline	0.76	0.99	1.15	1.22	1.38	1.05	1.04	0.99	1.00	0.92	1.08	1.20
		Top Slab Thickness Change	1.11	1.44	1.70	1.64	1.68	1.78	1.97	1.72	1.92	1.61	2.40	1.50
		Top Slab Webs & Cantilever	1.74	2.26	2.79	3.35	3.19	2.81	2.52	2.24	2.38	2.07	2.58	2.32

Overall Rating Factor	0.76	0.99	1.15	0.92
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)		31.63	51.84	61.91

* Max number of lanes loaded = 2

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]Truck Data

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)**

Import Brug Data | Delete Load Rating Factors | Calculate Load Rating Factors | Print Load Rating Results | View Single LC Results

CALCS BY: PT DATE: 1/27/09

CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue**

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

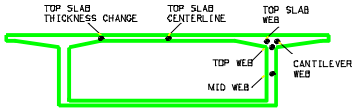
Summary of Rating Factors:

	Combine Trucks?	Truck Description		Operating - Strength I		View Single LC Results	Operating - Strength I						AS required - With Live Load		PRINT	Calculate Rating Factors
	Y or N	Rating Truck ID	Truck Name	Brug File with 2 or more vehicles	Brug File with a single vehicle	Y or N	RF	RF Controlling Location	Top Slab Centerline	Top Slab (Thickness Change Section)	Top Slab Webs	Cantilever at Webs	Top of Web	Middle of Web	Y or N	Y or N
HL93- DESIGN LOADS	N	1	HL93-TRUCK	V_B_HL93_TRUCK_EL.OUT	1V_B_HL93_TRUCK_EL.OUT	Y	0.99	Top Slab Centerline	0.99	1.44	3.04	2.63	0.27	0.09	N	Y
	N	2	HL93-TANDEM	/_B_HL93_TANDEM_EL.OUT	1V_B_HL93_TANDEM_EL.OUT	N	1.07	Top Slab Centerline	1.07	1.89	2.74	2.26	0.28	0.08	N	Y
INDOT DESIGN LOADS	N	3	R1	V_B_R1_EL.OUT	1V_B_R1_EL.OUT	N	1.15	Top Slab Centerline	1.15	1.70	2.79	2.90	0.31	0.11	N	Y
	N	4	R2	V_B_R2_EL.OUT	1V_B_R2_EL.OUT	N	1.22	Top Slab Centerline	1.22	1.64	3.37	3.35	0.26	0.09	N	Y
	N	5	R3	V_B_R3_EL.OUT	1V_B_R3_EL.OUT	N	1.38	Top Slab Centerline	1.38	1.68	3.44	3.19	0.25	0.07	N	Y
	N	6	NOT USED	n/a	n/a	N									N	N
	N	7	NOT USED	n/a	n/a	N									N	N
	N	8	NOT USED	n/a	n/a	N									N	N
	N	9	NOT USED	n/a	n/a	N									N	N
	N	10	NOT USED	n/a	n/a	N									N	N
	N	11	NOT USED	n/a	n/a	N									N	N
INDOT DESIGN LOADS	Y	12	R4 + HL93	V_B_R4_EL.OUT	1V_B_R4_EL.OUT	N	1.05	Top Slab Centerline	1.05	1.78	2.81	2.89	0.29	0.09	N	Y
	Y	13	R5 + HL93	V_B_R5_EL.OUT	1V_B_R5_EL.OUT	N	1.04	Top Slab Centerline	1.04	1.97	2.55	2.52	0.32	0.11	N	Y
INDOT PERMIT LOADS	Y	14	S1 + HL93	V_B_S1_EL.OUT	1V_B_S1_EL.OUT	N	0.99	Top Slab Centerline	0.99	1.72	2.59	2.24	0.30	0.10	N	Y
	Y	15	S2 + HL93	V_B_S2_EL.OUT	1V_B_S2_EL.OUT	N	1.00	Top Slab Centerline	1.00	1.92	2.63	2.38	0.30	0.10	N	Y
	Y	16	S3 + HL93	V_B_S3_EL.OUT	1V_B_S3_EL.OUT	N	0.92	Top Slab Centerline	0.92	1.61	2.41	2.07	0.33	0.12	N	Y
	Y	17	S4 + HL93	V_B_S4_EL.OUT	1V_B_S4_EL.OUT	N	1.08	Top Slab Centerline	1.08	2.40	2.92	2.58	0.27	0.08	N	Y
	Y	18	S5 + HL93	V_B_S5_EL.OUT	1V_B_S5_EL.OUT	N	1.20	Top Slab Centerline	1.20	1.50	3.66	2.32	0.08	0.07	N	Y
	N	19	NOT USED	n/a	n/a	N									N	N
	N	20	NOT USED	n/a	n/a	N									N	N
	N	21	NOT USED	n/a	n/a	N									N	N
	N	22	NOT USED	n/a	n/a	N									N	N
	N	23	NOT USED	n/a	n/a	N									N	N
	N	24	NOT USED	n/a	n/a	N									N	N
	N	25	NOT USED	n/a	n/a	N									N	N
	N	26	NOT USED	n/a	n/a	N									N	N

LRFR Load Factors For Segmental Bridges				Multiple Presence Factor	
LOAD CASE	DL	SDL	LL	one lane	two lanes
Operating - Strength I	1.25	1.50	1.35	1.20	1.00

Multiple Presence Factor	
LOAD CASE	DL	SDL	LL	one lane	two lanes
Operating - Strength I	1.25	1.50	1.35	1.00	1.00

Brug plates with reversed moment sign and reversed LL Max/Min
6



URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]Truck Data

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)**

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue**

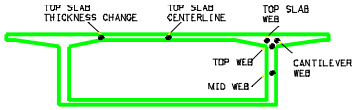
Import Brug Data | Delete Load Rating Factors | Calculate Load Rating Factors | Print Load Rating Results | View Single LC Results

CALCS BY: PT DATE: 1/27/09

CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

	Combine Trucks?	Truck Description		Inventory - Strength I		PRINT	Operating - Strength I						AS required		PRINT	Calculate Rating Factors
	Y or N	Rating Truck ID	Truck Name	RF	RF Controlling Location	Y or N	RF	RF Controlling Location	Top Slab Centerline	Top Slab (Thickness Change Section)	Top Slab Webs	Cantilever at Webs	Top of Web	Middle of Web	Y or N	Y or N
HS20- DESIGN LOADS	N	1	HL93-TRUCK	V_B_HL93_TRUCK_EL.OUT	1V_B_HL93_TRUCK_EL.OUT	N	0.76	Top Slab Centerline	0.76	1.11	2.34	2.03	0.35	0.12	Y	Y
	N	2	HL93-TANDEM	V_B_HL93_TANDEM_EL.OUT	1V_B_HL93_TANDEM_EL.OUT	N	0.83	Top Slab Centerline	0.83	1.46	2.11	1.74	0.36	0.12	N	Y

LFR Load Factors For Segmental Bridges - NC DOT				Multiple Presence Factor	
LOAD CASE	DL	SDL	LL	one lane	two lanes
Inventory - Strength I	1.25	1.50	1.75	1.20	1.00



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PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP- IC RJB DATE: Jan 09 - Aug 09

Area of Steel Requirements

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

			Middle of Web		Top of Web	
Section	Inventory / Operating	Combined Name	A_b req'd (in^2/ft)	$A_{b\ Dead}$ req'd (in^2/ft)	A_b req'd (in^2/ft)	$A_{b\ Dead}$ req'd (in^2/ft)
HL-93	Inventory	HL-93 Inventory	0.12	0.03	0.36	0.02
HL-93	Operating	HL-93 Operating	0.09	0.03	0.28	0.02
HL-93-s	Operating	HL-93-s Operating	0.09	0.03	0.28	0.02
R1	Operating	R1 Operating	0.11	0.03	0.31	0.02
R1-s	Operating	R1-s Operating	0.11	0.03	0.31	0.02
R2	Operating	R2 Operating	0.09	0.03	0.26	0.02
R2-s	Operating	R2-s Operating	0.09	0.03	0.26	0.02
R3	Operating	R3 Operating	0.07	0.03	0.25	0.02
R3-s	Operating	R3-s Operating	0.07	0.03	0.25	0.02
R4	Operating	R4 Operating	0.09	0.03	0.29	0.02
R4-s	Operating	R4-s Operating	0.09	0.03	0.29	0.02
R5	Operating	R5 Operating	0.11	0.03	0.32	0.02
R5-s	Operating	R5-s Operating	0.11	0.03	0.32	0.02
S1	Operating	S1 Operating	0.10	0.03	0.30	0.02
S1-s	Operating	S1-s Operating	0.10	0.03	0.30	0.02
S2	Operating	S2 Operating	0.10	0.03	0.30	0.02
S2-s	Operating	S2-s Operating	0.10	0.03	0.30	0.02
S3	Operating	S3 Operating	0.12	0.03	0.33	0.02
S3-s	Operating	S3-s Operating	0.12	0.03	0.33	0.02
S4	Operating	S4 Operating	0.08	0.03	0.27	0.02
S4-s	Operating	S4-s Operating	0.08	0.03	0.27	0.02
S5	Operating	S5 Operating	0.07	0.03	0.08	0.02
S5-s	Operating	S5-s Operating	0.07	0.03	0.08	0.02

5.8.2 General Data AASHTO Lanes

URS

Project	Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]General Data

GENERAL DATA:

Concrete Strength, F'c, final conditions: 5500 psi

Width of Section, b: 1.00 ft

Steel Strength, Fsy: 60,000 psi

Rating Action	Description
0	No Action
1	Calculate Area of Steel Required at Top of Webs
2	Calculate Area of Steel Required at Middle of Webs
3	Calculate Rating Factor - Top Slab Centerline
4	Calculate Rating Factor - Top Slab Thickness Change (Between Webs)
5	Calculate Rating Factor - Top Slab at Web
6	Calculate Rating Factor - Top Slab at Cantilever

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

*** Clear Cover, longitudinal bars are below top steel and above bottom steel

Ref: Sheet 105, 106, 109 (Ramp A)

Initialize Spreadsheet

Calculate Mn

SECTION	GTSTRUDL NODE NO.	Rating Action	Calculate Moment Capacity	Depth (ft)	*** Cover - at (in)	dt (in)	Regular Reinforcement (Top) Size of Bar	Regular Reinforcement (Top) No. of Bars	*** Cover - ab (in)	db (in)	Regular Reinforcement (Bot) Size of Bar	Regular Reinforcement (Bot) No. of Bars	fc'= 5500 ϕ Mn ** (Kip-ft) MAX.	MIN.
1 a		0	Y	0.750	1.50	7.25	4	2.40	1.00	7.75	4	1.20	8.23	-15.11
1 b		0	Y	1.125	1.50	11.75	4	2.40	1.00	12.25	4	1.20	13.09	-24.83
1 c		6	Y	1.500	1.50	16.25	4	2.40	1.00	16.75	4	1.20	17.95	-34.55
2 a		5	Y	1.500	1.50	16.25	4	5.04	1.00	16.75	4	1.20	17.95	-71.26
2 b		4	Y	0.750	1.50	7.25	4	5.04	1.00	7.75	4	1.20	8.23	-30.44
2 c		3	Y	0.750	1.50	7.25	4	1.20	1.00	7.75	4	3.06	20.44	-7.69
3 a		6	Y	1.500	1.50	16.25	4	2.40	1.00	16.75	4	1.20	17.95	-34.55
3 b		0	Y	1.125	1.50	11.75	4	2.40	1.00	12.25	4	1.20	13.09	-24.83
3 c		0	Y	0.750	1.50	7.25	4	2.40	1.00	7.75	4	1.20	8.23	-15.11
4 a		0	Y	0.667	1.00	6.75	4	1.20	1.00	6.75	4	1.20	7.15	-7.15
4 b		0	Y	0.667	1.00	6.75	4	1.20	1.00	6.75	4	1.20	7.15	-7.15
4 c		0	Y	0.667	1.00	6.75	4	1.20	1.00	6.75	4	1.20	7.15	-7.15
5 a		1	Y	1.292	1.00	14.19	5	1.20	1.00	14.19	5	1.20	23.42	-23.42
5 b		2	Y	1.292	1.00	14.19	5	1.20	1.00	14.19	5	1.20	23.42	-23.42
5 c		0	Y	1.292	1.00	14.19	5	1.20	1.00	14.19	5	1.20	23.42	-23.42
6 a		1	Y	1.292	1.00	14.19	5	1.20	1.00	14.19	5	1.20	23.42	-23.42
6 b		2	Y	1.292	1.00	14.19	5	1.20	1.00	14.19	5	1.20	23.42	-23.42
6 c		0	Y	1.292	1.00	14.19	5	1.20	1.00	14.19	5	1.20	23.42	-23.42

5.8.3 Load Summary AASHTO Lanes

URS

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]LLMult

Project: Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B) | Design: PT | Date: 1/27/09

Portion: Superstructure - Transverse Analysis - Cline Avenue | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 6 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 or 2 Vehicles)**

	Truck 1 - HL93-TRUCK		Truck 1 - HL93-TRUCK		Truck 2 - HL93-TANDEM		Truck 2 - HL93-TANDEM		Truck 3 - R1		Truck 3 - R1		Truck 4 - R2		Truck 4 - R2	
	Maximum		Minimum		Maximum		Minimum		Maximum		Minimum		Maximum		Minimum	
GTSTRUDL	Positive Moment		Negative Moment		Positive Moment		Negative Moment		Positive Moment		Negative Moment		Positive Moment		Negative Moment	
SECTION NODE NO.	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)
1 a	0.00	0.27	0.00	-0.04	0.00	0.21	0.00	-0.08	0.00	0.12	0.00	-0.05	0.00	0.16	0.00	-0.04
1 b	0.00	1.56	0.00	-0.37	0.00	0.95	0.00	-0.66	0.00	0.63	0.00	-0.43	0.00	0.99	0.00	-0.22
1 c	0.00	0.04	0.00	-7.25	0.00	0.01	0.00	-8.43	0.00	0.05	0.00	-6.38	0.00	0.05	0.00	-5.40
2 a	0.00	-0.27	0.00	-14.79	0.00	-1.71	0.00	-16.39	0.00	0.24	0.00	-16.12	0.00	0.70	0.00	-13.33
2 b	0.00	4.51	0.00	-5.60	0.00	3.45	0.00	-5.61	0.00	3.84	0.00	-6.52	0.00	3.96	0.00	-5.60
2 c	0.00	12.05	0.00	0.01	0.00	11.12	0.00	0.02	0.00	10.34	0.00	0.04	0.00	9.73	0.00	0.03
3 a	0.00	0.04	0.00	-7.25	0.00	0.01	0.00	-8.43	0.00	0.05	0.00	-6.38	0.00	0.05	0.00	-5.40
3 b	0.00	1.55	0.00	-0.37	0.00	0.95	0.00	-0.66	0.00	0.63	0.00	-0.43	0.00	0.97	0.00	-0.22
3 c	0.00	0.27	0.00	-0.04	0.00	0.21	0.00	-0.08	0.00	0.12	0.00	-0.05	0.00	0.16	0.00	-0.04
4 a	0.00	1.40	0.00	-1.56	0.00	0.95	0.00	-1.14	0.00	1.71	0.00	-1.91	0.00	1.64	0.00	-1.79
4 b	0.00	0.01	0.00	-0.13	0.00	0.00	0.00	-0.10	0.00	0.01	0.00	-0.16	0.00	0.01	0.00	-0.14
4 c	0.00	1.40	0.00	-1.56	0.00	0.95	0.00	-1.14	0.00	1.71	0.00	-1.91	0.00	1.64	0.00	-1.79
5 a	0.00	12.53	0.00	-3.97	0.00	12.82	0.00	-3.50	0.00	14.59	0.00	-4.71	0.00	12.13	0.00	-4.19
5 b	0.00	5.90	0.00	-1.45	0.00	5.70	0.00	-1.27	0.00	7.18	0.00	-1.76	0.00	5.90	0.00	-1.55
5 c	0.00	1.52	0.00	-1.18	0.00	1.11	0.00	-0.84	0.00	1.87	0.00	-1.44	0.00	1.75	0.00	-1.38
6 a	0.00	12.53	0.00	-3.97	0.00	12.82	0.00	-3.50	0.00	14.59	0.00	-4.71	0.00	12.13	0.00	-4.19
6 b	0.00	5.90	0.00	-1.45	0.00	5.70	0.00	-1.26	0.00	7.18	0.00	-1.76	0.00	5.90	0.00	-1.55
6 c	0.00	1.52	0.00	-1.18	0.00	1.11	0.00	-0.84	0.00	1.87	0.00	-1.44	0.00	1.75	0.00	-1.38

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FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL V

Project: Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 6 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 or 2 Vehicles)**

	Truck 5 - R3		Truck 5 - R3		Truck 6 - NOT USED		Truck 6 - NOT USED		Truck 7 - NOT USED		Truck 7 - NOT USED		Truck 8 - NOT USED		Truck 8 - NOT USED	
	Maximum		Minimum		Maximum		Minimum		Maximum		Minimum		Maximum		Minimum	
GTSTRUDL	Positive Moment		Negative Moment		Positive Moment		Negative Moment		Positive Moment		Negative Moment		Positive Moment		Negative Moment	
SECTION NODE NO.	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)
1 a	0.00	0.14	0.00	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 b	0.00	0.67	0.00	-0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 c	0.00	0.04	0.00	-5.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 a	0.00	0.56	0.00	-13.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 b	0.00	3.87	0.00	-5.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 c	0.00	8.61	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 a	0.00	0.04	0.00	-5.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 b	0.00	0.66	0.00	-0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 c	0.00	0.14	0.00	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 a	0.00	1.84	0.00	-1.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 b	0.00	0.01	0.00	-0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 c	0.00	1.84	0.00	-1.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 a	0.00	11.29	0.00	-4.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 b	0.00	5.21	0.00	-1.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 c	0.00	1.89	0.00	-1.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 a	0.00	11.29	0.00	-4.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 b	0.00	5.21	0.00	-1.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 c	0.00	1.89	0.00	-1.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project: Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 6 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 or 2 Vehicles)**

	Truck 9 - NOT USED		Truck 9 - NOT USED		Truck 10 - NOT USED		Truck 10 - NOT USED		Truck 11 - NOT USED		Truck 11 - NOT USED		Truck 12 - R4 + HL93		Truck 12 - R4 + HL93	
	Maximum		Minimum		Maximum		Minimum		Maximum		Minimum		Maximum		Minimum	
GTSTRUDL	Positive Moment		Negative Moment		Positive Moment		Negative Moment		Positive Moment		Negative Moment		Positive Moment		Negative Moment	
SECTION NODE NO.	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)
1 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	-0.03
1 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.72	0.00	-0.04
1 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	-4.49
2 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.01	0.00	-13.60
2 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.39	0.00	-6.61
2 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.02	0.00	0.03
3 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	-4.49
3 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.72	0.00	-0.04
3 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	-0.03
4 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.31	0.00	-2.46
4 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	-0.17
4 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.31	0.00	-2.46
5 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.36	0.00	-5.26
5 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.64	0.00	-1.93
5 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.39	0.00	-1.95
6 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.36	0.00	-5.26
6 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.64	0.00	-1.93
6 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.39	0.00	-1.94

Project: Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 6 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 or 2 Vehicles)**

SECTION	GTSTRUDL NODE NO.	Truck 13 - R5 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 13 - R5 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 14 - S1 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 14 - S1 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 15 - S2 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 15 - S2 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 16 - S3 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 16 - S3 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	0.02	0.00	-0.04	0.00	0.20	0.00	-0.05	0.00	0.16	0.00	-0.06	0.00	0.18	0.00	-0.09
1 b		0.00	0.03	0.00	-0.98	0.00	0.99	0.00	-0.41	0.00	0.80	0.00	-0.46	0.00	0.83	0.00	-0.64
1 c		0.00	0.07	0.00	-6.30	0.00	0.05	0.00	-7.87	0.00	0.04	0.00	-7.32	0.00	0.04	0.00	-8.85
2 a		0.00	0.95	0.00	-17.41	0.00	-0.11	0.00	-17.12	0.00	-0.12	0.00	-16.80	0.00	-0.06	0.00	-20.63
2 b		0.00	3.96	0.00	-7.85	0.00	4.54	0.00	-6.98	0.00	4.06	0.00	-6.73	0.00	4.84	0.00	-8.35
2 c		0.00	9.28	0.00	0.04	0.00	11.75	0.00	0.02	0.00	11.19	0.00	0.03	0.00	13.35	0.00	0.05
3 a		0.00	0.07	0.00	-6.30	0.00	0.05	0.00	-7.87	0.00	0.04	0.00	-7.32	0.00	0.04	0.00	-8.85
3 b		0.00	0.02	0.00	-0.98	0.00	0.97	0.00	-0.41	0.00	0.80	0.00	-0.46	0.00	0.83	0.00	-0.64
3 c		0.00	0.02	0.00	-0.04	0.00	0.20	0.00	-0.05	0.00	0.16	0.00	-0.06	0.00	0.17	0.00	-0.09
4 a		0.00	2.36	0.00	-2.56	0.00	1.84	0.00	-2.02	0.00	1.66	0.00	-1.86	0.00	2.06	0.00	-2.32
4 b		0.00	0.01	0.00	-0.19	0.00	0.01	0.00	-0.16	0.00	0.01	0.00	-0.15	0.00	0.01	0.00	-0.17
4 c		0.00	2.36	0.00	-2.56	0.00	1.84	0.00	-2.02	0.00	1.66	0.00	-1.86	0.00	2.06	0.00	-2.32
5 a		0.00	16.29	0.00	-5.89	0.00	14.77	0.00	-5.03	0.00	14.50	0.00	-4.71	0.00	17.70	0.00	-5.79
5 b		0.00	7.98	0.00	-2.16	0.00	7.01	0.00	-1.81	0.00	6.98	0.00	-1.73	0.00	8.49	0.00	-2.13
5 c		0.00	2.49	0.00	-2.00	0.00	1.97	0.00	-1.56	0.00	1.81	0.00	-1.42	0.00	2.24	0.00	-1.78
6 a		0.00	16.29	0.00	-5.89	0.00	14.77	0.00	-5.03	0.00	14.51	0.00	-4.71	0.00	17.70	0.00	-5.79
6 b		0.00	7.98	0.00	-2.16	0.00	7.01	0.00	-1.81	0.00	6.98	0.00	-1.73	0.00	8.49	0.00	-2.13
6 c		0.00	2.49	0.00	-2.00	0.00	1.97	0.00	-1.56	0.00	1.81	0.00	-1.42	0.00	2.24	0.00	-1.78

Project: Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 6 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 or 2 Vehicles)**

	Truck 17 - S4 + HL93		Truck 17 - S4 + HL93		Truck 18 - S5 + HL93		Truck 18 - S5 + HL93		Truck 19 - NOT USED		Truck 19 - NOT USED		Truck 20 - NOT USED		Truck 20 - NOT USED	
	Maximum		Minimum		Maximum		Minimum		Maximum		Minimum		Maximum		Minimum	
GTSTRUDL	Positive Moment		Negative Moment		Positive Moment		Negative Moment		Positive Moment		Negative Moment		Positive Moment		Negative Moment	
SECTION NODE NO.	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)
1 a	0.00	0.13	0.00	-0.04	0.00	0.30	0.00	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 b	0.00	0.64	0.00	-0.30	0.00	1.50	0.00	-0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 c	0.00	0.03	0.00	-5.51	0.00	-0.03	0.00	-4.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 a	0.00	0.05	0.00	-12.30	0.00	1.67	0.00	-6.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 b	0.00	3.25	0.00	-5.10	0.00	2.56	0.00	-0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 c	0.00	8.24	0.00	0.02	0.00	5.12	0.00	-0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 a	0.00	0.03	0.00	-5.51	0.00	-0.03	0.00	-4.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 b	0.00	0.64	0.00	-0.30	0.00	1.50	0.00	-0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 c	0.00	0.13	0.00	-0.04	0.00	0.30	0.00	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 a	0.00	1.38	0.00	-1.52	0.00	0.65	0.00	-0.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 b	0.00	0.01	0.00	-0.11	0.00	0.05	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 c	0.00	1.38	0.00	-1.52	0.00	0.65	0.00	-0.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 a	0.00	10.67	0.00	-3.69	0.00	1.33	0.00	-2.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 b	0.00	5.06	0.00	-1.33	0.00	0.40	0.00	-1.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 c	0.00	1.48	0.00	-1.18	0.00	0.51	0.00	-0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 a	0.00	10.67	0.00	-3.69	0.00	1.33	0.00	-2.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 b	0.00	5.06	0.00	-1.33	0.00	0.40	0.00	-1.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 c	0.00	1.48	0.00	-1.18	0.00	0.51	0.00	-0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

URS

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]LLSing

Project: Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B) | Design: PT | Date: 1/27/09

Portion: Superstructure - Transverse Analysis - Cline Avenue | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 6 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 Vehicle Only)**

SECTION NO.	GTSTRUDL NODE	Truck 1 - HL93-TRUCK Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 1 - HL93-TRUCK Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 2 - HL93-TANDEM Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 2 - HL93-TANDEM Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 3 - R1 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 3 - R1 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 4 - R2 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 4 - R2 Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	0.27	0.00	-0.03	0.00	0.21	0.00	-0.05	0.00	0.12	0.00	-0.03	0.00	0.16	0.00	-0.02
1 b		0.00	1.55	0.00	0.01	0.00	0.95	0.00	0.01	0.00	0.62	0.00	-0.20	0.00	0.97	0.00	0.01
1 c		0.00	0.04	0.00	-5.97	0.00	0.01	0.00	-6.43	0.00	0.05	0.00	-5.48	0.00	0.05	0.00	-4.73
2 a		0.00	-0.27	0.00	-9.00	0.00	-1.71	0.00	-10.32	0.00	0.24	0.00	-9.49	0.00	0.70	0.00	-7.66
2 b		0.00	4.51	0.00	-3.91	0.00	3.45	0.00	-4.18	0.00	3.84	0.00	-4.38	0.00	3.96	0.00	-3.66
2 c		0.00	8.77	0.00	0.01	0.00	8.11	0.00	0.02	0.00	7.41	0.00	0.04	0.00	7.01	0.00	0.03
3 a		0.00	0.04	0.00	-5.97	0.00	0.01	0.00	-6.43	0.00	0.05	0.00	-5.48	0.00	0.05	0.00	-4.73
3 b		0.00	1.55	0.00	0.01	0.00	0.95	0.00	0.01	0.00	0.62	0.00	-0.20	0.00	0.97	0.00	0.01
3 c		0.00	0.27	0.00	-0.03	0.00	0.21	0.00	-0.05	0.00	0.12	0.00	-0.03	0.00	0.16	0.00	-0.02
4 a		0.00	1.05	0.00	-1.03	0.00	0.78	0.00	-0.73	0.00	1.27	0.00	-1.26	0.00	1.19	0.00	-1.19
4 b		0.00	0.01	0.00	-0.07	0.00	0.00	0.00	-0.06	0.00	0.01	0.00	-0.09	0.00	0.01	0.00	-0.08
4 c		0.00	1.05	0.00	-1.03	0.00	0.78	0.00	-0.73	0.00	1.27	0.00	-1.26	0.00	1.19	0.00	-1.19
5 a		0.00	7.36	0.00	-3.97	0.00	7.76	0.00	-3.50	0.00	8.54	0.00	-4.71	0.00	6.93	0.00	-4.19
5 b		0.00	3.56	0.00	-1.45	0.00	3.50	0.00	-1.27	0.00	4.34	0.00	-1.76	0.00	3.55	0.00	-1.55
5 c		0.00	1.00	0.00	-0.89	0.00	0.72	0.00	-0.64	0.00	1.23	0.00	-1.09	0.00	1.15	0.00	-1.03
6 a		0.00	7.36	0.00	-3.97	0.00	7.76	0.00	-3.50	0.00	8.54	0.00	-4.71	0.00	6.93	0.00	-4.19
6 b		0.00	3.56	0.00	-1.45	0.00	3.50	0.00	-1.26	0.00	4.34	0.00	-1.76	0.00	3.55	0.00	-1.55
6 c		0.00	1.00	0.00	-0.89	0.00	0.72	0.00	-0.64	0.00	1.23	0.00	-1.09	0.00	1.15	0.00	-1.03

Project: Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 6 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 Vehicle Only)**

SECTION NO.	GTSTRUDL NODE	Truck 5 - R3 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 5 - R3 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 6 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 6 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 7 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 7 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 8 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 8 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	0.14	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 b		0.00	0.66	0.00	-0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 c		0.00	0.04	0.00	-4.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 a		0.00	0.56	0.00	-7.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 b		0.00	3.87	0.00	-3.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 c		0.00	6.24	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 a		0.00	0.04	0.00	-4.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 b		0.00	0.66	0.00	-0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 c		0.00	0.14	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 a		0.00	1.32	0.00	-1.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 b		0.00	0.01	0.00	-0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 c		0.00	1.32	0.00	-1.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 a		0.00	6.32	0.00	-4.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 b		0.00	3.09	0.00	-1.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 c		0.00	1.25	0.00	-1.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 a		0.00	6.32	0.00	-4.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 b		0.00	3.09	0.00	-1.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 c		0.00	1.25	0.00	-1.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project: Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 6 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 Vehicle Only)**

	Truck 9 - NOT USED		Truck 9 - NOT USED		Truck 10 - NOT USED		Truck 10 - NOT USED		Truck 11 - NOT USED		Truck 11 - NOT USED		Truck 12 - R4 + HL93		Truck 12 - R4 + HL93	
	Maximum		Minimum		Maximum		Minimum		Maximum		Minimum		Maximum		Minimum	
GTSTRUDL	Positive Moment		Negative Moment		Positive Moment		Negative Moment		Positive Moment		Negative Moment		Positive Moment		Negative Moment	
SECTION NODE NO.	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)
1 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	-0.03
1 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.00	0.00
1 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	-4.33
2 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.01	0.00	-7.93
2 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.39	0.00	-3.96
2 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.44	0.00	0.03
3 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	-4.33
3 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.00	0.00
3 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	-0.03
4 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.63	0.00	-1.66
4 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	-0.10
4 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.63	0.00	-1.66
5 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.74	0.00	-5.26
5 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.93	0.00	-1.93
5 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.58	0.00	-1.43
6 a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.74	0.00	-5.26
6 b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.93	0.00	-1.93
6 c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.58	0.00	-1.43

Project: Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 6 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 Vehicle Only)**

SECTION	GTSTRUDL NODE NO.	Truck 13 - R5 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 13 - R5 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 14 - S1 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 14 - S1 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 15 - S2 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 15 - S2 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 16 - S3 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 16 - S3 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	0.02	0.00	-0.03	0.00	0.20	0.00	-0.03	0.00	0.16	0.00	-0.04	0.00	0.17	0.00	-0.06
1 b		0.00	0.02	0.00	-0.79	0.00	0.98	0.00	0.02	0.00	0.79	0.00	-0.09	0.00	0.82	0.00	-0.22
1 c		0.00	0.07	0.00	-5.57	0.00	0.05	0.00	-6.49	0.00	0.04	0.00	-6.00	0.00	0.04	0.00	-7.18
2 a		0.00	0.95	0.00	-10.08	0.00	-0.11	0.00	-10.12	0.00	-0.12	0.00	-10.03	0.00	-0.06	0.00	-12.29
2 b		0.00	3.96	0.00	-4.99	0.00	4.54	0.00	-4.74	0.00	4.06	0.00	-4.61	0.00	4.84	0.00	-5.69
2 c		0.00	6.59	0.00	0.04	0.00	8.52	0.00	0.02	0.00	8.07	0.00	0.03	0.00	9.61	0.00	0.05
3 a		0.00	0.07	0.00	-5.57	0.00	0.05	0.00	-6.49	0.00	0.04	0.00	-6.00	0.00	0.04	0.00	-7.18
3 b		0.00	0.02	0.00	-0.79	0.00	0.97	0.00	0.02	0.00	0.79	0.00	-0.09	0.00	0.82	0.00	-0.22
3 c		0.00	0.02	0.00	-0.03	0.00	0.20	0.00	-0.03	0.00	0.16	0.00	-0.04	0.00	0.17	0.00	-0.06
4 a		0.00	1.71	0.00	-1.71	0.00	1.36	0.00	-1.34	0.00	1.25	0.00	-1.22	0.00	1.55	0.00	-1.53
4 b		0.00	0.01	0.00	-0.11	0.00	0.01	0.00	-0.09	0.00	0.01	0.00	-0.08	0.00	0.01	0.00	-0.10
4 c		0.00	1.71	0.00	-1.71	0.00	1.36	0.00	-1.34	0.00	1.25	0.00	-1.22	0.00	1.55	0.00	-1.53
5 a		0.00	9.28	0.00	-5.89	0.00	8.58	0.00	-5.03	0.00	8.54	0.00	-4.71	0.00	10.39	0.00	-5.79
5 b		0.00	4.79	0.00	-2.16	0.00	4.21	0.00	-1.81	0.00	4.20	0.00	-1.73	0.00	5.11	0.00	-2.13
5 c		0.00	1.65	0.00	-1.48	0.00	1.30	0.00	-1.16	0.00	1.19	0.00	-1.06	0.00	1.48	0.00	-1.32
6 a		0.00	9.28	0.00	-5.89	0.00	8.58	0.00	-5.03	0.00	8.54	0.00	-4.71	0.00	10.39	0.00	-5.79
6 b		0.00	4.79	0.00	-2.16	0.00	4.21	0.00	-1.81	0.00	4.20	0.00	-1.73	0.00	5.11	0.00	-2.13
6 c		0.00	1.65	0.00	-1.48	0.00	1.30	0.00	-1.16	0.00	1.19	0.00	-1.06	0.00	1.48	0.00	-1.32

Project: Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 6 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 Vehicle Only)**

SECTION NO.	GTSTRUDL NODE	Truck 17 - S4 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 17 - S4 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 18 - S5 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 18 - S5 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 19 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 19 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 20 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 20 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	0.13	0.00	-0.02	0.00	0.30	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 b		0.00	0.63	0.00	-0.04	0.00	1.50	0.00	-0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 c		0.00	0.03	0.00	-4.56	0.00	-0.03	0.00	-3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 a		0.00	0.05	0.00	-7.21	0.00	1.22	0.00	-4.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 b		0.00	3.25	0.00	-3.42	0.00	1.87	0.00	-0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 c		0.00	5.96	0.00	0.02	0.00	3.94	0.00	-0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 a		0.00	0.03	0.00	-4.56	0.00	-0.03	0.00	-3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 b		0.00	0.63	0.00	-0.04	0.00	1.50	0.00	-0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 c		0.00	0.13	0.00	-0.02	0.00	0.30	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 a		0.00	1.02	0.00	-1.01	0.00	0.45	0.00	-0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 b		0.00	0.01	0.00	-0.06	0.00	0.03	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 c		0.00	1.02	0.00	-1.01	0.00	0.45	0.00	-0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 a		0.00	6.16	0.00	-3.69	0.00	1.33	0.00	-1.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 b		0.00	3.04	0.00	-1.33	0.00	0.40	0.00	-0.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 c		0.00	0.97	0.00	-0.87	0.00	0.39	0.00	-0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 a		0.00	6.16	0.00	-3.69	0.00	1.33	0.00	-1.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 b		0.00	3.04	0.00	-1.33	0.00	0.40	0.00	-0.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 c		0.00	0.97	0.00	-0.87	0.00	0.39	0.00	-0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.8.4 Operating Rating Evaluations
AASHTO Lanes

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]SummaryRFLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 1 - HL93-TRUCK					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	0.99	Top Slab Centerline	**0.99**	1.44	3.04	2.63

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 1 - HL93-TRUCK	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.27	0.09

Project	Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 c	2.90	-0.15	0.64	12.05	0.01	10.52	0.01	2	1	20.44	-7.69	0.99	992.59

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 b	-1.35	-0.15	-0.27	4.51	-5.60	5.41	-4.69	1	2	8.23	-30.44	1.44	3.72

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 a	-6.72	-0.15	-1.33	-0.27	-14.79	-0.32	-10.80	1	2	17.95	-71.26	138.68	3.04

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
1 c	-3.27	-2.61	-0.55	0.04	-7.25	0.05	-7.16	1	2	17.95	-34.55	413.45	2.63
3 a	-3.27	-2.61	-0.55	0.04	-7.25	0.05	-7.16	1	2	17.95	-34.55	413.45	2.63

URS

Project	Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]Strer

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

			two vehicles	One Vehicle				One or two vehicles	One Vehicle						
		MPF =	1.00	1.20				1.00	1.20						
	LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 a	3.03	-1.70	-3.97	-4.76	1	-5.20	0.08	12.53	8.83	2	18.14	0.27	1.23	0.018
	6 a	3.03	-1.70	-3.97	-4.76	1	-5.20	0.08	12.53	8.83	2	18.14	0.27	1.23	0.018
Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 b	-0.62	-0.88	-1.45	-1.74	1	-4.44	0.07	5.90	4.27	2	5.87	0.09	-2.09	0.031
	6 b	-0.62	-0.88	-1.45	-1.74	1	-4.44	0.07	5.90	4.27	2	5.87	0.09	-2.09	0.031

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]SummaryRFLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 2 - HL93-TANDEM					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.07	Top Slab Centerline	**1.07**	1.89	2.74	2.26

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 2 - HL93-TANDEM	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.28	0.08

Project	Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 2 **Truck 2 - HL93-TANDEM**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 c	2.90	-0.15	0.64	11.12	0.02	9.73	0.02	2	1	20.44	-7.69	1.07	496.29

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 b	-1.35	-0.15	-0.27	3.45	-5.61	4.14	-5.02	1	2	8.23	-30.44	1.89	3.71

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 a	-6.72	-0.15	-1.33	-1.71	-16.39	-2.05	-12.38	1	2	17.95	-71.26	21.90	2.74

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
1 c	-3.27	-2.61	-0.55	0.01	-8.43	0.01	-7.72	1	2	17.95	-34.55	1653.80	2.26
3 a	-3.27	-2.61	-0.55	0.01	-8.43	0.01	-7.72	1	2	17.95	-34.55	1653.80	2.26

URS

Project	Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]Strer

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 2 **Truck 2 - HL93-TANDEM**

Combine trucks? N

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.20				1.00	1.20					
	LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 a	3.03	-1.70	-3.50	-4.20	1	-4.44	0.07	12.82	9.31	2	18.54	0.28	1.23	0.018
	6 a	3.03	-1.70	-3.50	-4.20	1	-4.44	0.07	12.82	9.31	2	18.54	0.28	1.23	0.018
Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 b	-0.62	-0.88	-1.27	-1.52	1	-4.15	0.06	5.70	4.20	2	5.60	0.08	-2.09	0.031
	6 b	-0.62	-0.88	-1.26	-1.51	1	-4.13	0.06	5.70	4.20	2	5.60	0.08	-2.09	0.031

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]SummaryRFLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 3 - R1					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.15	Top Slab Centerline	**1.15**	1.70	2.79	2.90

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 3 - R1	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.31	0.11

Project	Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 3 **Truck 3 - R1**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
Top Slab Centerline	2 c	2.90	-0.15	0.64	10.34	0.04	8.89	0.05	2	1	20.44	-7.69	1.15	248.15
Top Slab Thickness Change (Between Webs)	2 b	-1.35	-0.15	-0.27	3.84	-6.52	4.61	-5.26	1	2	8.23	-30.44	1.70	3.20
Top Slab at Web	2 a	-6.72	-0.15	-1.33	0.24	-16.12	0.29	-11.39	1	2	17.95	-71.26	73.45	2.79
Top Slab at Cantilever	1 c	-3.27	-2.61	-0.55	0.05	-6.38	0.06	-6.58	1	1	17.95	-34.55	330.76	2.90
	3 a	-3.27	-2.61	-0.55	0.05	-6.38	0.06	-6.58	1	1	17.95	-34.55	330.76	2.90

Project: Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B) | Design: PT | Date: 1/27/09

Portion: Superstructure - Transverse Analysis - Cline Avenue | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]Strer

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles: LLMultiple

One vehicle with HL93: LLHL93

One or two vehicles: LLSingle

SW, WS, Barrier: DC&PTBrug

Truck ID 3 **Truck 3 - R1**

Combine trucks? N

		two vehicles	One Vehicle		One or two vehicles	One Vehicle
MPF =		1.00	1.20		1.00	1.20
LF =	1.25	1.50	1.35		1.35	

Calculate Area of Steel Required at Top of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Minimum Live Load Moment: Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Maximum Live Load Moment: Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Dead Loads: Mu (max) kip-ft	As (min) in^2/ft
5 a	3.03	-1.70	-4.71	-5.65	1	-6.40	0.10	14.59	10.25	2	20.93	0.31	1.23	0.018
6 a	3.03	-1.70	-4.71	-5.65	1	-6.40	0.10	14.59	10.25	2	20.93	0.31	1.23	0.018

Calculate Area of Steel Required at Middle of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
5 b	-0.62	-0.88	-1.76	-2.11	1	-4.94	0.07	7.18	5.21	2	7.60	0.11	-2.09	0.031
6 b	-0.62	-0.88	-1.76	-2.11	1	-4.94	0.07	7.18	5.21	2	7.60	0.11	-2.09	0.031

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]SummaryRFLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 4 - R2					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.22	Top Slab Centerline	**1.22**	1.64	3.37	3.35

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 4 - R2	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.26	0.09

Project	Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I

Rating Factors

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 4 **Truck 4 - R2**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 c	2.90	-0.15	0.64	9.73	0.03	8.41	0.04	2	1	20.44	-7.69	1.22	330.86

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 b	-1.35	-0.15	-0.27	3.96	-5.60	4.75	-4.39	1	2	8.23	-30.44	1.64	3.72

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 a	-6.72	-0.15	-1.33	0.70	-13.33	0.84	-9.19	1	2	17.95	-71.26	25.18	3.37

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
1 c	-3.27	-2.61	-0.55	0.05	-5.40	0.06	-5.68	1	1	17.95	-34.55	330.76	3.35
3 a	-3.27	-2.61	-0.55	0.05	-5.40	0.06	-5.68	1	1	17.95	-34.55	330.76	3.35

Project: Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B) | Design: PT | Date: 1/27/09

Portion: Superstructure - Transverse Analysis - Cline Avenue | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]Strer

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles: LLMultiple

One vehicle with HL93: LLHL93

One or two vehicles: LLSingle

SW, WS, Barrier: DC&PTBrug

Truck ID 4 **Truck 4 - R2**

Combine trucks? N

		two vehicles	One Vehicle		One or two vehicles	One Vehicle
MPF =		1.00	1.20		1.00	1.20
LF =	1.25	1.50	1.35	Minimum Live Load Moment	1.35	Maximum Live Load Moment

Calculate Area of Steel Required at Top of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
													Dead Loads	
5 a	3.03	-1.70	-4.19	-5.03	1	-5.56	0.08	12.13	8.32	2	17.60	0.26	1.23	0.018
6 a	3.03	-1.70	-4.19	-5.03	1	-5.56	0.08	12.13	8.32	2	17.60	0.26	1.23	0.018

Calculate Area of Steel Required at Middle of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
5 b	-0.62	-0.88	-1.55	-1.86	1	-4.60	0.07	5.90	4.26	2	5.87	0.09	-2.09	0.031
6 b	-0.62	-0.88	-1.55	-1.86	1	-4.60	0.07	5.90	4.26	2	5.87	0.09	-2.09	0.031

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]SummaryRFLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 5 - R3					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.38	Top Slab Centerline	**1.38**	1.68	3.44	3.19

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 5 - R3	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.25	0.07

Project	Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 5 **Truck 5 - R3**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 c	2.90	-0.15	0.64	8.61	0.01	7.49	0.01	2	1	20.44	-7.69	1.38	992.59

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 b	-1.35	-0.15	-0.27	3.87	-5.98	4.64	-4.57	1	2	8.23	-30.44	1.68	3.48

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 a	-6.72	-0.15	-1.33	0.56	-13.07	0.67	-8.84	1	2	17.95	-71.26	31.48	3.44

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
1 c	-3.27	-2.61	-0.55	0.04	-5.97	0.05	-5.92	1	2	17.95	-34.55	413.45	3.19
3 a	-3.27	-2.61	-0.55	0.04	-5.96	0.05	-5.92	1	2	17.95	-34.55	413.45	3.19

Project: Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B) | Design: PT | Date: 1/27/09

Portion: Superstructure - Transverse Analysis - Cline Avenue | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]Strer

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles: LLMultiple

One vehicle with HL93: LLHL93

One or two vehicles: LLSingle

SW, WS, Barrier: DC&PTBrug

Truck ID 5 **Truck 5 - R3**

Combine trucks? N

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.20				1.00	1.20					
LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	

Calculate Area of Steel Required at Top of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
5 a	3.03	-1.70	-4.47	-5.36	1	-6.01	0.09	11.29	7.58	2	16.47	0.25	1.23	0.018
6 a	3.03	-1.70	-4.47	-5.36	1	-6.01	0.09	11.29	7.58	2	16.47	0.25	1.23	0.018

Calculate Area of Steel Required at Middle of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
5 b	-0.62	-0.88	-1.57	-1.88	1	-4.63	0.07	5.21	3.71	2	4.94	0.07	-2.09	0.031
6 b	-0.62	-0.88	-1.57	-1.88	1	-4.63	0.07	5.21	3.71	2	4.94	0.07	-2.09	0.031

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]SummaryRFLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 12 - R4 + HL93					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.05	Top Slab Centerline	**1.05**	1.78	2.81	2.89

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 12 - R4 + HL93	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.29	0.09

Project	Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 12 **Truck 12 - R4 + HL93**

Combine trucks? Y

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.00	1.00
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 c	2.90	-0.15	0.64	11.35	0.03	6.44	0.03	2	1	20.44	-7.69	1.05	397.04

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 b	-1.35	-0.15	-0.27	4.39	-6.83	4.39	-3.96	1	2	8.23	-30.44	1.78	3.05

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 a	-6.72	-0.15	-1.33	2.01	-15.99	2.01	-7.93	1	2	17.95	-71.26	10.52	2.81

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
1 c	-3.27	-2.61	-0.55	0.10	-6.59	0.07	-4.33	2	2	17.95	-34.55	198.46	2.89
3 a	-3.27	-2.61	-0.55	0.07	-6.59	0.07	-4.33	1	2	17.95	-34.55	283.51	2.89

Project: Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B) | Design: PT | Date: 1/27/09

Portion: Superstructure - Transverse Analysis - Cline Avenue | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]Strer

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles: LLMultiple

One vehicle with HL93: LLHL93

One or two vehicles: LLSingle

SW, WS, Barrier: DC&PTBrug

Truck ID 12 **Truck 12 - R4 + HL93**

Combine trucks? Y

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.00				1.00	1.00					
	LF =	1.25	1.50	1.35	Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 a	3.03	-1.70	-5.26	-5.26	1	-5.87	0.09	13.38	7.74	2	19.29	0.29	1.23	0.018
	6 a	3.03	-1.70	-5.26	-5.26	1	-5.87	0.09	13.38	7.74	2	19.29	0.29	1.23	0.018

Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 b	-0.62	-0.88	-1.93	-1.93	1	-4.70	0.07	6.27	3.93	2	6.37	0.09	-2.09	0.031
	6 b	-0.62	-0.88	-1.93	-1.93	1	-4.70	0.07	6.27	3.93	2	6.37	0.09	-2.09	0.031

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]SummaryRFLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 13 - R5 + HL93					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.04	Top Slab Centerline	**1.04**	1.97	2.55	2.52

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 13 - R5 + HL93	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.32	0.11

Project	Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I

Rating Factors

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 13 **Truck 13 - R5 + HL93**

Combine trucks? Y

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.00	1.00
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
2 c	2.90	-0.15	0.64		11.46	0.04	6.59	0.04	2	1	20.44	-7.69	1.04	297.78

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
2 b	-1.35	-0.15	-0.27		3.96	-7.04	3.96	-4.99	1	2	8.23	-30.44	1.97	2.96

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
2 a	-6.72	-0.15	-1.33		0.95	-17.65	0.95	-10.08	1	2	17.95	-71.26	22.27	2.55

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
1 c	-3.27	-2.61	-0.55		0.07	-7.57	0.07	-5.57	1	2	17.95	-34.55	283.51	2.52
3 a	-3.27	-2.61	-0.55		0.07	-7.57	0.07	-5.57	1	2	17.95	-34.55	283.51	2.52

Project: Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B) | Design: PT | Date: 1/27/09

Portion: Superstructure - Transverse Analysis - Cline Avenue | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]Strer

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles: LLMultiple

One vehicle with HL93: LLHL93

One or two vehicles: LLSingle

SW, WS, Barrier: DC&PTBrug

Truck ID 13 **Truck 13 - R5 + HL93**

Combine trucks? Y

		two vehicles	One Vehicle		One or two vehicles	One Vehicle
MPF =		1.00	1.00		1.00	1.00
LF =	1.25	1.50	1.35	Minimum Live Load Moment	1.35	Maximum Live Load Moment

Calculate Area of Steel Required at Top of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
5 a	3.03	-1.70	-5.89	-5.89	1	-6.72	0.10	14.77	9.28	2	21.17	0.32	1.23	0.018
6 a	3.03	-1.70	-5.89	-5.89	1	-6.72	0.10	14.77	9.28	2	21.17	0.32	1.23	0.018

Dead Loads

Calculate Area of Steel Required at Middle of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
5 b	-0.62	-0.88	-2.16	-2.16	1	-5.01	0.07	7.13	4.79	2	7.54	0.11	-2.09	0.031
6 b	-0.62	-0.88	-2.16	-2.16	1	-5.01	0.07	7.13	4.79	2	7.54	0.11	-2.09	0.031

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]SummaryRFLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 14 - S1 + HL93					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	0.99	Top Slab Centerline	**0.99**	1.72	2.59	2.24

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 14 - S1 + HL93	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.30	0.10

Project	Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I

Rating Factors

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 14 **Truck 14 - S1 + HL93**

Combine trucks? y

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.00	1.00
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
Top Slab Centerline	2 c	2.90	-0.15	0.64	12.00	0.02	8.52	0.02	2	1	20.44	-7.69	0.99	595.55
Top Slab Thickness Change (Between Webs)	2 b	-1.35	-0.15	-0.27	4.54	-6.43	4.54	-4.74	1	2	8.23	-30.44	1.72	3.24
Top Slab at Web	2 a	-6.72	-0.15	-1.33	-0.11	-17.32	-0.11	-10.12	1	2	17.95	-71.26	408.47	2.59
Top Slab at Cantilever	1 c	-3.27	-2.61	-0.55	0.05	-8.49	0.05	-6.49	1	2	17.95	-34.55	396.91	2.24
	3 a	-3.27	-2.61	-0.55	0.05	-8.49	0.05	-6.49	1	2	17.95	-34.55	396.91	2.24

Project: Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B) | Design: PT | Date: 1/27/09

Portion: Superstructure - Transverse Analysis - Cline Avenue | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]Strer

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles: LLMultiple

One vehicle with HL93: LLHL93

One or two vehicles: LLSingle

SW, WS, Barrier: DC&PTBrug

Truck ID 14 **Truck 14 - S1 + HL93**

Combine trucks? Y

		two vehicles	One Vehicle		One or two vehicles	One Vehicle
MPF =		1.00	1.00		1.00	1.00
LF =	1.25	1.50	1.35	Minimum Live Load Moment	1.35	Maximum Live Load Moment

Calculate Area of Steel Required at Top of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
													Dead Loads	
5 a	3.03	-1.70	-5.03	-5.03	1	-5.56	0.08	13.95	8.58	2	20.06	0.30	1.23	0.018
6 a	3.03	-1.70	-5.03	-5.03	1	-5.56	0.08	13.95	8.58	2	20.06	0.30	1.23	0.018

Calculate Area of Steel Required at Middle of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
5 b	-0.62	-0.88	-1.81	-1.81	1	-4.53	0.07	6.55	4.21	2	6.75	0.10	-2.09	0.031
6 b	-0.62	-0.88	-1.81	-1.81	1	-4.53	0.07	6.55	4.21	2	6.75	0.10	-2.09	0.031

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]SummaryRFLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 15 - S2 + HL93					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.00	Top Slab Centerline	**1.00**	1.92	2.63	2.38

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 15 - S2 + HL93	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.30	0.10

Project	Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 15 **Truck 15 - S2 + HL93**

Combine trucks? Y

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.00	1.00
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 c	2.90	-0.15	0.64	11.89	0.03	8.07	0.03	2	1	20.44	-7.69	1.00	397.04

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 b	-1.35	-0.15	-0.27	4.06	-6.30	4.06	-4.61	1	2	8.23	-30.44	1.92	3.31

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 a	-6.72	-0.15	-1.33	-0.12	-17.09	-0.12	-10.03	1	2	17.95	-71.26	374.43	2.63

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
1 c	-3.27	-2.61	-0.55	0.04	-8.00	0.04	-6.00	1	2	17.95	-34.55	496.14	2.38
3 a	-3.27	-2.61	-0.55	0.04	-8.00	0.04	-6.00	1	2	17.95	-34.55	496.14	2.38

Project: Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B) | Design: PT | Date: 1/27/09

Portion: Superstructure - Transverse Analysis - Cline Avenue | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]Strer

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles: LLMultiple

One vehicle with HL93: LLHL93

One or two vehicles: LLSingle

SW, WS, Barrier: DC&PTBrug

Truck ID 15 **Truck 15 - S2 + HL93**

Combine trucks? Y

		two vehicles	One Vehicle		One or two vehicles	One Vehicle
MPF =		1.00	1.00		1.00	1.00
LF =	1.25	1.50	1.35	Minimum Live Load Moment	1.35	Maximum Live Load Moment

Calculate Area of Steel Required at Top of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
													Dead Loads	
5 a	3.03	-1.70	-4.71	-4.71	1	-5.13	0.08	13.72	8.54	2	19.75	0.30	1.23	0.018
6 a	3.03	-1.70	-4.71	-4.71	1	-5.13	0.08	13.73	8.54	2	19.76	0.30	1.23	0.018

Calculate Area of Steel Required at Middle of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
5 b	-0.62	-0.88	-1.73	-1.73	1	-4.43	0.07	6.54	4.20	2	6.74	0.10	-2.09	0.031
6 b	-0.62	-0.88	-1.73	-1.73	1	-4.43	0.07	6.54	4.20	2	6.74	0.10	-2.09	0.031

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]SummaryRFLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 16 - S3 + HL93					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	0.92	Top Slab Centerline	**0.92**	1.61	2.41	2.07

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 16 - S3 + HL93	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.33	0.12

Project	Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I

Rating Factors

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 16 **Truck 16 - S3 + HL93**

Combine trucks? Y

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.00	1.00
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
Top Slab Centerline	2 c	2.90	-0.15	0.64	12.89	0.05	9.61	0.05	2	1	20.44	-7.69	0.92	238.22
Top Slab Thickness Change (Between Webs)	2 b	-1.35	-0.15	-0.27	4.84	-7.38	4.84	-5.69	1	2	8.23	-30.44	1.61	2.82
Top Slab at Web	2 a	-6.72	-0.15	-1.33	-0.06	-18.66	-0.06	-12.29	1	2	17.95	-71.26	748.87	2.41
Top Slab at Cantilever	1 c	-3.27	-2.61	-0.55	0.04	-9.18	0.04	-7.18	1	2	17.95	-34.55	496.14	2.07
	3 a	-3.27	-2.61	-0.55	0.04	-9.18	0.04	-7.18	1	2	17.95	-34.55	496.14	2.07

Project: Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B) | Design: PT | Date: 1/27/09

Portion: Superstructure - Transverse Analysis - Cline Avenue | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]Strer

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles: LLMultiple

One vehicle with HL93: LLHL93

One or two vehicles: LLSingle

SW, WS, Barrier: DC&PTBrug

Truck ID 16 **Truck 16 - S3 + HL93**

Combine trucks? Y

		two vehicles	One Vehicle		One or two vehicles	One Vehicle
MPF =		1.00	1.00		1.00	1.00
LF =	1.25	1.50	1.35	Minimum Live Load Moment	1.35	Maximum Live Load Moment

Calculate Area of Steel Required at Top of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
													Dead Loads	
5 a	3.03	-1.70	-5.79	-5.79	1	-6.59	0.10	15.56	10.39	2	22.24	0.33	1.23	0.018
6 a	3.03	-1.70	-5.79	-5.79	1	-6.59	0.10	15.56	10.39	2	22.24	0.33	1.23	0.018

Calculate Area of Steel Required at Middle of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
5 b	-0.62	-0.88	-2.13	-2.13	1	-4.97	0.07	7.45	5.11	2	7.97	0.12	-2.09	0.031
6 b	-0.62	-0.88	-2.13	-2.13	1	-4.97	0.07	7.45	5.11	2	7.97	0.12	-2.09	0.031

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]SummaryRFLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 17 - S4 + HL93					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.08	Top Slab Centerline	**1.08**	2.40	2.92	2.58

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 17 - S4 + HL93	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.27	0.08

Project	Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I

Rating Factors

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 17 **Truck 17 - S4 + HL93**

Combine trucks? y

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.00	1.00
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
Top Slab Centerline	2 c	2.90	-0.15	0.64	11.05	0.02	5.96	0.02	2	1	20.44	-7.69	1.08	595.55
Top Slab Thickness Change (Between Webs)	2 b	-1.35	-0.15	-0.27	3.25	-5.86	3.25	-3.42	1	2	8.23	-30.44	2.40	3.56
Top Slab at Web	2 a	-6.72	-0.15	-1.33	0.05	-15.41	0.05	-7.21	1	2	17.95	-71.26	423.08	2.92
Top Slab at Cantilever	1 c	-3.27	-2.61	-0.55	0.03	-7.38	0.03	-4.56	1	2	17.95	-34.55	661.52	2.58
	3 a	-3.27	-2.61	-0.55	0.03	-7.38	0.03	-4.56	1	2	17.95	-34.55	661.52	2.58

Project: Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B) | Design: PT | Date: 1/27/09

Portion: Superstructure - Transverse Analysis - Cline Avenue | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]Strer

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 17 **Truck 17 - S4 + HL93**

Combine trucks? Y

	two vehicles	One Vehicle	One or two vehicles	One Vehicle
MPF =	1.00	1.00	1.00	1.00

LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
Calculate Area of Steel Required at Top of Webs														
5 a	3.03	-1.70	-3.69	-3.69	1	-3.75	0.06	12.27	6.16	2	17.79	0.27	1.23	0.018
6 a	3.03	-1.70	-3.69	-3.69	1	-3.75	0.06	12.27	6.16	2	17.79	0.27	1.23	0.018
Calculate Area of Steel Required at Middle of Webs														
SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
5 b	-0.62	-0.88	-1.33	-1.33	1	-3.89	0.06	5.58	3.04	2	5.44	0.08	-2.09	0.031
6 b	-0.62	-0.88	-1.33	-1.33	1	-3.89	0.06	5.58	3.04	2	5.44	0.08	-2.09	0.031

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]SummaryRFLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 17 - S4 + HL93					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.08	Top Slab Centerline	**1.08**	2.40	2.92	2.58

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 17 - S4 + HL93	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.27	0.08

Project	Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I

Rating Factors

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 17 **Truck 17 - S4 + HL93**

Combine trucks? y

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.00	1.00
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
2 c	2.90	-0.15	0.64		11.05	0.02	5.96	0.02	2	1	20.44	-7.69	1.08	595.55

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
2 b	-1.35	-0.15	-0.27		3.25	-5.86	3.25	-3.42	1	2	8.23	-30.44	2.40	3.56

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
2 a	-6.72	-0.15	-1.33		0.05	-15.41	0.05	-7.21	1	2	17.95	-71.26	423.08	2.92

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
1 c	-3.27	-2.61	-0.55		0.03	-7.38	0.03	-4.56	1	2	17.95	-34.55	661.52	2.58
3 a	-3.27	-2.61	-0.55		0.03	-7.38	0.03	-4.56	1	2	17.95	-34.55	661.52	2.58

Project: Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B) | Design: PT | Date: 1/27/09

Portion: Superstructure - Transverse Analysis - Cline Avenue | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]Strer

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles: LLMultiple

One vehicle with HL93: LLHL93

One or two vehicles: LLSingle

SW, WS, Barrier: DC&PTBrug

Truck ID 17 **Truck 17 - S4 + HL93**

Combine trucks? Y

		two vehicles	One Vehicle		One or two vehicles	One Vehicle
MPF =		1.00	1.00		1.00	1.00
LF =	1.25	1.50	1.35	Minimum Live Load Moment	1.35	Maximum Live Load Moment

Calculate Area of Steel Required at Top of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
													Dead Loads	
5 a	3.03	-1.70	-3.69	-3.69	1	-3.75	0.06	12.27	6.16	2	17.79	0.27	1.23	0.018
6 a	3.03	-1.70	-3.69	-3.69	1	-3.75	0.06	12.27	6.16	2	17.79	0.27	1.23	0.018

Calculate Area of Steel Required at Middle of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
5 b	-0.62	-0.88	-1.33	-1.33	1	-3.89	0.06	5.58	3.04	2	5.44	0.08	-2.09	0.031
6 b	-0.62	-0.88	-1.33	-1.33	1	-3.89	0.06	5.58	3.04	2	5.44	0.08	-2.09	0.031

5.8.5 Inventory Rating Evaluations
AASHTO Lanes

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]SummaryRFLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 1 - HL93-TRUCK					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Inventory - Strength I	0.76	Top Slab Centerline	**0.76**	1.11	2.34	2.03

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 1 - HL93-TRUCK	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Inventory - Strength I	0.35	0.12

Project	Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Inventory - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.75	1.75	1.75	1.75

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 c	2.90	-0.15	0.64	12.05	0.01	10.52	0.01	2	1	20.44	-7.69	0.76	765.71

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 b	-1.35	-0.15	-0.27	4.51	-5.60	5.41	-4.69	1	2	8.23	-30.44	1.11	2.87

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 a	-6.72	-0.15	-1.33	-0.27	-14.79	-0.32	-10.80	1	2	17.95	-71.26	106.98	2.34

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
1 c	-3.27	-2.61	-0.55	0.04	-7.25	0.05	-7.16	1	2	17.95	-34.55	318.95	2.03
3 a	-3.27	-2.61	-0.55	0.04	-7.25	0.05	-7.16	1	2	17.95	-34.55	318.95	2.03

URS

Project	Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]Strer

Area of Steel Required at Webs due to Transverse Bending

Inventory - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

			two vehicles	One Vehicle				One or two vehicles	One Vehicle						
		MPF =	1.00	1.20				1.00	1.20						
	LF =	1.25	1.50	1.75		Minimum Live Load Moment			1.75		Maximum Live Load Moment			Dead Loads	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 a	3.03	-1.70	-3.97	-4.76	1	-7.11	0.11	12.53	8.83	2	23.16	0.35	1.23	0.018
	6 a	3.03	-1.70	-3.97	-4.76	1	-7.11	0.11	12.53	8.83	2	23.16	0.35	1.23	0.018
Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 b	-0.62	-0.88	-1.45	-1.74	1	-5.14	0.08	5.90	4.27	2	8.23	0.12	-2.09	0.031
	6 b	-0.62	-0.88	-1.45	-1.74	1	-5.14	0.08	5.90	4.27	2	8.23	0.12	-2.09	0.031

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]SummaryRFLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 1 - HL93-TRUCK					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Inventory - Strength I	0.76	Top Slab Centerline	**0.76**	1.11	2.34	2.03

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis - Cline Avenue** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 1 - HL93-TRUCK	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Inventory - Strength I	0.35	0.12

Project	Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Inventory - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.75	1.75	1.75	1.75

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 c	2.90	-0.15	0.64	12.05	0.01	10.52	0.01	2	1	20.44	-7.69	0.76	765.71

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 b	-1.35	-0.15	-0.27	4.51	-5.60	5.41	-4.69	1	2	8.23	-30.44	1.11	2.87

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 a	-6.72	-0.15	-1.33	-0.27	-14.79	-0.32	-10.80	1	2	17.95	-71.26	106.98	2.34

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
1 c	-3.27	-2.61	-0.55	0.04	-7.25	0.05	-7.16	1	2	17.95	-34.55	318.95	2.03
3 a	-3.27	-2.61	-0.55	0.04	-7.25	0.05	-7.16	1	2	17.95	-34.55	318.95	2.03

URS

Project	Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis - Cline Avenue	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VB.XLS]Strer

Area of Steel Required at Webs due to Transverse Bending

Inventory - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

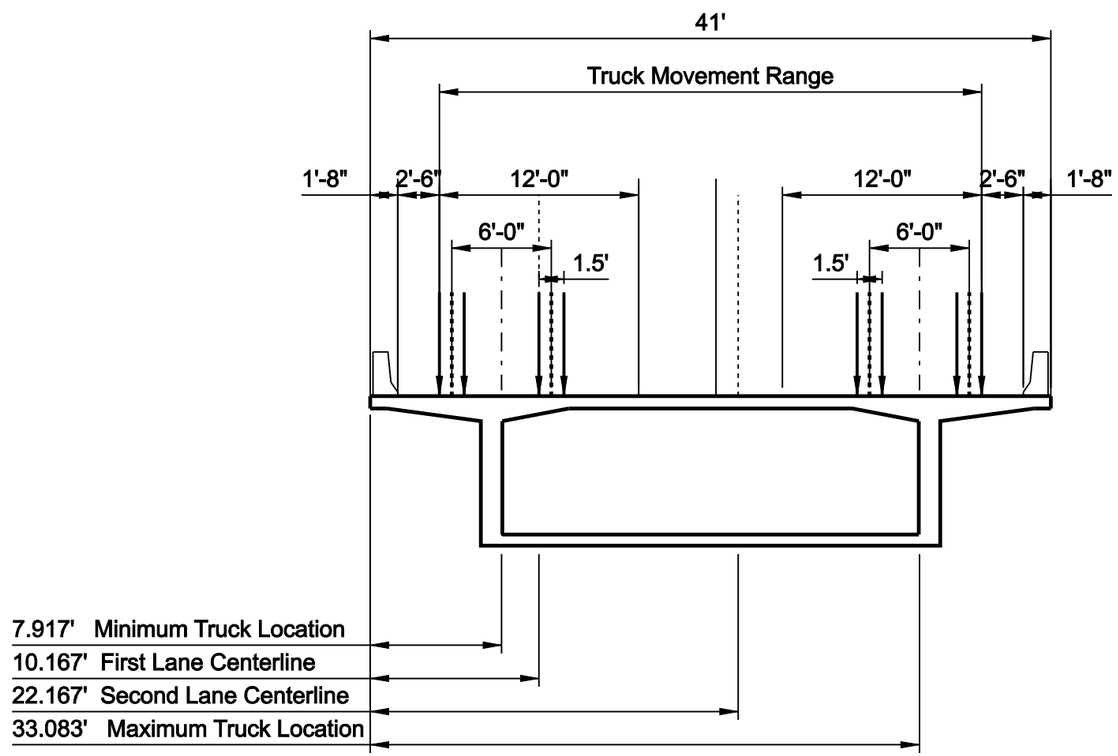
Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

			two vehicles	One Vehicle				One or two vehicles	One Vehicle						
		MPF =	1.00	1.20				1.00	1.20						
	LF =	1.25	1.50	1.75		Minimum Live Load Moment			1.75		Maximum Live Load Moment			Dead Loads	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 a	3.03	-1.70	-3.97	-4.76	1	-7.11	0.11	12.53	8.83	2	23.16	0.35	1.23	0.018
	6 a	3.03	-1.70	-3.97	-4.76	1	-7.11	0.11	12.53	8.83	2	23.16	0.35	1.23	0.018
Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 b	-0.62	-0.88	-1.45	-1.74	1	-5.14	0.08	5.90	4.27	2	8.23	0.12	-2.09	0.031
	6 b	-0.62	-0.88	-1.45	-1.74	1	-5.14	0.08	5.90	4.27	2	8.23	0.12	-2.09	0.031

5.8.6 Striped Lanes Location

TRUCK LOCATION - NO TRAFFIC ON SHOULDERS



Design by: PT 09/09
Independent Check by: RJB 09/09

HALF SIZE PRINT - 11x17

No.	Date	App.	Revisions

Designed by .
Drawn by R.V.A.
Checked by .
DRAWING SCALE

URS Corporation Southern
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C.A. No. EB 00000002

TYPICAL SECTION - Transverse Analysis

SECTION VB

DRAWING NO. . SHEET NO. .

NAME P.E. NO.

patricia_thessler 7/25/2009 7:44:44 AM SPB_XLS

5.8.6/1

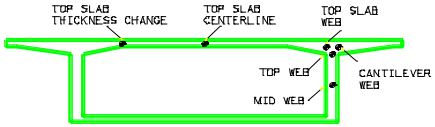
5.8.7 Rating Summary Striped Lanes

URS

PROJECT: Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B) CALCS BY: PT DATE: 08/09

ESCRIPTION: **Striped Lanes - Transverse Analysis - Cline Avenue** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length



Cline Avenue			Inventory	Operating										
			LFR Design Loads	LFR Design Loads	INDOT Legal Loads*			INDOT Permit Loads						
			HL93 or Tandem*	Hl93 or Tandem*	Single Vehicle (SV)			Super Loads						
					R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Gross Vehicle Weight (tons)			32	32	45	45	63	67	67.1	129	133.5	175	152.5	240
Longitudinal	Factored	Flexure												
		Shear												
	Service	Flexure												
		Principal Stress												
Transverse	Factored	Top Slab Centerline	0.76	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Top Slab Thickness Change	1.11	1.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Top Slab Webs & Cantilever	2.11	2.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Overall Rating Factor	0.76	0.99	0.00	0.00
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)		31.63	0.00	0.00

* Max number of lanes loaded = 2

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VB EL STRIPED LANES.XLS]Truck Data

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)**

Import Brug Data | Delete Load Rating Factors | Calculate Load Rating Factors | Print Load Rating Results | View Single LC Results

CALCS BY: PT DATE: 08/09

CHECKED BY: IC by RJB DATE: 08/09

DESCRIPTION: **Striped Lanes - Transverse Analysis - Cline Avenue**

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

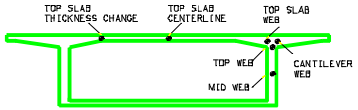
Summary of Rating Factors:

	Combine Trucks?	Truck Description		Operating - Strength I		View Single LC Results	Operating - Strength I						AS required - With Live Load		PRINT	Calculate Rating Factors
	Y or N	Rating Truck ID	Truck Name	Brug File with 2 or more vehicles	Brug File with a single vehicle	Y or N	RF	RF Controlling Location	Top Slab Centerline	Top Slab (Thickness Change Section)	Top Slab Webs	Cantilever at Webs	Top of Web	Middle of Web	Y or N	Y or N
HL93-DESIGN LOADS	N	1	HL93-TRUCK	_B_SL_HL93_TRUCK_EL.OU	V_B_SL_HL93_TRUCK_EL.OUT	N	0.99	Top Slab Centerline	0.99	1.44	3.04	4.06	0.27	0.09	N	Y
	N	2	HL93-TANDEM	B_SL_HL93_TANDEM_EL.O	_B_SL_HL93_TANDEM_EL.OU	N	1.07	Top Slab Centerline	1.07	1.89	2.74	3.17	0.28	0.08	N	Y
INDOT DESIGN LOADS	N	3	R1	V_B_SL_R1_EL.OUT	1V_B_SL_R1_EL.OUT	N									N	N
	N	4	R2	V_B_SL_R2_EL.OUT	1V_B_SL_R2_EL.OUT	N									N	N
	N	5	R3	V_B_SL_R3_EL.OUT	1V_B_SL_R3_EL.OUT	N									N	N
	N	6	NOT USED	n/a	n/a	N									N	N
	N	7	NOT USED	n/a	n/a	N									N	N
	N	8	NOT USED	n/a	n/a	N									N	N
	N	9	NOT USED	n/a	n/a	N									N	N
	N	10	NOT USED	n/a	n/a	N									N	N
	N	11	NOT USED	n/a	n/a	N									N	N
INDOT DESIGN LOADS	Y	12	R4 + HL93	V_B_SL_R4_EL.OUT	1V_B_SL_R4_EL.OUT	N									N	N
	Y	13	R5 + HL93	V_B_SL_R5_EL.OUT	1V_B_SL_R5_EL.OUT	N									N	N
INDOT PERMIT LOADS	Y	14	S1 + HL93	V_B_SL_S1_EL.OUT	1V_B_SL_S1_EL.OUT	N									N	N
	Y	15	S2 + HL93	V_B_SL_S2_EL.OUT	1V_B_SL_S2_EL.OUT	N									N	N
	Y	16	S3 + HL93	V_B_SL_S3_EL.OUT	1V_B_SL_S3_EL.OUT	N									N	N
	Y	17	S4 + HL93	V_B_SL_S4_EL.OUT	1V_B_SL_S4_EL.OUT	N									N	N
	Y	18	S5 + HL93	V_B_SL_S5_EL.OUT	1V_B_SL_S5_EL.OUT	N									N	N
	N	19	NOT USED	n/a	n/a	N									N	N
	N	20	NOT USED	n/a	n/a	N									N	N
	N	21	NOT USED	n/a	n/a	N									N	N
	N	22	NOT USED	n/a	n/a	N									N	N
	N	23	NOT USED	n/a	n/a	N									N	N
	N	24	NOT USED	n/a	n/a	N									N	N
	N	25	NOT USED	n/a	n/a	N									N	N
	N	26	NOT USED	n/a	n/a	N									N	N

LRFR Load Factors For Segmental Bridges				Multiple Presence Factor	
LOAD CASE	DL	SDL	LL	one lane	two lanes
Operating - Strength I	1.25	1.50	1.35	1.20	1.00

Brug plates with reversed moment sign and reversed LL Max/Min
6

	Multiple Presence Factor	
LOAD CASE	one lane	two lanes
Operating - Strength I	1.00	1.00



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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VB EL STRIPED LANES.XLS]Truck Data

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)**

DESCRIPTION: **Striped Lanes - Transverse Analysis - Cline Avenue**

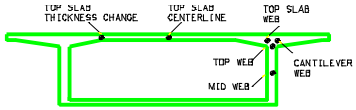
Import Brug Data | Delete Load Rating Factors | Calculate Load Rating Factors | Print Load Rating Results | View Single LC Results

CALCS BY: PT DATE: 08/09

CHECKED BY: IC by RJB DATE: 08/09

	Combine Trucks?	Truck Description		Inventory - Strength I		PRINT	Operating - Strength I						AS required		PRINT	Calculate Rating Factors
	Y or N	Rating Truck ID	Truck Name	RF	RF Controlling Location	Y or N	RF	RF Controlling Location	Top Slab Centerline	Top Slab (Thickness Change Section)	Top Slab Webs	Cantilever at Webs	Top of Web	Middle of Web	Y or N	Y or N
HS20- DESIGN LOADS	N	1	HL93-TRUCK	_B_SL_HL93_TRUCK_EL.OU	V_B_SL_HL93_TRUCK_EL.OUT	N	0.76	Top Slab Centerline	0.76	1.11	2.34	3.13	0.35	0.12	Y	Y
	N	2	HL93-TANDEM	B_SL_HL93_TANDEM_EL.O	_B_SL_HL93_TANDEM_EL.OU	Y	0.83	Top Slab Centerline	0.83	1.46	2.11	2.44	0.36	0.12	N	Y

LFR Load Factors For Segmental Bridges - NC DOT				Multiple Presence Factor	
LOAD CASE	DL	SDL	LL	one lane	two lanes
Inventory - Strength I	1.25	1.50	1.75	1.20	1.00



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PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)**
DESCRIPTION: **Striped Lanes - Transverse Analysis - Cline Avenue**
Area of Steel Requirements

CALCS BY: PT DATE: 08/09
CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

			Middle of Web		Top of Web	
Section	Inventory / Operating	Combined Name	A_b req'd (in^2/ft)	$A_{b\ Dead}$ req'd	A_b req'd (in^2/ft)	$A_{b\ Dead}$ req'd (in^2/ft)
HL-93	Inventory	HL-93 Inventory	0.12	0.03	0.36	0.02
HL-93	Operating	HL-93 Operating	0.09	0.03	0.28	0.02
HL-93-s	Operating	HL-93-s Operating	0.09	0.03	0.28	0.02

5.8.8 Load Summary Striped Lanes

URS

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spre

Project Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)

Portion

MAXIMUM loads for section(s) 6 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces st

SERVICE FORCES **Live Load Loading (1 or 2 Vehicles)**

	Truck 1 - HL93-TRUCK		Truck 1 - HL93-TRUCK		Truck 2 - HL93-TANDEM		Truck 2 - HL93-TANDEM	
	Maximum		Minimum		Maximum		Minimum	
GTSTRUDL	Positive Moment		Negative Moment		Positive Moment		Negative Moment	
SECTION NODE	F	M	F	M	F	M	F	M
NO.	(Kip)	(Kip-ft)	(Kip)	(Kip-ft)	(Kip)	(Kip-ft)	(Kip)	(Kip-ft)
1 a	0.00	0.00	0.00	-0.04	0.00	0.03	0.00	-0.08
1 b	0.00	1.28	0.00	-0.36	0.00	0.76	0.00	-0.66
1 c	0.00	-0.12	0.00	-4.69	0.00	-0.30	0.00	-6.01
2 a	0.00	-2.10	0.00	-14.79	0.00	-3.43	0.00	-16.39
2 b	0.00	4.51	0.00	-3.91	0.00	3.45	0.00	-4.60
2 c	0.00	12.05	0.00	0.11	0.00	11.12	0.00	0.10
3 a	0.00	0.03	0.00	-1.99	0.00	-0.01	0.00	-2.99
3 b	0.00	0.01	0.00	-0.37	0.00	0.00	0.00	-0.66
3 c	0.00	0.00	0.00	-0.04	0.00	0.00	0.00	-0.08
4 a	0.00	1.22	0.00	-0.92	0.00	0.81	0.00	-0.69
4 b	0.00	-0.01	0.00	-0.13	0.00	-0.01	0.00	-0.10
4 c	0.00	0.80	0.00	-1.44	0.00	0.51	0.00	-1.07
5 a	0.00	12.53	0.00	-1.77	0.00	12.82	0.00	-1.05
5 b	0.00	5.90	0.00	-0.40	0.00	5.70	0.00	-0.21
5 c	0.00	1.45	0.00	-0.73	0.00	1.05	0.00	-0.52
6 a	0.00	12.53	0.00	2.72	0.00	12.82	0.00	2.02
6 b	0.00	5.90	0.00	0.89	0.00	5.70	0.00	0.67
6 c	0.00	0.95	0.00	-1.03	0.00	0.68	0.00	-0.73

URS

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spre

Project Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)

Portion

MAXIMUM loads for section(s) 6 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces st

SERVICE FORCES **Live Load Loading (1 Vehicle Only)**

	Truck 1 - HL93-TRUCK		Truck 1 - HL93-TRUCK		Truck 2 - HL93-TANDEM		Truck 2 - HL93-TANDEM	
	Maximum		Minimum		Maximum		Minimum	
GTSTRUDL	Positive Moment		Negative Moment		Positive Moment		Negative Moment	
SECTION NODE	F	M	F	M	F	M	F	M
NO.	(Kip)	(Kip-ft)	(Kip)	(Kip-ft)	(Kip)	(Kip-ft)	(Kip)	(Kip-ft)
1 a	0.00	0.00	0.00	-0.03	0.00	0.03	0.00	-0.05
1 b	0.00	1.28	0.00	-0.26	0.00	0.76	0.00	-0.46
1 c	0.00	-0.12	0.00	-3.57	0.00	-0.30	0.00	-4.19
2 a	0.00	-2.10	0.00	-9.00	0.00	-3.43	0.00	-10.32
2 b	0.00	4.51	0.00	-3.91	0.00	3.45	0.00	-4.18
2 c	0.00	8.77	0.00	0.11	0.00	8.11	0.00	0.10
3 a	0.00	0.03	0.00	-1.47	0.00	-0.01	0.00	-2.13
3 b	0.00	0.01	0.00	-0.26	0.00	0.00	0.00	-0.46
3 c	0.00	0.00	0.00	-0.03	0.00	0.00	0.00	-0.05
4 a	0.00	1.03	0.00	-0.92	0.00	0.74	0.00	-0.66
4 b	0.00	-0.01	0.00	-0.07	0.00	-0.01	0.00	-0.06
4 c	0.00	0.80	0.00	-1.03	0.00	0.51	0.00	-0.73
5 a	0.00	7.36	0.00	-1.77	0.00	7.76	0.00	-1.05
5 b	0.00	3.56	0.00	-0.40	0.00	3.50	0.00	-0.21
5 c	0.00	1.00	0.00	-0.73	0.00	0.72	0.00	-0.52
6 a	0.00	7.36	0.00	2.72	0.00	7.76	0.00	2.02
6 b	0.00	3.56	0.00	0.89	0.00	3.50	0.00	0.67
6 c	0.00	0.93	0.00	-0.90	0.00	0.67	0.00	-0.64

URS

Project	Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)	Design	PT	Date	08/09
Portion	Striped Lanes - Transverse Analysis - Cline Avenue	Check	IC by RJB	Date	08/09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VB EL STRIPED LANES

SERVICE FORCES

MAXIMUM loads for section(s) 6 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SECTION	GTStrudl NODE NO.	Selfweight F (Kip)	Selfweight M (Kip-ft)	Surcharge (WS) F (Kip)	Surcharge (WS) M (Kip-ft)	Surcharge (Barrier) F (Kip)	Surcharge (Barrier) M (Kip-ft)
1 a		0.00	-0.05	0.00	-0.01	0.00	-0.12
1 b		0.00	-0.96	0.00	-0.18	0.00	-1.37
1 c		0.00	-3.27	0.00	-0.55	0.00	-2.61
2 a		0.00	-6.72	0.00	-1.33	0.00	-0.15
2 b		0.00	-1.35	0.00	-0.27	0.00	-0.15
2 c		0.00	2.90	0.00	0.64	0.00	-0.15
3 a		0.00	-3.27	0.00	-0.55	0.00	-2.61
3 b		0.00	-0.96	0.00	-0.18	0.00	-1.37
3 c		0.00	-0.05	0.00	-0.01	0.00	-0.12
4 a		0.00	-3.76	0.00	-0.01	0.00	0.04
4 b		0.00	4.40	0.00	-0.01	0.00	0.03
4 c		0.00	-3.76	0.00	-0.01	0.00	0.04
5 a		0.00	3.03	0.00	0.78	0.00	-2.49
5 b		0.00	-0.62	0.00	0.41	0.00	-1.28
5 c		0.00	-4.27	0.00	0.03	0.00	-0.08
6 a		0.00	3.03	0.00	0.78	0.00	-2.49
6 b		0.00	-0.62	0.00	0.41	0.00	-1.28
6 c		0.00	-4.27	0.00	0.03	0.00	-0.08

5.8.9 Operating Rating Evaluations
Striped Lanes

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VB EL STRIPED LANES.XLS]Summary

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Striped Lanes - Transverse Analysis - Cline Avenue** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 1 - HL93-TRUCK					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	0.99	Top Slab Centerline	**0.99**	1.44	3.04	4.06

URS

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PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Striped Lanes - Transverse Analysis - Cline Avenue** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 1 - HL93-TRUCK	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.27	0.09

Project	Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)	Design	PT	Date	08/09
Portion	Striped Lanes - Transverse Analysis - Cline Avenue	Check	IC by RJB	Date	08/09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VB EL STRIPED LANES.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 c	2.90	-0.15	0.64	12.05	0.11	10.52	0.13	2	1	20.44	-7.69	0.99	90.24

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 b	-1.35	-0.15	-0.27	4.51	-3.91	5.41	-4.69	1	1	8.23	-30.44	1.44	4.44

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 a	-6.72	-0.15	-1.33	-2.10	-14.79	-2.52	-10.80	1	2	17.95	-71.26	17.83	3.04

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
1 c	-3.27	-2.61	-0.55	-0.12	-4.69	-0.14	-4.28	1	2	17.95	-34.55	132.23	4.06
3 a	-3.27	-2.61	-0.55	0.03	-1.99	0.04	-1.76	1	2	17.95	-34.55	551.27	9.57

URS

Project	Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)	Design	PT	Date	08/09
Portion	Striped Lanes - Transverse Analysis - Cline Avenue	Check	IC by RJB	Date	08/09

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VB EL STRIPED LANES.XLS]StrengthI(W)L

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.20				1.00	1.20					
LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Load Moment	

Calculate Area of Steel Required at Top of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
5 a	3.03	-1.70	-1.77	-2.12	1	-1.64	0.02	12.53	8.83	2	18.14	0.27	1.23	0.018
6 a	3.03	-1.70	2.72	3.26	1	5.64	0.08	12.53	8.83	2	18.14	0.27	1.23	0.018

Calculate Area of Steel Required at Middle of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
5 b	-0.62	-0.88	-0.40	-0.48	1	-2.74	0.04	5.90	4.27	2	5.87	0.09	-2.09	0.031
6 b	-0.62	-0.88	0.89	1.07	1	-0.65	0.01	5.90	4.27	2	5.87	0.09	-2.09	0.031

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VB EL STRIPED LANES.XLS]Summary

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Striped Lanes - Transverse Analysis - Cline Avenue** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 2 - HL93-TANDEM					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.07	Top Slab Centerline	**1.07**	1.89	2.74	3.17

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VB EL STRIPED LANES.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Striped Lanes - Transverse Analysis - Cline Avenue** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 2 - HL93-TANDEM	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.28	0.08

Project	Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)	Design	PT	Date	08/09
Portion	Striped Lanes - Transverse Analysis - Cline Avenue	Check	IC by RJB	Date	08/09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VB EL STRIPED LANES.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 2 **Truck 2 - HL93-TANDEM**

Combine trucks? N

					One or two vehicles		One vehicle							
			MPF =		1.00	1.00	1.20	1.20						
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35			Allowable		Rating Factor	
	SECTION	Selfweight	Barrier	WS	LL+I (Max.)	LL+I (Min)	LL+I (Max.)	LL+I (Min)	Controlling # vehicles		Mn** (kip-ft)		RF	RF
		kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	LL+I (Max.)	LL+I (Min)	Max.	Min.	(Max Live Load)	(Min. Live Load)
Top Slab Centerline	2 c	2.90	-0.15	0.64	11.12	0.10	9.73	0.12	2	1	20.44	-7.69	1.07	99.26
Top Slab Thickness Change (Between Webs)	2 b	-1.35	-0.15	-0.27	3.45	-4.60	4.14	-5.02	1	1	8.23	-30.44	1.89	4.15
Top Slab at Web	2 a	-6.72	-0.15	-1.33	-3.43	-16.39	-4.12	-12.38	1	2	17.95	-71.26	10.92	2.74
Top Slab at Cantilever	1 c	-3.27	-2.61	-0.55	-0.30	-6.01	-0.36	-5.03	1	2	17.95	-34.55	52.89	3.17
	3 a	-3.27	-2.61	-0.55	-0.01	-2.99	-0.01	-2.56	1	2	17.95	-34.55	1586.75	6.37

URS

Project	Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)	Design	PT	Date	08/09
Portion	Striped Lanes - Transverse Analysis - Cline Avenue	Check	IC by RJB	Date	08/09

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VB EL STRIPED LANES.XLS]StrengthI(W)L

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Truck ID 2 **Truck 2 - HL93-TANDEM**

Combine trucks? N

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

			two vehicles	One Vehicle				One or two vehicles	One Vehicle						
		MPF =	1.00	1.20				1.00	1.20						
	LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Load Moment	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 a	3.03	-1.70	-1.05	-1.26	1	-0.47	0.01	12.82	9.31	2	18.54	0.28	1.23	0.018
	6 a	3.03	-1.70	2.02	2.42	1	4.50	0.07	12.82	9.31	2	18.54	0.28	1.23	0.018
Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 b	-0.62	-0.88	-0.21	-0.25	1	-2.43	0.04	5.70	4.20	2	5.60	0.08	-2.09	0.031
	6 b	-0.62	-0.88	0.67	0.80	1	-1.01	0.01	5.70	4.20	2	5.60	0.08	-2.09	0.031

5.8.10 Inventory Rating Evaluations
Striped Lanes

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VB EL STRIPED LANES.XLS]Summary

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Striped Lanes - Transverse Analysis - Cline Avenue** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 1 - HL93-TRUCK					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Inventory - Strength I	0.76	Top Slab Centerline	**0.76**	1.11	2.34	3.13

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VB EL STRIPED LANES.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Striped Lanes - Transverse Analysis - Cline Avenue** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 1 - HL93-TRUCK	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Inventory - Strength I	0.35	0.12

Project	Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)	Design	PT	Date	08/09
Portion	Striped Lanes - Transverse Analysis - Cline Avenue	Check	IC by RJB	Date	08/09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VB EL STRIPED LANES.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Inventory - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.75	1.75	1.75	1.75

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 c	2.90	-0.15	0.64	12.05	0.11	10.52	0.13	2	1	20.44	-7.69	0.76	69.61

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 b	-1.35	-0.15	-0.27	4.51	-3.91	5.41	-4.69	1	1	8.23	-30.44	1.11	3.43

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
2 a	-6.72	-0.15	-1.33	-2.10	-14.79	-2.52	-10.80	1	2	17.95	-71.26	13.75	2.34

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
1 c	-3.27	-2.61	-0.55	-0.12	-4.69	-0.14	-4.28	1	2	17.95	-34.55	102.01	3.13
3 a	-3.27	-2.61	-0.55	0.03	-1.99	0.04	-1.76	1	2	17.95	-34.55	425.26	7.38

Project	Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)	Design	PT	Date	08/09
Portion	Striped Lanes - Transverse Analysis - Cline Avenue	Check	IC by RJB	Date	08/09

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VB EL STRIPED LANES.XLS]StrengthI(W)L

Area of Steel Required at Webs due to Transverse Bending

Inventory - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

			two vehicles	One Vehicle				One or two vehicles	One Vehicle						
		MPF =	1.00	1.20				1.00	1.20						
	LF =	1.25	1.50	1.75		Minimum Live Load Moment			1.75		Maximum Live Load Moment			Dead Load Moment	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 a	3.03	-1.70	-1.77	-2.12	1	-2.49	0.04	12.53	8.83	2	23.16	0.35	1.23	0.018
	6 a	3.03	-1.70	2.72	3.26	1	6.94	0.10	12.53	8.83	2	23.16	0.35	1.23	0.018
Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 b	-0.62	-0.88	-0.40	-0.48	1	-2.93	0.04	5.90	4.27	2	8.23	0.12	-2.09	0.031
	6 b	-0.62	-0.88	0.89	1.07	1	-0.22	0.00	5.90	4.27	2	8.23	0.12	-2.09	0.031

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VB EL STRIPED LANES.XLS]Summary

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Striped Lanes - Transverse Analysis - Cline Avenue** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 2 - HL93-TANDEM					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Inventory - Strength I	0.83	Top Slab Centerline	**0.83**	1.46	2.11	2.44

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VB EL STRIPED LANES.XLS]SummaryASLegal

PROJECT: **Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Striped Lanes - Transverse Analysis - Cline Avenue** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 2 - HL93-TANDEM	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Inventory - Strength I	0.36	0.12

Project	Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)	Design	PT	Date	08/09
Portion	Striped Lanes - Transverse Analysis - Cline Avenue	Check	IC by RJB	Date	08/09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VB EL STRIPED LANES.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Inventory - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 2 **Truck 2 - HL93-TANDEM**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.75	1.75	1.75	1.75

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
Top Slab Centerline	2 c	2.90	-0.15	0.64	11.12	0.10	9.73	0.12	2	1	20.44	-7.69	0.83	76.57
Top Slab Thickness Change (Between Webs)	2 b	-1.35	-0.15	-0.27	3.45	-4.60	4.14	-5.02	1	1	8.23	-30.44	1.46	3.20
Top Slab at Web	2 a	-6.72	-0.15	-1.33	-3.43	-16.39	-4.12	-12.38	1	2	17.95	-71.26	8.42	2.11
Top Slab at Cantilever	1 c	-3.27	-2.61	-0.55	-0.30	-6.01	-0.36	-5.03	1	2	17.95	-34.55	40.80	2.44
	3 a	-3.27	-2.61	-0.55	-0.01	-2.99	-0.01	-2.56	1	2	17.95	-34.55	1224.06	4.91

Project	Single Cell - Two Web Box - 41.0' Wide (Ramps - Case V-B)	Design	PT	Date	08/09
Portion	Striped Lanes - Transverse Analysis - Cline Avenue	Check	IC by RJB	Date	08/09

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VB EL STRIPED LANES.XLS]StrengthI(W)L

Area of Steel Required at Webs due to Transverse Bending

Inventory - Strength I

Concrete Strength, 5500 psi

Steel Strength, Fsy: 60,000 psi

Truck ID 2 **Truck 2 - HL93-TANDEM**

Combine trucks? N

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

			two vehicles	One Vehicle				One or two vehicles	One Vehicle						
		MPF =	1.00	1.20				1.00	1.20						
	LF =	1.25	1.50	1.75		Minimum Live Load Moment			1.75		Maximum Live Load Moment			Dead Load Moment	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 a	3.03	-1.70	-1.05	-1.26	1	-0.98	0.01	12.82	9.31	2	23.66	0.36	1.23	0.018
	6 a	3.03	-1.70	2.02	2.42	1	5.47	0.08	12.82	9.31	2	23.66	0.36	1.23	0.018
Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	5 b	-0.62	-0.88	-0.21	-0.25	1	-2.53	0.04	5.70	4.20	2	7.88	0.12	-2.09	0.031
	6 b	-0.62	-0.88	0.67	0.80	1	-0.68	0.01	5.70	4.20	2	7.88	0.12	-2.09	0.031

5.9 Section VC

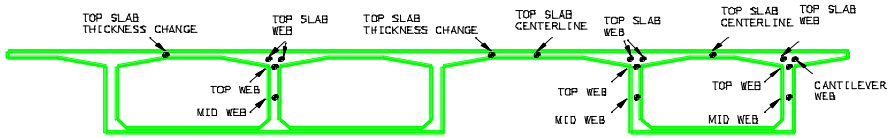
5.9.1 Rating Summary AASHTO Lanes

URS

PROJECT: Cline Avenue-Single Box Portion of Section IVA-(Case VC) CALCS BY: PT DATE: 1/27/09

ESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP- IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length



Cline Avenue			Inventory	Operating										
			LFR Design Loads	LFR Design Loads	INDOT Legal Loads*			INDOT Permit Loads						
			HL93 or Tandem*	Hl93 or Tandem*	Single Vehicle (SV)			Super Loads						
					R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Gross Vehicle Weight (tons)			32	32	45	45	63	67	67.1	129	133.5	175	152.5	240
Longitudinal	Factored	Flexure												
		Shear												
	Service	Flexure												
		Principal Stress												
Transverse	Factored	Top Slab Centerline	1.53	1.99	2.11	2.22	2.22	1.90	1.83	1.76	1.76	1.54	1.78	1.58
		Top Slab Thickness Change	1.60	2.07	2.26	2.31	2.27	2.01	1.95	1.86	1.88	1.56	1.86	1.60
		Top Slab Webs & Cantilever	4.64	6.01	6.56	5.46	5.81	4.27	5.37	4.75	4.69	3.36	4.04	3.45

Overall Rating Factor	1.53	1.99	2.11	1.54
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)		63.61	94.87	102.99

* Max number of lanes loaded = 2

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]Truck Data

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)**

Import Brug Data | Delete Load Rating Factors | Calculate Load Rating Factors | Print Load Rating Results | View Single LC Results

CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis**

CHECKED BY: TSP - IC RJE DATE: Jan 09 - Aug 09

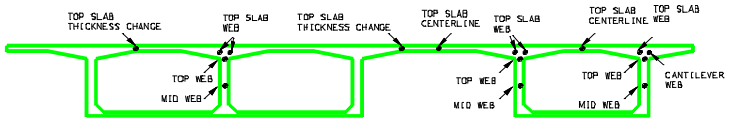
LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Summary of Rating Factors:

	Combine Trucks?	Truck Description		Operating - Strength I		View Single LC Results	Operating - Strength I						AS required - With Live Load		PRINT	Calculate Rating Factors	Brug plates with reversed moment sign and reversed LL Max/Min
	Y or N	Rating Truck ID	Truck Name	Brug File with 2 or more vehicles	Brug File with a single vehicle	Y or N	RF	RF Controlling Location	Top Slab Centerline	Top Slab (Thickness Change Section)	Top Slab Webs	Cantilever at Webs	Top of Web	Middle of Web	Y or N	Y or N	
HL93- DESIGN LOADS	N	1	HL93-TRUCK	IV_A_HL93_TRUCK_EL.OUT	1_IV_A_HL93_TRUCK_EL.OUT	Y	1.99	Top Slab Centerline	1.99	2.07	7.41	8.21	0.32	0.16	N	Y	11
	N	2	HL93-TANDEM	V_A_HL93_TANDEM_EL.OU	IV_A_HL93_TANDEM_EL.OU	N	2.13	Top Slab Centerline	2.13	2.31	6.01	6.77	0.27	0.13	N	Y	12
INDOT DESIGN LOADS	N	3	R1	IV_A_R1_EL.OUT	1_IV_A_R1_EL.OUT	N	2.11	Top Slab Centerline	2.11	2.26	6.56	9.03	0.37	0.18	N	Y	14
	N	4	R2	IV_A_R2_EL.OUT	1_IV_A_R2_EL.OUT	N	2.22	Top Slab Centerline	2.22	2.31	5.46	10.68	0.35	0.17	N	Y	
	N	5	R3	IV_A_R3_EL.OUT	1_IV_A_R3_EL.OUT	N	2.22	Top Slab Centerline	2.22	2.27	5.81	9.73	0.40	0.20	N	Y	
	N	6	NOT USED	n/a	n/a	N									N	N	
	N	7	NOT USED	n/a	n/a	N									N	N	
	N	8	NOT USED	n/a	n/a	N									N	N	
	N	9	NOT USED	n/a	n/a	N									N	N	
	N	10	NOT USED	n/a	n/a	N									N	N	
	N	11	NOT USED	n/a	n/a	N									N	N	
INDOT DESIGN LOADS	Y	12	R4 + HL93	IV_A_R4_EL.OUT	1_IV_A_R4_EL.OUT	N	1.90	Top Slab Centerline	1.90	2.01	4.27	8.60	0.38	0.19	N	Y	
	Y	13	R5 + HL93	IV_A_R5_EL.OUT	1_IV_A_R5_EL.OUT	N	1.83	Top Slab Centerline	1.83	1.95	5.37	7.92	0.41	0.20	N	Y	
INDOT PERMIT LOADS	Y	14	S1 + HL93	IV_A_S1_EL.OUT	1_IV_A_S1_EL.OUT	N	1.76	Top Slab Centerline	1.76	1.86	4.75	6.92	0.45	0.23	N	Y	
	Y	15	S2 + HL93	IV_A_S2_EL.OUT	1_IV_A_S2_EL.OUT	N	1.76	Top Slab Centerline	1.76	1.88	4.69	7.41	0.45	0.23	N	Y	
	Y	16	S3 + HL93	IV_A_S3_EL.OUT	1_IV_A_S3_EL.OUT	N	1.54	Top Slab Centerline	1.54	1.56	3.36	6.31	0.54	0.28	N	Y	
	Y	17	S4 + HL93	IV_A_S4_EL.OUT	1_IV_A_S4_EL.OUT	N	1.78	Top Slab Centerline	1.78	1.86	4.04	8.07	0.45	0.23	N	Y	
	Y	18	S5 + HL93	IV_A_S5_EL.OUT	1_IV_A_S5_EL.OUT	N	1.58	Top Slab Centerline	1.58	1.60	3.45	6.57	0.55	0.28	N	Y	
	N	19	NOT USED	n/a	n/a	N									N	N	
	N	20	NOT USED	n/a	n/a	N									N	N	
	N	21	NOT USED	n/a	n/a	N									N	N	
	N	22	NOT USED	n/a	n/a	N									N	N	
	N	23	NOT USED	n/a	n/a	N									N	N	
	N	24	NOT USED	n/a	n/a	N									N	N	
	N	25	NOT USED	n/a	n/a	N									N	N	
	N	26	NOT USED	n/a	n/a	N									N	N	

LRFR Load Factors For Segmental Bridges				Multiple Presence Factor	
LOAD CASE	DL	SDL	LL	one lane	two lanes
Operating - Strength I	1.25	1.50	1.35	1.20	1.00

				Multiple Presence Factor	
LOAD CASE	DL	SDL	LL	one lane	two lanes
Operating - Strength I	1.25	1.50	1.35	1.00	1.00



URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]Truck Data

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)**

DESCRIPTION: **Superstructure - Transverse Analysis**

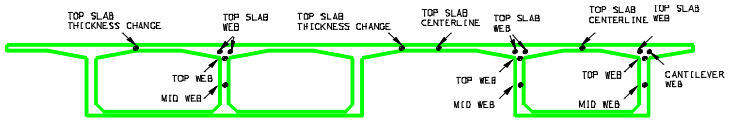
Import Brug Data | Delete Load Rating Factors | Calculate Load Rating Factors | Print Load Rating Results | View Single LC Results

CALCS BY: PT DATE: 1/27/09

CHECKED BY: TSP - IC RJE DATE: Jan 09 - Aug 09

	Combine Trucks?	Truck Description		Inventory - Strength I		PRINT	Operating - Strength I						AS required		PRINT	Calculate Rating Factors
	Y or N	Rating Truck ID	Truck Name	RF	RF Controlling Location	Y or N	RF	RF Controlling Location	Top Slab Centerline	Top Slab (Thickness Change Section)	Top Slab Webs	Cantilever at Webs	Top of Web	Middle of Web	Y or N	Y or N
HS20- DESIGN LOADS	N	1	HL93-TRUCK	IV_A_HL93_TRUCK_EL.OUT	1_IV_A_HL93_TRUCK_EL.OUT	N	1.53	Top Slab Centerline	1.53	1.60	5.72	6.34	0.40	0.20	Y	Y
	N	2	HL93-TANDEM	V_A_HL93_TANDEM_EL.OU	IV_A_HL93_TANDEM_EL.OU	N	1.64	Top Slab Centerline	1.64	1.78	4.64	5.23	0.34	0.16	N	Y

LFR Load Factors For Segmental Bridges - NC DOT				Multiple Presence Factor	
LOAD CASE	DL	SDL	LL	one lane	two lanes
Inventory - Strength I	1.25	1.50	1.75	1.20	1.00



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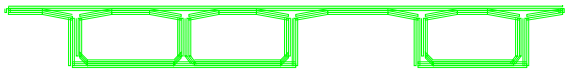
PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP- IC RJB DATE: Jan 09 - Aug 09

Area of Steel Requirements



LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

			Middle of Web		Top of Web	
Section	Inventory / Operating	Combined Name	A_b req'd (in^2/ft)	$A_{b\ Dead}$ req'd (in^2/ft)	A_b req'd (in^2/ft)	$A_{b\ Dead}$ req'd (in^2/ft)
HL-93	Inventory	HL-93 Inventory	0.20	0.03	0.40	0.07
HL-93	Operating	HL-93 Operating	0.16	0.03	0.32	0.07
HL-93-s	Operating	HL-93-s Operating	0.16	0.03	0.32	0.07
R1	Operating	R1 Operating	0.18	0.03	0.37	0.07
R1-s	Operating	R1-s Operating	0.18	0.03	0.37	0.07
R2	Operating	R2 Operating	0.17	0.03	0.35	0.07
R2-s	Operating	R2-s Operating	0.17	0.03	0.35	0.07
R3	Operating	R3 Operating	0.20	0.03	0.40	0.07
R3-s	Operating	R3-s Operating	0.20	0.03	0.40	0.07
R4	Operating	R4 Operating	0.19	0.03	0.38	0.07
R4-s	Operating	R4-s Operating	0.19	0.03	0.38	0.07
R5	Operating	R5 Operating	0.20	0.03	0.41	0.07
R5-s	Operating	R5-s Operating	0.20	0.03	0.41	0.07
S1	Operating	S1 Operating	0.23	0.03	0.45	0.07
S1-s	Operating	S1-s Operating	0.23	0.03	0.45	0.07
S2	Operating	S2 Operating	0.23	0.03	0.45	0.07
S2-s	Operating	S2-s Operating	0.23	0.03	0.45	0.07
S3	Operating	S3 Operating	0.28	0.03	0.54	0.07
S3-s	Operating	S3-s Operating	0.28	0.03	0.54	0.07
S4	Operating	S4 Operating	0.23	0.03	0.45	0.07
S4-s	Operating	S4-s Operating	0.23	0.03	0.45	0.07
S5	Operating	S5 Operating	0.28	0.03	0.55	0.07
S5-s	Operating	S5-s Operating	0.28	0.03	0.55	0.07

5.9.2 General Data AASHTO Lanes

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Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis	Check	TSP -IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]General Data

GENERAL DATA:

Concrete Strength, F'c, final conditions: 5000 psi

Width of Section, b: 1.00 ft

Steel Strength, Fsy: 60,000 psi

Rating Action	Description
0	No Action
1	Calculate Area of Steel Required at Top of Webs
2	Calculate Area of Steel Required at Middle of Webs
3	Calculate Rating Factor - Top Slab Centerline
4	Calculate Rating Factor - Top Slab Thickness Change (Between Webs)
5	Calculate Rating Factor - Top Slab at Web
6	Calculate Rating Factor - Top Slab at Cantilever

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

*** Clear Cover, longitudinal bars are below top steel and above bottom steel

Ref: Sheet 532, 540, 561

Initialize Spreadsheet

Calculate Mn

SECTION	GTSTRUDL NODE NO.	Rating Action	Calculate Moment Capacity	Depth (ft)	*** Cover - at (in)	dt (in)	Regular Reinforcement (Top) Size of Bar	Regular Reinforcement (Top) No. of Bars	*** Cover - ab (in)	db (in)	Regular Reinforcement (Bot) Size of Bar	Regular Reinforcement (Bot) No. of Bars	fc'= 5000 ϕ Mn ** (Kip-ft) MAX.	MIN.
1 a		0	Y	0.750	1.50	7.19	5	2.42	1.00	7.75	4	1.00	6.88	-22.90
1 b		0	Y	1.667	1.50	18.19	5	2.42	1.00	18.75	4	1.00	16.78	-60.04
2 a		0	Y	1.667	1.50	18.19	5	2.42	1.00	18.75	4	1.00	16.78	-60.03
2 b		0	Y	0.750	1.50	7.19	5	2.42	1.00	7.63	6	1.00	14.63	-22.90
2 c		0	Y	0.750	1.50	7.19	5	1.00	1.00	7.63	6	1.00	14.63	-9.80
3 a		0	Y	1.667	1.50	18.19	5	2.42	1.00	18.75	4	1.00	16.78	-60.03
3 b		0	Y	0.750	1.50	7.19	5	2.42	1.00	7.63	6	1.00	14.63	-22.90
3 c		0	Y	0.750	1.50	7.19	5	1.00	1.00	7.63	6	1.00	14.63	-9.80
4 a		0	Y	1.667	1.50	18.19	5	2.42	1.00	18.75	4	1.00	16.78	-60.03
4 b		0	Y	0.750	1.50	7.19	5	2.42	1.00	7.63	6	1.00	14.63	-22.90
4 c		0	Y	0.750	1.50	7.19	5	1.00	1.00	7.63	6	1.00	14.63	-9.80
5 a		5	Y	1.667	1.50	18.19	5	2.42	1.00	18.75	4	1.00	16.78	-60.03
5 b		4	Y	0.750	1.50	7.19	5	2.42	1.00	7.63	6	1.00	14.63	-22.90
5 c		3	Y	0.750	1.50	7.19	5	1.00	1.00	7.63	6	1.00	14.63	-9.80
6 a		6	Y	1.667	1.50	18.19	5	2.42	1.00	18.75	4	1.00	16.78	-60.03
7 a		0	N	1.458	1.00	16.25	4	1.20	1.00	16.19	5	1.20		
7 b		0	N	0.458	1.00	4.25	4	1.20	1.00	4.19	5	1.20		
7 c		0	N	0.458	1.00	4.25	4	1.20	1.00	4.19	5	1.20		
8 a		0	N	1.458	1.00	16.25	4	1.20	1.00	16.19	5	1.20		
8 b		0	N	0.458	1.00	4.25	4	1.20	1.00	4.19	5	1.20		
8 c		0	N	0.458	1.00	4.25	4	1.20	1.00	4.19	5	1.20		
9 a		0	N	1.458	1.00	16.25	4	1.20	1.00	16.19	5	1.20		
9 b		0	N	0.458	1.00	4.25	4	1.20	1.00	4.19	5	1.20		
9 c		0	N	0.458	1.00	4.25	4	1.20	1.00	4.19	5	1.20		
10 a		0	N	1.167	1.00	12.69	5		1.00	12.69	5			
10 b		0	N	1.167	1.00	12.69	5		1.00	12.69	5			
11 a		0	N	1.167	1.00	12.69	5		1.00	12.69	5			
11 b		0	N	1.167	1.00	12.69	5		1.00	12.69	5			
12 a		0	N	1.167	1.00	12.69	5		1.00	12.69	5			
12 b		0	N	1.167	1.00	12.69	5		1.00	12.69	5			
13 a		1	N	1.167	1.00	12.69	5		1.00	12.69	5			
13 b		2	N	1.167	1.00	12.69	5		1.00	12.69	5			
14 a		1	N	1.167	1.00	12.69	5		1.00	12.69	5			
14 b		2	N	1.167	1.00	12.69	5		1.00	12.69	5			

5.9.3 Load Summary AASHTO Lanes

URS

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]LLMult

Project: Cline Avenue-Single Box Portion of Section IVA-(Case VC) | Design: PT | Date: 1/27/09

Portion: Superstructure - Transverse Analysis | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 11 12 14 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 or 2 Vehicles)**

	Truck 1 - HL93-TRUCK		Truck 1 - HL93-TRUCK		Truck 2 - HL93-TANDEM		Truck 2 - HL93-TANDEM		Truck 3 - R1		Truck 3 - R1		Truck 4 - R2		Truck 4 - R2	
	Maximum		Minimum		Maximum		Minimum		Maximum		Minimum		Maximum		Minimum	
GTSTRUDL	Positive Moment		Negative Moment		Positive Moment		Negative Moment		Positive Moment		Negative Moment		Positive Moment		Negative Moment	
SECTION NODE NO.	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)
1 a	0.00	1.02	0.00	-6.27	0.00	0.68	0.00	-6.83	0.00	0.39	0.00	-6.55	0.00	0.70	0.00	-5.48
1 b	0.00	0.06	0.00	-11.01	0.00	0.12	0.00	-12.66	0.00	0.07	0.00	-11.65	0.00	0.04	0.00	-9.39
2 a	0.00	1.05	0.00	-6.37	0.00	-0.07	0.00	-7.53	0.00	1.38	0.00	-6.06	0.00	1.93	0.00	-5.20
2 b	0.00	4.09	0.00	-1.32	0.00	3.50	0.00	-1.31	0.00	3.97	0.00	-1.26	0.00	3.89	0.00	-1.21
2 c	0.00	4.86	0.00	-0.91	0.00	4.66	0.00	-0.79	0.00	4.34	0.00	-1.12	0.00	4.13	0.00	-0.95
3 a	0.00	1.92	0.00	-8.73	0.00	0.73	0.00	-9.19	0.00	2.43	0.00	-8.76	0.00	2.62	0.00	-7.59
3 b	0.00	3.96	0.00	-1.97	0.00	3.54	0.00	-1.47	0.00	3.64	0.00	-1.83	0.00	3.56	0.00	-1.77
3 c	0.00	5.16	0.00	-0.80	0.00	4.86	0.00	-0.65	0.00	4.71	0.00	-0.98	0.00	4.50	0.00	-0.91
4 a	0.00	4.36	0.00	-13.16	0.00	2.80	0.00	-13.42	0.00	5.42	0.00	-14.51	0.00	5.60	0.00	-12.68
4 b	0.00	5.04	0.00	-5.05	0.00	4.15	0.00	-4.24	0.00	5.02	0.00	-5.46	0.00	4.95	0.00	-5.24
4 c	0.00	6.72	0.00	-0.34	0.00	6.46	0.00	-0.34	0.00	5.95	0.00	-0.42	0.00	5.71	0.00	-0.38
5 a	0.00	1.63	0.00	-5.07	0.00	0.18	0.00	-6.76	0.00	1.93	0.00	-4.72	0.00	2.32	0.00	-3.82
5 b	0.00	4.40	0.00	-1.11	0.00	3.92	0.00	-1.18	0.00	4.40	0.00	-1.05	0.00	4.19	0.00	-0.89
5 c	0.00	4.91	0.00	-0.64	0.00	4.59	0.00	-0.58	0.00	4.63	0.00	-0.79	0.00	4.39	0.00	-0.70
6 a	0.00	0.08	0.00	-4.76	0.00	0.17	0.00	-5.79	0.00	0.09	0.00	-4.13	0.00	0.03	0.00	-3.44
7 a	0.00	1.22	0.00	-0.67	0.00	0.93	0.00	-0.49	0.00	1.48	0.00	-0.82	0.00	1.38	0.00	-0.77
7 b	0.00	1.04	0.00	-0.58	0.00	0.77	0.00	-0.42	0.00	1.27	0.00	-0.71	0.00	1.19	0.00	-0.67
7 c	0.00	0.06	0.00	-0.05	0.00	0.05	0.00	-0.04	0.00	0.07	0.00	-0.06	0.00	0.06	0.00	-0.05
8 a	0.00	1.11	0.00	-0.90	0.00	0.85	0.00	-0.66	0.00	1.34	0.00	-1.10	0.00	1.26	0.00	-1.03
8 b	0.00	0.94	0.00	-0.78	0.00	0.69	0.00	-0.57	0.00	1.14	0.00	-0.95	0.00	1.08	0.00	-0.90
8 c	0.00	0.05	0.00	-0.07	0.00	0.04	0.00	-0.06	0.00	0.06	0.00	-0.09	0.00	0.06	0.00	-0.08
9 a	0.00	0.66	0.00	-0.79	0.00	0.61	0.00	-0.62	0.00	0.78	0.00	-0.95	0.00	0.67	0.00	-0.89
9 b	0.00	0.53	0.00	-0.67	0.00	0.45	0.00	-0.49	0.00	0.64	0.00	-0.82	0.00	0.56	0.00	-0.77
9 c	0.00	0.04	0.00	-0.09	0.00	0.03	0.00	-0.07	0.00	0.05	0.00	-0.11	0.00	0.04	0.00	-0.10
10 a	0.00	4.65	0.00	-9.35	0.00	4.81	0.00	-8.58	0.00	5.27	0.00	-10.89	0.00	4.52	0.00	-9.47
10 b	0.00	2.45	0.00	-4.66	0.00	2.39	0.00	-4.13	0.00	2.96	0.00	-5.65	0.00	2.45	0.00	-4.91
11 a	0.00	9.13	0.00	-7.92	0.00	7.81	0.00	-7.04	0.00	10.73	0.00	-9.24	0.00	9.61	0.00	-8.15
11 b	0.00	4.19	0.00	-3.81	0.00	3.56	0.00	-3.31	0.00	5.08	0.00	-4.62	0.00	4.53	0.00	-4.07
12 a	0.00	8.81	0.00	-11.10	0.00	7.61	0.00	-9.82	0.00	10.33	0.00	-13.13	0.00	9.36	0.00	-11.71
12 b	0.00	4.69	0.00	-5.71	0.00	3.90	0.00	-4.85	0.00	5.70	0.00	-6.95	0.00	5.16	0.00	-6.20
13 a	0.00	11.26	0.00	-7.27	0.00	9.18	0.00	-7.23	0.00	13.33	0.00	-8.44	0.00	12.31	0.00	-7.08
13 b	0.00	5.93	0.00	-3.65	0.00	4.69	0.00	-3.45	0.00	7.21	0.00	-4.43	0.00	6.67	0.00	-3.72
14 a	0.00	5.54	0.00	-2.22	0.00	5.32	0.00	-1.82	0.00	6.38	0.00	-2.62	0.00	5.47	0.00	-2.36
14 b	0.00	2.94	0.00	-0.93	0.00	2.68	0.00	-0.76	0.00	3.57	0.00	-1.13	0.00	3.06	0.00	-1.01

Project: Cline Avenue-Single Box Portion of Section IVA-(Case VC) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 11 12 14 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 or 2 Vehicles)**

SECTION NO.	GTSTRUDL NODE	Truck 5 - R3 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 5 - R3 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 6 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 6 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 7 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 7 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 8 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 8 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	0.50	0.00	-5.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 b		0.00	0.02	0.00	-9.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 a		0.00	2.08	0.00	-5.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 b		0.00	3.87	0.00	-1.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 c		0.00	3.91	0.00	-0.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 a		0.00	2.86	0.00	-8.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 b		0.00	3.63	0.00	-2.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 c		0.00	4.40	0.00	-1.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 a		0.00	6.84	0.00	-14.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 b		0.00	5.52	0.00	-6.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 c		0.00	5.43	0.00	-0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 a		0.00	2.18	0.00	-3.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 b		0.00	4.38	0.00	-0.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 c		0.00	4.40	0.00	-0.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 a		0.00	0.02	0.00	-4.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 a		0.00	1.58	0.00	-0.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 b		0.00	1.36	0.00	-0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 c		0.00	0.05	0.00	-0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8 a		0.00	1.49	0.00	-1.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8 b		0.00	1.28	0.00	-1.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8 c		0.00	0.06	0.00	-0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 a		0.00	0.65	0.00	-1.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 b		0.00	0.52	0.00	-0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 c		0.00	0.04	0.00	-0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10 a		0.00	4.68	0.00	-9.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10 b		0.00	2.42	0.00	-4.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11 a		0.00	10.53	0.00	-8.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11 b		0.00	4.81	0.00	-4.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12 a		0.00	11.00	0.00	-13.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12 b		0.00	5.84	0.00	-7.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13 a		0.00	14.42	0.00	-7.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13 b		0.00	7.74	0.00	-3.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14 a		0.00	5.51	0.00	-2.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14 b		0.00	3.00	0.00	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project: Cline Avenue-Single Box Portion of Section IVA-(Case VC) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 11 12 14 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 or 2 Vehicles)**

SECTION NO.	GTSTRUDL NODE	Truck 9 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 9 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 10 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 10 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 11 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 11 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 12 - R4 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 12 - R4 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.51	0.00	-5.41
1 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.00	-9.15
2 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.41	0.00	-5.61
2 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.38	0.00	-1.68
2 c		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.01	0.00	-1.12
3 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.11	0.00	-8.85
3 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.82	0.00	-2.22
3 c		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.55	0.00	-1.22
4 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.46	0.00	-16.03
4 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.06	0.00	-7.43
4 c		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.52	0.00	-0.48
5 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.56	0.00	-3.36
5 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.78	0.00	-1.08
5 c		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.61	0.00	-0.89
6 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	-2.76
7 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.88	0.00	-1.07
7 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.64	0.00	-0.92
7 c		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	-0.06
8 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.73	0.00	-1.43
8 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.51	0.00	-1.24
8 c		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	-0.10
9 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	0.00	-1.22
9 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.69	0.00	-1.07
9 c		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	-0.13
10 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.39	0.00	-11.34
10 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.94	0.00	-5.99
11 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.13	0.00	-9.97
11 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.77	0.00	-5.09
12 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.41	0.00	-15.25
12 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.76	0.00	-8.28
13 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.34	0.00	-8.33
13 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.98	0.00	-4.58
14 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.74	0.00	-2.99
14 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.67	0.00	-1.29

Project: Cline Avenue-Single Box Portion of Section IVA-(Case VC) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 11 12 14 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 or 2 Vehicles)**

SECTION NO.	GTSTRUDL NODE	Truck 13 - R5 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 13 - R5 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 14 - S1 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 14 - S1 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 15 - S2 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 15 - S2 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 16 - S3 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 16 - S3 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	0.11	0.00	-6.96	0.00	0.60	0.00	-7.20	0.00	0.47	0.00	-7.00	0.00	0.41	0.00	-9.14
1 b		0.00	0.04	0.00	-12.54	0.00	0.03	0.00	-13.12	0.00	0.05	0.00	-12.60	0.00	0.06	0.00	-16.33
2 a		0.00	2.47	0.00	-6.98	0.00	3.32	0.00	-8.02	0.00	3.41	0.00	-7.73	0.00	4.64	0.00	-9.91
2 b		0.00	4.53	0.00	-1.69	0.00	5.35	0.00	-2.06	0.00	5.18	0.00	-1.94	0.00	6.70	0.00	-2.58
2 c		0.00	4.40	0.00	-1.29	0.00	5.19	0.00	-1.15	0.00	4.93	0.00	-1.14	0.00	6.21	0.00	-1.62
3 a		0.00	3.56	0.00	-10.38	0.00	4.53	0.00	-11.47	0.00	4.58	0.00	-11.13	0.00	6.14	0.00	-14.65
3 b		0.00	3.99	0.00	-2.24	0.00	5.17	0.00	-2.86	0.00	4.93	0.00	-2.71	0.00	6.14	0.00	-3.48
3 c		0.00	4.94	0.00	-1.29	0.00	5.97	0.00	-1.61	0.00	5.71	0.00	-1.60	0.00	7.21	0.00	-2.07
4 a		0.00	7.99	0.00	-17.94	0.00	10.96	0.00	-21.83	0.00	11.02	0.00	-21.70	0.00	14.29	0.00	-28.17
4 b		0.00	6.08	0.00	-7.65	0.00	8.17	0.00	-10.31	0.00	7.93	0.00	-10.25	0.00	10.04	0.00	-13.15
4 c		0.00	6.02	0.00	-0.52	0.00	7.26	0.00	-0.56	0.00	6.90	0.00	-0.56	0.00	8.65	0.00	-0.76
5 a		0.00	2.83	0.00	-4.83	0.00	3.20	0.00	-4.69	0.00	3.24	0.00	-4.39	0.00	4.52	0.00	-5.73
5 b		0.00	5.11	0.00	-1.24	0.00	6.18	0.00	-1.41	0.00	5.99	0.00	-1.41	0.00	7.70	0.00	-1.84
5 c		0.00	5.02	0.00	-0.97	0.00	6.09	0.00	-1.08	0.00	5.86	0.00	-1.07	0.00	7.43	0.00	-1.41
6 a		0.00	0.03	0.00	-4.10	0.00	0.03	0.00	-5.22	0.00	0.06	0.00	-4.73	0.00	0.07	0.00	-5.63
7 a		0.00	1.98	0.00	-1.11	0.00	2.29	0.00	-1.26	0.00	2.26	0.00	-1.25	0.00	3.03	0.00	-1.68
7 b		0.00	1.71	0.00	-0.96	0.00	1.98	0.00	-1.10	0.00	1.96	0.00	-1.08	0.00	2.62	0.00	-1.46
7 c		0.00	0.08	0.00	-0.07	0.00	0.07	0.00	-0.07	0.00	0.07	0.00	-0.07	0.00	0.11	0.00	-0.09
8 a		0.00	1.82	0.00	-1.49	0.00	2.23	0.00	-1.73	0.00	2.21	0.00	-1.71	0.00	2.90	0.00	-2.28
8 b		0.00	1.57	0.00	-1.29	0.00	1.91	0.00	-1.50	0.00	1.90	0.00	-1.49	0.00	2.50	0.00	-1.99
8 c		0.00	0.08	0.00	-0.11	0.00	0.10	0.00	-0.12	0.00	0.10	0.00	-0.12	0.00	0.13	0.00	-0.16
9 a		0.00	0.93	0.00	-1.29	0.00	0.84	0.00	-1.57	0.00	0.82	0.00	-1.56	0.00	1.13	0.00	-2.05
9 b		0.00	0.77	0.00	-1.11	0.00	0.69	0.00	-1.35	0.00	0.68	0.00	-1.34	0.00	0.95	0.00	-1.77
9 c		0.00	0.06	0.00	-0.14	0.00	0.06	0.00	-0.16	0.00	0.06	0.00	-0.16	0.00	0.08	0.00	-0.21
10 a		0.00	6.26	0.00	-13.03	0.00	6.61	0.00	-13.66	0.00	6.54	0.00	-13.48	0.00	8.75	0.00	-18.12
10 b		0.00	3.35	0.00	-6.82	0.00	3.43	0.00	-6.88	0.00	3.43	0.00	-6.85	0.00	4.65	0.00	-9.35
11 a		0.00	13.48	0.00	-11.32	0.00	15.03	0.00	-12.00	0.00	14.84	0.00	-11.82	0.00	19.78	0.00	-15.92
11 b		0.00	6.39	0.00	-5.70	0.00	6.87	0.00	-5.90	0.00	6.84	0.00	-5.87	0.00	9.23	0.00	-7.99
12 a		0.00	13.32	0.00	-16.48	0.00	16.77	0.00	-20.13	0.00	16.67	0.00	-20.05	0.00	21.63	0.00	-26.15
12 b		0.00	7.37	0.00	-8.81	0.00	8.92	0.00	-10.75	0.00	8.91	0.00	-10.72	0.00	11.62	0.00	-14.09
13 a		0.00	17.56	0.00	-9.62	0.00	21.75	0.00	-10.14	0.00	21.56	0.00	-10.08	0.00	28.09	0.00	-13.48
13 b		0.00	9.58	0.00	-5.08	0.00	11.74	0.00	-5.41	0.00	11.70	0.00	-5.39	0.00	15.32	0.00	-7.31
14 a		0.00	7.49	0.00	-3.25	0.00	7.50	0.00	-3.15	0.00	7.36	0.00	-3.06	0.00	10.06	0.00	-4.26
14 b		0.00	4.24	0.00	-1.41	0.00	4.17	0.00	-1.29	0.00	4.16	0.00	-1.26	0.00	5.69	0.00	-1.79

URS

Project: Cline Avenue-Single Box Portion of Section IVA-(Case VC) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 11 12 14 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 or 2 Vehicles)**

SECTION	GTSTRUDL NODE NO.	Truck 17 - S4 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 17 - S4 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 18 - S5 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 18 - S5 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 19 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 19 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 20 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 20 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	0.37	0.00	-5.86	0.00	0.52	0.00	-8.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 b		0.00	0.01	0.00	-10.45	0.00	0.05	0.00	-14.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 a		0.00	4.14	0.00	-6.91	0.00	4.93	0.00	-9.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 b		0.00	4.88	0.00	-2.06	0.00	6.48	0.00	-2.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 c		0.00	4.22	0.00	-1.10	0.00	5.86	0.00	-1.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 a		0.00	5.39	0.00	-10.43	0.00	6.56	0.00	-13.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 b		0.00	4.74	0.00	-2.78	0.00	6.35	0.00	-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 c		0.00	5.05	0.00	-1.68	0.00	6.96	0.00	-2.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 a		0.00	12.03	0.00	-22.02	0.00	15.45	0.00	-28.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 b		0.00	7.95	0.00	-10.88	0.00	10.54	0.00	-14.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 c		0.00	5.90	0.00	-0.57	0.00	8.26	0.00	-0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 a		0.00	3.76	0.00	-3.36	0.00	4.40	0.00	-4.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 b		0.00	5.66	0.00	-1.46	0.00	7.60	0.00	-1.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 c		0.00	5.29	0.00	-1.12	0.00	7.26	0.00	-1.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 a		0.00	0.01	0.00	-3.60	0.00	0.07	0.00	-5.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 a		0.00	2.34	0.00	-1.30	0.00	2.99	0.00	-1.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 b		0.00	2.03	0.00	-1.13	0.00	2.60	0.00	-1.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 c		0.00	0.07	0.00	-0.06	0.00	0.09	0.00	-0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8 a		0.00	2.28	0.00	-1.78	0.00	2.96	0.00	-2.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8 b		0.00	1.97	0.00	-1.55	0.00	2.55	0.00	-2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8 c		0.00	0.10	0.00	-0.12	0.00	0.14	0.00	-0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 a		0.00	0.79	0.00	-1.60	0.00	1.01	0.00	-2.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 b		0.00	0.67	0.00	-1.39	0.00	0.85	0.00	-1.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 c		0.00	0.07	0.00	-0.16	0.00	0.09	0.00	-0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10 a		0.00	6.05	0.00	-12.90	0.00	8.25	0.00	-16.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10 b		0.00	3.32	0.00	-6.65	0.00	4.34	0.00	-8.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11 a		0.00	14.65	0.00	-11.53	0.00	19.14	0.00	-14.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11 b		0.00	6.79	0.00	-5.76	0.00	8.81	0.00	-7.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12 a		0.00	16.95	0.00	-20.56	0.00	22.42	0.00	-27.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12 b		0.00	9.12	0.00	-11.18	0.00	12.01	0.00	-14.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13 a		0.00	21.87	0.00	-10.06	0.00	28.84	0.00	-13.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13 b		0.00	11.96	0.00	-5.55	0.00	15.70	0.00	-7.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14 a		0.00	7.09	0.00	-3.04	0.00	9.12	0.00	-3.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14 b		0.00	3.98	0.00	-1.25	0.00	5.17	0.00	-1.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

URS

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]LLSing

Project: Cline Avenue-Single Box Portion of Section IVA-(Case VC) | Design: PT | Date: 1/27/09

Portion: Superstructure - Transverse Analysis | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 11 12 14 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 Vehicle Only)**

SECTION NO.	GTSTRUDL NODE	Truck 1 - HL93-TRUCK Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 1 - HL93-TRUCK Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 2 - HL93-TANDEM Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 2 - HL93-TANDEM Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 3 - R1 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 3 - R1 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 4 - R2 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 4 - R2 Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	1.00	0.00	-6.01	0.00	0.64	0.00	-6.36	0.00	0.37	0.00	-6.33	0.00	0.69	0.00	-5.34
1 b		0.00	-0.01	0.00	-9.86	0.00	0.00	0.00	-10.85	0.00	-0.01	0.00	-10.93	0.00	-0.01	0.00	-8.83
2 a		0.00	1.05	0.00	-5.03	0.00	-0.07	0.00	-6.05	0.00	1.38	0.00	-4.70	0.00	1.93	0.00	-3.83
2 b		0.00	3.86	0.00	-0.19	0.00	3.44	0.00	-0.49	0.00	3.52	0.00	-0.21	0.00	3.45	0.00	-0.07
2 c		0.00	4.05	0.00	-0.57	0.00	3.83	0.00	-0.50	0.00	3.48	0.00	-0.70	0.00	3.38	0.00	-0.59
3 a		0.00	1.03	0.00	-6.48	0.00	0.73	0.00	-7.15	0.00	1.35	0.00	-6.47	0.00	1.66	0.00	-5.43
3 b		0.00	3.62	0.00	-1.30	0.00	3.27	0.00	-1.12	0.00	3.22	0.00	-1.09	0.00	3.19	0.00	-1.01
3 c		0.00	4.18	0.00	-0.46	0.00	3.92	0.00	-0.38	0.00	3.64	0.00	-0.57	0.00	3.55	0.00	-0.50
4 a		0.00	2.29	0.00	-7.60	0.00	1.19	0.00	-9.20	0.00	2.90	0.00	-8.58	0.00	3.15	0.00	-7.31
4 b		0.00	4.05	0.00	-2.90	0.00	3.46	0.00	-2.81	0.00	3.81	0.00	-2.91	0.00	3.78	0.00	-2.73
4 c		0.00	4.88	0.00	-0.23	0.00	4.69	0.00	-0.19	0.00	4.24	0.00	-0.29	0.00	4.09	0.00	-0.25
5 a		0.00	1.63	0.00	-4.69	0.00	0.18	0.00	-5.78	0.00	1.93	0.00	-4.72	0.00	2.32	0.00	-3.82
5 b		0.00	4.01	0.00	-0.56	0.00	3.59	0.00	-0.58	0.00	3.67	0.00	-0.66	0.00	3.59	0.00	-0.53
5 c		0.00	4.06	0.00	-0.40	0.00	3.77	0.00	-0.35	0.00	3.62	0.00	-0.49	0.00	3.52	0.00	-0.41
6 a		0.00	-0.01	0.00	-3.98	0.00	0.00	0.00	-4.51	0.00	-0.01	0.00	-3.62	0.00	-0.01	0.00	-3.06
7 a		0.00	0.93	0.00	-0.37	0.00	0.76	0.00	-0.27	0.00	1.10	0.00	-0.45	0.00	1.01	0.00	-0.43
7 b		0.00	0.77	0.00	-0.32	0.00	0.59	0.00	-0.23	0.00	0.93	0.00	-0.39	0.00	0.87	0.00	-0.37
7 c		0.00	0.04	0.00	-0.04	0.00	0.03	0.00	-0.03	0.00	0.05	0.00	-0.05	0.00	0.04	0.00	-0.04
8 a		0.00	0.61	0.00	-0.48	0.00	0.50	0.00	-0.36	0.00	0.74	0.00	-0.59	0.00	0.69	0.00	-0.55
8 b		0.00	0.51	0.00	-0.42	0.00	0.38	0.00	-0.31	0.00	0.63	0.00	-0.51	0.00	0.59	0.00	-0.48
8 c		0.00	0.03	0.00	-0.05	0.00	0.02	0.00	-0.04	0.00	0.04	0.00	-0.06	0.00	0.03	0.00	-0.05
9 a		0.00	0.39	0.00	-0.69	0.00	0.38	0.00	-0.51	0.00	0.46	0.00	-0.84	0.00	0.39	0.00	-0.78
9 b		0.00	0.31	0.00	-0.59	0.00	0.27	0.00	-0.43	0.00	0.37	0.00	-0.72	0.00	0.32	0.00	-0.67
9 c		0.00	0.02	0.00	-0.06	0.00	0.02	0.00	-0.05	0.00	0.03	0.00	-0.07	0.00	0.02	0.00	-0.06
10 a		0.00	3.41	0.00	-9.35	0.00	3.50	0.00	-8.58	0.00	3.95	0.00	-10.89	0.00	3.26	0.00	-9.47
10 b		0.00	1.83	0.00	-4.66	0.00	1.75	0.00	-4.13	0.00	2.22	0.00	-5.65	0.00	1.84	0.00	-4.91
11 a		0.00	5.66	0.00	-5.02	0.00	5.38	0.00	-4.94	0.00	6.68	0.00	-5.90	0.00	5.91	0.00	-5.15
11 b		0.00	2.68	0.00	-2.46	0.00	2.32	0.00	-2.17	0.00	3.25	0.00	-2.99	0.00	2.86	0.00	-2.61
12 a		0.00	5.38	0.00	-6.27	0.00	5.12	0.00	-6.19	0.00	6.35	0.00	-7.32	0.00	5.65	0.00	-6.49
12 b		0.00	2.89	0.00	-3.20	0.00	2.46	0.00	-2.92	0.00	3.51	0.00	-3.90	0.00	3.14	0.00	-3.47
13 a		0.00	6.86	0.00	-4.40	0.00	5.83	0.00	-4.90	0.00	8.14	0.00	-4.95	0.00	7.39	0.00	-4.13
13 b		0.00	3.63	0.00	-2.15	0.00	2.97	0.00	-2.24	0.00	4.42	0.00	-2.62	0.00	4.02	0.00	-2.20
14 a		0.00	4.05	0.00	-2.22	0.00	3.93	0.00	-1.82	0.00	4.72	0.00	-2.62	0.00	4.00	0.00	-2.36
14 b		0.00	2.17	0.00	-0.93	0.00	1.98	0.00	-0.76	0.00	2.63	0.00	-1.13	0.00	2.24	0.00	-1.01

Project: Cline Avenue-Single Box Portion of Section IVA-(Case VC) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 11 12 14 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 Vehicle Only)**

SECTION NO.	GTSTRUDL NODE	Truck 5 - R3 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 5 - R3 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 6 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 6 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 7 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 7 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 8 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 8 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	0.49	0.00	-5.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 b		0.00	-0.01	0.00	-8.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 a		0.00	2.08	0.00	-4.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 b		0.00	3.46	0.00	-0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 c		0.00	3.15	0.00	-0.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 a		0.00	1.80	0.00	-5.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 b		0.00	3.22	0.00	-1.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 c		0.00	3.38	0.00	-0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 a		0.00	3.68	0.00	-7.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 b		0.00	3.94	0.00	-3.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 c		0.00	3.87	0.00	-0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 a		0.00	2.18	0.00	-3.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 b		0.00	3.63	0.00	-0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 c		0.00	3.38	0.00	-0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 a		0.00	-0.01	0.00	-3.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 a		0.00	1.15	0.00	-0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 b		0.00	0.97	0.00	-0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 c		0.00	0.03	0.00	-0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8 a		0.00	0.81	0.00	-0.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8 b		0.00	0.69	0.00	-0.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8 c		0.00	0.03	0.00	-0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 a		0.00	0.37	0.00	-0.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 b		0.00	0.29	0.00	-0.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 c		0.00	0.02	0.00	-0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10 a		0.00	3.09	0.00	-9.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10 b		0.00	1.68	0.00	-4.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11 a		0.00	6.34	0.00	-5.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11 b		0.00	2.96	0.00	-2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12 a		0.00	6.36	0.00	-7.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12 b		0.00	3.44	0.00	-3.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13 a		0.00	8.42	0.00	-3.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13 b		0.00	4.51	0.00	-2.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14 a		0.00	3.91	0.00	-2.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14 b		0.00	2.15	0.00	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project: Cline Avenue-Single Box Portion of Section IVA-(Case VC) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 11 12 14 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 Vehicle Only)**

SECTION NO.	GTSTRUDL NODE	Truck 9 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 9 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 10 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 10 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 11 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 11 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 12 - R4 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 12 - R4 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	-5.39
1 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	-9.05
2 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.41	0.00	-3.57
2 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.69	0.00	-0.10
2 c		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.22	0.00	-0.69
3 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.76	0.00	-5.66
3 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.34	0.00	-1.23
3 c		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.46	0.00	-0.64
4 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.91	0.00	-8.33
4 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.26	0.00	-3.78
4 c		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.90	0.00	-0.32
5 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.56	0.00	-3.36
5 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.84	0.00	-0.59
5 c		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.53	0.00	-0.50
6 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	-2.71
7 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.33	0.00	-0.59
7 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.16	0.00	-0.51
7 c		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	-0.05
8 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.94	0.00	-0.75
8 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.00	-0.65
8 c		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	-0.06
9 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.00	-1.06
9 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.00	-0.91
9 c		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	-0.08
10 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.52	0.00	-11.34
10 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.09	0.00	-5.99
11 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.32	0.00	-6.21
11 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.58	0.00	-3.22
12 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.09	0.00	-8.15
12 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.02	0.00	-4.43
13 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.35	0.00	-4.68
13 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.30	0.00	-2.57
14 a		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.41	0.00	-2.99
14 b		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.66	0.00	-1.29

Project: Cline Avenue-Single Box Portion of Section IVA-(Case VC) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 11 12 14 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 Vehicle Only)**

SECTION NO.	GTSTRUDL NODE	Truck 13 - R5 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 13 - R5 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 14 - S1 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 14 - S1 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 15 - S2 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 15 - S2 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 16 - S3 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 16 - S3 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	0.10	0.00	-6.77	0.00	0.59	0.00	-6.93	0.00	0.46	0.00	-6.74	0.00	0.40	0.00	-8.86
1 b		0.00	-0.01	0.00	-11.95	0.00	-0.02	0.00	-11.93	0.00	-0.02	0.00	-11.59	0.00	-0.02	0.00	-15.37
2 a		0.00	2.47	0.00	-4.97	0.00	3.32	0.00	-5.45	0.00	3.41	0.00	-5.21	0.00	4.64	0.00	-6.59
2 b		0.00	3.88	0.00	-0.11	0.00	4.72	0.00	-1.04	0.00	4.48	0.00	-1.00	0.00	5.69	0.00	-1.35
2 c		0.00	3.43	0.00	-0.80	0.00	4.15	0.00	-0.70	0.00	3.92	0.00	-0.70	0.00	4.89	0.00	-0.99
3 a		0.00	2.19	0.00	-7.21	0.00	2.91	0.00	-7.59	0.00	2.98	0.00	-7.33	0.00	4.01	0.00	-9.59
3 b		0.00	3.47	0.00	-1.28	0.00	4.45	0.00	-1.56	0.00	4.23	0.00	-1.44	0.00	5.28	0.00	-1.87
3 c		0.00	3.68	0.00	-0.71	0.00	4.52	0.00	-0.82	0.00	4.29	0.00	-0.81	0.00	5.36	0.00	-1.06
4 a		0.00	4.38	0.00	-10.05	0.00	5.88	0.00	-11.35	0.00	5.95	0.00	-11.28	0.00	7.83	0.00	-14.77
4 b		0.00	4.35	0.00	-3.93	0.00	5.58	0.00	-5.18	0.00	5.37	0.00	-5.15	0.00	6.81	0.00	-6.60
4 c		0.00	4.24	0.00	-0.35	0.00	5.14	0.00	-0.39	0.00	4.87	0.00	-0.39	0.00	6.08	0.00	-0.51
5 a		0.00	2.83	0.00	-4.83	0.00	3.20	0.00	-4.69	0.00	3.24	0.00	-4.39	0.00	4.52	0.00	-5.73
5 b		0.00	4.02	0.00	-0.71	0.00	4.96	0.00	-0.72	0.00	4.71	0.00	-0.72	0.00	5.97	0.00	-0.96
5 c		0.00	3.75	0.00	-0.56	0.00	4.59	0.00	-0.56	0.00	4.38	0.00	-0.55	0.00	5.50	0.00	-0.74
6 a		0.00	-0.01	0.00	-3.66	0.00	-0.02	0.00	-4.39	0.00	-0.02	0.00	-4.01	0.00	-0.02	0.00	-4.94
7 a		0.00	1.44	0.00	-0.61	0.00	1.66	0.00	-0.69	0.00	1.64	0.00	-0.68	0.00	2.18	0.00	-0.92
7 b		0.00	1.24	0.00	-0.53	0.00	1.41	0.00	-0.60	0.00	1.40	0.00	-0.59	0.00	1.87	0.00	-0.80
7 c		0.00	0.05	0.00	-0.05	0.00	0.05	0.00	-0.05	0.00	0.05	0.00	-0.05	0.00	0.07	0.00	-0.07
8 a		0.00	0.99	0.00	-0.79	0.00	1.20	0.00	-0.90	0.00	1.19	0.00	-0.89	0.00	1.57	0.00	-1.20
8 b		0.00	0.85	0.00	-0.68	0.00	1.03	0.00	-0.78	0.00	1.02	0.00	-0.78	0.00	1.35	0.00	-1.04
8 c		0.00	0.04	0.00	-0.07	0.00	0.05	0.00	-0.08	0.00	0.05	0.00	-0.08	0.00	0.07	0.00	-0.10
9 a		0.00	0.53	0.00	-1.11	0.00	0.46	0.00	-1.23	0.00	0.45	0.00	-1.21	0.00	0.63	0.00	-1.64
9 b		0.00	0.44	0.00	-0.96	0.00	0.36	0.00	-1.06	0.00	0.36	0.00	-1.05	0.00	0.52	0.00	-1.42
9 c		0.00	0.03	0.00	-0.09	0.00	0.03	0.00	-0.10	0.00	0.03	0.00	-0.10	0.00	0.04	0.00	-0.13
10 a		0.00	4.39	0.00	-13.03	0.00	4.20	0.00	-13.66	0.00	4.16	0.00	-13.48	0.00	5.63	0.00	-18.12
10 b		0.00	2.51	0.00	-6.82	0.00	2.30	0.00	-6.88	0.00	2.30	0.00	-6.85	0.00	3.19	0.00	-9.35
11 a		0.00	8.27	0.00	-7.15	0.00	8.98	0.00	-7.44	0.00	8.88	0.00	-7.35	0.00	11.89	0.00	-9.93
11 b		0.00	4.01	0.00	-3.64	0.00	4.20	0.00	-3.70	0.00	4.18	0.00	-3.68	0.00	5.67	0.00	-5.03
12 a		0.00	7.98	0.00	-9.13	0.00	9.47	0.00	-10.41	0.00	9.41	0.00	-10.37	0.00	12.29	0.00	-13.71
12 b		0.00	4.44	0.00	-4.88	0.00	5.14	0.00	-5.51	0.00	5.15	0.00	-5.48	0.00	6.80	0.00	-7.32
13 a		0.00	10.49	0.00	-5.64	0.00	12.54	0.00	-5.37	0.00	12.43	0.00	-5.35	0.00	16.28	0.00	-7.32
13 b		0.00	5.74	0.00	-3.00	0.00	6.76	0.00	-2.83	0.00	6.74	0.00	-2.81	0.00	8.90	0.00	-3.91
14 a		0.00	5.44	0.00	-3.25	0.00	5.32	0.00	-3.15	0.00	5.25	0.00	-3.06	0.00	7.13	0.00	-4.26
14 b		0.00	3.09	0.00	-1.41	0.00	2.97	0.00	-1.29	0.00	2.96	0.00	-1.26	0.00	4.08	0.00	-1.79

Project: Cline Avenue-Single Box Portion of Section IVA-(Case VC) | Design: PT | Date: 1/27/09

Portion: | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

MAXIMUM loads for section(s) 11 12 14 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SERVICE FORCES **Live Load Loading (1 Vehicle Only)**

SECTION NO.	GTSTRUDL NODE	Truck 17 - S4 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 17 - S4 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 18 - S5 + HL93 Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 18 - S5 + HL93 Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 19 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 19 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)	Truck 20 - NOT USED Maximum Positive Moment F (Kip)	M (Kip-ft)	Truck 20 - NOT USED Minimum Negative Moment F (Kip)	M (Kip-ft)
1 a		0.00	0.37	0.00	-5.74	0.00	0.50	0.00	-7.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1 b		0.00	-0.02	0.00	-9.93	0.00	-0.03	0.00	-13.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 a		0.00	4.14	0.00	-4.21	0.00	4.93	0.00	-6.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 b		0.00	4.12	0.00	-1.08	0.00	5.54	0.00	-1.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2 c		0.00	3.32	0.00	-0.66	0.00	4.63	0.00	-0.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 a		0.00	3.49	0.00	-6.35	0.00	4.27	0.00	-8.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 b		0.00	3.85	0.00	-1.45	0.00	5.26	0.00	-1.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 c		0.00	3.72	0.00	-0.85	0.00	5.16	0.00	-1.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 a		0.00	6.60	0.00	-11.13	0.00	8.37	0.00	-14.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 b		0.00	5.12	0.00	-5.48	0.00	6.86	0.00	-7.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 c		0.00	4.13	0.00	-0.41	0.00	5.79	0.00	-0.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 a		0.00	3.76	0.00	-3.36	0.00	4.40	0.00	-4.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 b		0.00	4.33	0.00	-0.75	0.00	5.83	0.00	-0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 c		0.00	3.86	0.00	-0.57	0.00	5.33	0.00	-0.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 a		0.00	-0.02	0.00	-3.25	0.00	-0.03	0.00	-4.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 a		0.00	1.66	0.00	-0.71	0.00	2.15	0.00	-0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 b		0.00	1.43	0.00	-0.62	0.00	1.84	0.00	-0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 c		0.00	0.05	0.00	-0.05	0.00	0.06	0.00	-0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8 a		0.00	1.22	0.00	-0.92	0.00	1.59	0.00	-1.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8 b		0.00	1.06	0.00	-0.80	0.00	1.37	0.00	-1.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8 c		0.00	0.05	0.00	-0.08	0.00	0.07	0.00	-0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 a		0.00	0.41	0.00	-1.25	0.00	0.53	0.00	-1.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 b		0.00	0.35	0.00	-1.09	0.00	0.44	0.00	-1.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 c		0.00	0.03	0.00	-0.10	0.00	0.04	0.00	-0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10 a		0.00	3.65	0.00	-12.90	0.00	5.03	0.00	-16.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10 b		0.00	2.12	0.00	-6.65	0.00	2.78	0.00	-8.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11 a		0.00	8.66	0.00	-7.05	0.00	11.35	0.00	-9.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11 b		0.00	4.11	0.00	-3.59	0.00	5.33	0.00	-4.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12 a		0.00	9.26	0.00	-10.48	0.00	12.37	0.00	-13.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12 b		0.00	5.13	0.00	-5.69	0.00	6.78	0.00	-7.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13 a		0.00	12.44	0.00	-5.21	0.00	16.43	0.00	-6.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13 b		0.00	6.82	0.00	-2.87	0.00	8.95	0.00	-3.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14 a		0.00	4.84	0.00	-3.04	0.00	6.38	0.00	-3.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14 b		0.00	2.81	0.00	-1.25	0.00	3.66	0.00	-1.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

URS

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis	Check	TSP - IC RJB	Date	Jan 09 - Aug 0

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]DC&PTBrug

SERVICE FORCES

MAXIMUM loads for section(s) 11 12 14 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SECTION	GTStrudl NODE NO.	Selfweight F (Kip)	Selfweight M (Kip-ft)	Surcharge (WS) F (Kip)	Surcharge (WS) M (Kip-ft)	Surcharge (Barrier) F (Kip)	Surcharge (Barrier) M (Kip-ft)
1 a		0.00	-3.30	0.00	-0.74	0.00	-3.07
1 b		0.00	-6.45	0.00	-1.30	0.00	-4.16
2 a		0.00	-3.08	0.00	-0.48	0.00	0.11
2 b		0.00	0.39	0.00	0.07	0.00	-0.17
2 c		0.00	0.55	0.00	0.10	0.00	-0.34
3 a		0.00	-5.51	0.00	-0.95	0.00	-0.17
3 b		0.00	-0.64	0.00	-0.10	0.00	-0.15
3 c		0.00	0.34	0.00	0.11	0.00	-0.14
4 a		0.00	-9.68	0.00	-1.19	0.00	-1.20
4 b		0.00	-2.09	0.00	-0.12	0.00	-0.66
4 c		0.00	1.64	0.00	0.33	0.00	-0.15
5 a		0.00	-2.26	0.00	-0.43	0.00	-0.18
5 b		0.00	0.99	0.00	0.12	0.00	-0.15
5 c		0.00	1.11	0.00	0.17	0.00	-0.12
6 a		0.00	-2.60	0.00	-0.40	0.00	-2.15
7 a		0.00	-0.95	0.00	0.07	0.00	0.37
7 b		0.00	-0.44	0.00	0.07	0.00	0.33
7 c		0.00	0.90	0.00	0.00	0.00	0.02
8 a		0.00	-2.07	0.00	-0.08	0.00	-0.05
8 b		0.00	-1.41	0.00	-0.07	0.00	-0.04
8 c		0.00	0.92	0.00	0.00	0.00	0.01
9 a		0.00	-1.25	0.00	0.03	0.00	-0.22
9 b		0.00	-0.72	0.00	0.02	0.00	-0.19
9 c		0.00	0.76	0.00	0.00	0.00	0.01
10 a		0.00	-3.36	0.00	-0.77	0.00	-4.03
10 b		0.00	-2.52	0.00	-0.42	0.00	-2.20
11 a		0.00	-0.62	0.00	-0.07	0.00	0.55
11 b		0.00	-0.22	0.00	-0.03	0.00	0.19
12 a		0.00	-6.68	0.00	-0.77	0.00	-1.01
12 b		0.00	-4.31	0.00	-0.41	0.00	-0.56
13 a		0.00	2.08	0.00	-0.10	0.00	0.97
13 b		0.00	0.53	0.00	-0.05	0.00	0.47
14 a		0.00	0.76	0.00	0.18	0.00	-2.07
14 b		0.00	-0.19	0.00	0.09	0.00	-1.11

5.9.4 Operating Rating Evaluations
AASHTO Lanes

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]SummaryRFLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 1 - HL93-TRUCK					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.99	Top Slab Centerline	**1.99**	2.07	7.41	8.21

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]SummaryASLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 1 - HL93-TRUCK	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.32	0.16

URS

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
Top Slab Centerline	5 c	1.11	-0.12	0.17	4.91	-0.64	4.87	-0.48	2	2	14.63	-9.80	1.99	13.02
Top Slab Thickness Change (Between Webs)	5 b	0.99	-0.15	0.12	4.40	-1.11	4.81	-0.67	1	2	14.63	-22.90	2.07	16.08
Top Slab at Web	5 a	-2.26	-0.18	-0.43	1.63	-5.07	1.96	-5.63	1	1	16.78	-60.03	7.77	7.41
Top Slab at Cantilever	6 a	-2.60	-2.15	-0.40	0.08	-4.76	-0.01	-4.78	2	1	16.78	-60.03	220.90	8.21

URS

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]Stren

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

			two vehicles	One Vehicle				One or two vehicles	One Vehicle						
		MPF =	1.00	1.20				1.00	1.20						
	LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	13 a	2.08	0.87	-7.27	-5.28	2	-5.91	0.10	11.26	8.23	2	19.11	0.32	3.91	0.065
	14 a	0.76	-1.89	-2.22	-2.66	1	-5.48	0.09	5.54	4.86	2	5.59	0.09	-1.89	0.031
Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	13 b	0.53	0.42	-3.65	-2.58	2	-3.63	0.06	5.93	4.36	2	9.30	0.16	1.30	0.022
	14 b	-0.19	-1.02	-0.93	-1.12	1	-3.28	0.05	2.94	2.60	2	2.20	0.04	-1.77	0.029

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]SummaryRFLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 2 - HL93-TANDEM					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	2.13	Top Slab Centerline	**2.13**	2.31	6.01	6.77

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]SummaryASLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 2 - HL93-TANDEM	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.27	0.13

URS

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 2 **Truck 2 - HL93-TANDEM**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
Top Slab Centerline	5 c	1.11	-0.12	0.17	4.59	-0.58	4.52	-0.42	2	2	14.63	-9.80	2.13	14.37
Top Slab Thickness Change (Between Webs)	5 b	0.99	-0.15	0.12	3.92	-1.18	4.31	-0.70	1	2	14.63	-22.90	2.31	15.13
Top Slab at Web	5 a	-2.26	-0.18	-0.43	0.18	-6.76	0.22	-6.94	1	1	16.78	-60.03	70.37	6.01
Top Slab at Cantilever	6 a	-2.60	-2.15	-0.40	0.17	-5.79	0.00	-5.41	2	2	16.78	-60.03	103.95	6.77

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]Stren

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 2 **Truck 2 - HL93-TANDEM**

Combine trucks? N

			two vehicles	One Vehicle				One or two vehicles	One Vehicle						
		MPF =	1.00	1.20				1.00	1.20						
	LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	13 a	2.08	0.87	-7.23	-5.88	2	-5.85	0.10	9.18	7.00	2	16.30	0.27	3.91	0.065
	14 a	0.76	-1.89	-1.82	-2.18	1	-4.84	0.08	5.32	4.72	2	5.29	0.09	-1.89	0.031

Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	13 b	0.53	0.42	-3.45	-2.69	2	-3.36	0.06	4.69	3.56	2	7.63	0.13	1.30	0.022
	14 b	-0.19	-1.02	-0.76	-0.91	1	-3.00	0.05	2.68	2.38	2	1.85	0.03	-1.77	0.029

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]SummaryRFLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 3 - R1					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	2.11	Top Slab Centerline	**2.11**	2.26	6.56	9.03

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]SummaryASLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 3 - R1	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.37	0.18

URS

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 3 **Truck 3 - R1**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
Top Slab Centerline	5 c	1.11	-0.12	0.17	4.63	-0.79	4.34	-0.59	2	2	14.63	-9.80	2.11	10.55
Top Slab Thickness Change (Between Webs)	5 b	0.99	-0.15	0.12	4.40	-1.05	4.40	-0.79	1	2	14.63	-22.90	2.26	17.00
Top Slab at Web	5 a	-2.26	-0.18	-0.43	1.93	-4.72	2.32	-5.66	1	1	16.78	-60.03	6.56	7.36
Top Slab at Cantilever	6 a	-2.60	-2.15	-0.40	0.09	-4.13	-0.01	-4.34	2	1	16.78	-60.03	196.35	9.03

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]Stren

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 3 **Truck 3 - R1**

Combine trucks? N

			two vehicles	One Vehicle				One or two vehicles	One Vehicle						
		MPF =	1.00	1.20				1.00	1.20						
	LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	13 a	2.08	0.87	-8.44	-5.94	2	-7.48	0.12	13.33	9.77	2	21.90	0.37	3.91	0.065
	14 a	0.76	-1.89	-2.62	-3.14	1	-6.13	0.10	6.38	5.66	2	6.72	0.11	-1.89	0.031

Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	13 b	0.53	0.42	-4.43	-3.14	2	-4.68	0.08	7.21	5.30	2	11.03	0.18	1.30	0.022
	14 b	-0.19	-1.02	-1.13	-1.36	1	-3.60	0.06	3.57	3.16	2	3.05	0.05	-1.77	0.029

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]SummaryRFLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 4 - R2					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	2.22	Top Slab Centerline	**2.22**	2.31	5.46	10.68

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]SummaryASLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 4 - R2	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.35	0.17

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 4 **Truck 4 - R2**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
Top Slab Centerline	5 c	1.11	-0.12	0.17	4.39	-0.70	4.22	-0.49	2	2	14.63	-9.80	2.22	11.90
Top Slab Thickness Change (Between Webs)	5 b	0.99	-0.15	0.12	4.19	-0.89	4.31	-0.64	1	2	14.63	-22.90	2.31	20.06
Top Slab at Web	5 a	-2.26	-0.18	-0.43	2.32	-3.82	2.78	-4.58	1	1	16.78	-60.03	5.46	9.10
Top Slab at Cantilever	6 a	-2.60	-2.15	-0.40	0.03	-3.44	-0.01	-3.67	2	1	16.78	-60.03	589.06	10.68

Project: Cline Avenue-Single Box Portion of Section IVA-(Case VC) | Design: PT | Date: 1/27/09

Portion: Superstructure - Transverse Analysis | Check: TSP - IC RJB | Date: Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]Stren

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles: LLMultiple

One vehicle with HL93: LLHL93

One or two vehicles: LLSingle

SW, WS, Barrier: DC&PTBrug

Truck ID 4 **Truck 4 - R2**

Combine trucks? N

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.20				1.00	1.20					
LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	

Calculate Area of Steel Required at Top of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
13 a	2.08	0.87	-7.08	-4.96	2	-5.65	0.09	12.31	8.87	2	20.53	0.35	3.91	0.065
14 a	0.76	-1.89	-2.36	-2.83	1	-5.71	0.10	5.47	4.80	2	5.50	0.09	-1.89	0.031

Calculate Area of Steel Required at Middle of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
13 b	0.53	0.42	-3.72	-2.64	2	-3.72	0.06	6.67	4.82	2	10.30	0.17	1.30	0.022
14 b	-0.19	-1.02	-1.01	-1.21	1	-3.41	0.06	3.06	2.69	2	2.36	0.04	-1.77	0.029

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]SummaryRFLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 5 - R3					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	2.22	Top Slab Centerline	**2.22**	2.27	5.81	9.73

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]SummaryASLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 5 - R3	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.40	0.20

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 5 **Truck 5 - R3**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
Top Slab Centerline	5 c	1.11	-0.12	0.17	4.40	-0.71	4.06	-0.46	2	2	14.63	-9.80	2.22	11.74
Top Slab Thickness Change (Between Webs)	5 b	0.99	-0.15	0.12	4.38	-0.92	4.36	-0.59	2	2	14.63	-22.90	2.27	19.40
Top Slab at Web	5 a	-2.26	-0.18	-0.43	2.18	-3.79	2.62	-4.55	1	1	16.78	-60.03	5.81	9.17
Top Slab at Cantilever	6 a	-2.60	-2.15	-0.40	0.02	-4.03	-0.01	-4.03	2	1	16.78	-60.03	883.59	9.73

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]Stren

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 5 **Truck 5 - R3**

Combine trucks? N

			two vehicles	One Vehicle				One or two vehicles	One Vehicle						
		MPF =	1.00	1.20				1.00	1.20						
	LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	13 a	2.08	0.87	-7.10	-4.73	2	-5.68	0.09	14.42	10.10	2	23.38	0.40	3.91	0.065
	14 a	0.76	-1.89	-2.40	-2.88	1	-5.78	0.10	5.51	4.69	2	5.55	0.09	-1.89	0.031
Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	13 b	0.53	0.42	-3.77	-2.46	2	-3.79	0.06	7.74	5.41	2	11.75	0.20	1.30	0.022
	14 b	-0.19	-1.02	-1.00	-1.20	1	-3.39	0.06	3.00	2.58	2	2.28	0.04	-1.77	0.029

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]SummaryRFLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 12 - R4 + HL93					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.90	Top Slab Centerline	**1.90**	2.01	4.27	8.60

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]SummaryASLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 12 - R4 + HL93	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.38	0.19

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I

Rating Factors

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 12 **Truck 12 - R4 + HL93**

Combine trucks? Y

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.00	1.00
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
Top Slab Centerline	5 c	1.11	-0.12	0.17	5.14	-0.79	3.53	-0.50	2	2	14.63	-9.80	1.90	10.55
Top Slab Thickness Change (Between Webs)	5 b	0.99	-0.15	0.12	4.95	-1.19	3.84	-0.59	2	2	14.63	-22.90	2.01	15.00
Top Slab at Web	5 a	-2.26	-0.18	-0.43	3.56	-3.36	3.56	-3.36	1	1	16.78	-60.03	4.27	12.41
Top Slab at Cantilever	6 a	-2.60	-2.15	-0.40	0.25	-4.56	0.25	-2.71	1	2	16.78	-60.03	70.69	8.60

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]Stren

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 12 **Truck 12 - R4 + HL93**

Combine trucks? Y

			two vehicles	One Vehicle				One or two vehicles	One Vehicle						
		MPF =	1.00	1.00				1.00	1.00						
	LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	13 a	2.08	0.87	-8.55	-4.68	2	-7.63	0.13	13.85	9.35	2	22.61	0.38	3.91	0.065
	14 a	0.76	-1.89	-2.99	-2.99	1	-5.92	0.10	6.38	4.41	2	6.72	0.11	-1.89	0.031

Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	13 b	0.53	0.42	-4.25	-2.57	2	-4.44	0.07	7.60	5.30	2	11.56	0.19	1.30	0.022
	14 b	-0.19	-1.02	-1.29	-1.29	1	-3.51	0.06	3.43	2.66	2	2.86	0.05	-1.77	0.029

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]SummaryRFLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 13 - R5 + HL93					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.83	Top Slab Centerline	**1.83**	1.95	5.37	7.92

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]SummaryASLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 13 - R5 + HL93	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.41	0.20

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 13 **Truck 13 - R5 + HL93**

Combine trucks? y

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.00	1.00
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
Top Slab Centerline	5 c	1.11	-0.12	0.17	5.33	-0.81	3.75	-0.56	2	2	14.63	-9.80	1.83	10.29
Top Slab Thickness Change (Between Webs)	5 b	0.99	-0.15	0.12	5.10	-1.31	4.02	-0.71	2	2	14.63	-22.90	1.95	13.63
Top Slab at Web	5 a	-2.26	-0.18	-0.43	2.83	-4.83	2.83	-4.83	1	1	16.78	-60.03	5.37	8.63
Top Slab at Cantilever	6 a	-2.60	-2.15	-0.40	0.16	-4.95	-0.01	-3.66	2	2	16.78	-60.03	110.45	7.92

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]Stren

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 13 **Truck 13 - R5 + HL93**

Combine trucks? y

			two vehicles	One Vehicle				One or two vehicles	One Vehicle						
		MPF =	1.00	1.00				1.00	1.00						
	LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	13 a	2.08	0.87	-8.88	-5.64	2	-8.08	0.13	14.89	10.49	2	24.01	0.41	3.91	0.065
	14 a	0.76	-1.89	-3.25	-3.25	1	-6.28	0.10	6.93	5.44	2	7.47	0.12	-1.89	0.031

Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	13 b	0.53	0.42	-4.50	-3.00	2	-4.78	0.08	8.04	5.74	2	12.15	0.20	1.30	0.022
	14 b	-0.19	-1.02	-1.41	-1.41	1	-3.67	0.06	3.86	3.09	2	3.44	0.06	-1.77	0.029

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]SummaryRFLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 14 - S1 + HL93					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.76	Top Slab Centerline	**1.76**	1.86	4.75	6.92

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]SummaryASLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 14 - S1 + HL93	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.45	0.23

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 14 **Truck 14 - S1 + HL93**

Combine trucks? y

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.00	1.00
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
5 c	1.11	-0.12	0.17		5.56	-0.92	4.59	-0.56	2	2	14.63	-9.80	1.76	9.06

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
5 b	0.99	-0.15	0.12		5.35	-1.32	4.96	-0.72	2	2	14.63	-22.90	1.86	13.52

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
5 a	-2.26	-0.18	-0.43		3.20	-4.69	3.20	-4.69	1	1	16.78	-60.03	4.75	8.89

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
6 a	-2.60	-2.15	-0.40		0.15	-5.67	-0.02	-4.39	2	2	16.78	-60.03	117.81	6.92

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]Stren

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 14 **Truck 14 - S1 + HL93**

Combine trucks? Y

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.00				1.00	1.00					
	LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	13 a	2.08	0.87	-9.67	-5.37	2	-9.15	0.15	16.94	12.54	2	26.78	0.45	3.91	0.065
	14 a	0.76	-1.89	-3.15	-3.15	1	-6.14	0.10	6.81	5.32	2	7.31	0.12	-1.89	0.031
Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	13 b	0.53	0.42	-4.82	-2.83	2	-5.21	0.09	9.06	6.76	2	13.53	0.23	1.30	0.022
	14 b	-0.19	-1.02	-1.29	-1.29	1	-3.51	0.06	3.74	2.97	2	3.28	0.05	-1.77	0.029

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]SummaryRFLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 15 - S2 + HL93					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.76	Top Slab Centerline	**1.76**	1.88	4.69	7.41

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]SummaryASLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 15 - S2 + HL93	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.45	0.23

URS

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 15 **Truck 15 - S2 + HL93**

Combine trucks? y

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.00	1.00
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

Top Slab Centerline

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
5 c	1.11	-0.12	0.17		5.54	-0.92	4.38	-0.55	2	2	14.63	-9.80	1.76	9.06

Top Slab Thickness Change (Between Webs)

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
5 b	0.99	-0.15	0.12		5.29	-1.32	4.71	-0.72	2	2	14.63	-22.90	1.88	13.52

Top Slab at Web

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
5 a	-2.26	-0.18	-0.43		3.24	-4.39	3.24	-4.39	1	1	16.78	-60.03	4.69	9.50

Top Slab at Cantilever

SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft		LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Mn** (kip-ft) Max.	Min.	RF (Max Live Load)	RF (Min. Live Load)
6 a	-2.60	-2.15	-0.40		0.15	-5.29	-0.02	-4.01	2	2	16.78	-60.03	117.81	7.41

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]Stren

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 15 **Truck 15 - S2 + HL93**

Combine trucks? Y

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.00				1.00	1.00					
	LF =	1.25	1.50	1.35	Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	13 a	2.08	0.87	-9.63	-5.35	2	-9.09	0.15	16.83	12.43	2	26.63	0.45	3.91	0.065
	14 a	0.76	-1.89	-3.06	-3.06	1	-6.02	0.10	6.74	5.25	2	7.21	0.12	-1.89	0.031
Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	13 b	0.53	0.42	-4.82	-2.81	2	-5.21	0.09	9.04	6.74	2	13.50	0.23	1.30	0.022
	14 b	-0.19	-1.02	-1.26	-1.26	1	-3.47	0.06	3.73	2.96	2	3.27	0.05	-1.77	0.029

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]SummaryRFLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 16 - S3 + HL93					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.54	Top Slab Centerline	**1.54**	1.56	3.36	6.31

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]SummaryASLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 16 - S3 + HL93	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.54	0.28

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 16 **Truck 16 - S3 + HL93**

Combine trucks? Y

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.00	1.00
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
Top Slab Centerline	5 c	1.11	-0.12	0.17	6.35	-1.07	5.50	-0.74	2	2	14.63	-9.80	1.54	7.79
Top Slab Thickness Change (Between Webs)	5 b	0.99	-0.15	0.12	6.36	-1.56	5.97	-0.96	2	2	14.63	-22.90	1.56	11.44
Top Slab at Web	5 a	-2.26	-0.18	-0.43	4.52	-5.73	4.52	-5.73	1	1	16.78	-60.03	3.36	7.28
Top Slab at Cantilever	6 a	-2.60	-2.15	-0.40	0.15	-6.22	-0.02	-4.94	2	2	16.78	-60.03	117.81	6.31

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]Stren

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 16 **Truck 16 - S3 + HL93**

Combine trucks? Y

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.00				1.00	1.00					
	LF =	1.25	1.50	1.35	Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	13 a	2.08	0.87	-11.06	-7.32	2	-11.02	0.18	20.68	16.28	2	31.83	0.54	3.91	0.065
	14 a	0.76	-1.89	-4.26	-4.26	1	-7.64	0.13	8.62	7.13	2	9.75	0.16	-1.89	0.031

Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	13 b	0.53	0.42	-5.64	-3.91	2	-6.31	0.11	11.20	8.90	2	16.42	0.28	1.30	0.022
	14 b	-0.19	-1.02	-1.79	-1.79	1	-4.19	0.07	4.85	4.08	2	4.78	0.08	-1.77	0.029

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]SummaryRFLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 17 - S4 + HL93					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.78	Top Slab Centerline	**1.78**	1.86	4.04	8.07

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]SummaryASLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 17 - S4 + HL93	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.45	0.23

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 17 **Truck 17 - S4 + HL93**

Combine trucks? y

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.00	1.00
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
Top Slab Centerline	5 c	1.11	-0.12	0.17	5.49	-0.95	3.86	-0.57	2	2	14.63	-9.80	1.78	8.77
Top Slab Thickness Change (Between Webs)	5 b	0.99	-0.15	0.12	5.34	-1.35	4.33	-0.75	2	2	14.63	-22.90	1.86	13.22
Top Slab at Web	5 a	-2.26	-0.18	-0.43	3.76	-3.36	3.76	-3.36	1	1	16.78	-60.03	4.04	12.41
Top Slab at Cantilever	6 a	-2.60	-2.15	-0.40	-0.02	-4.86	-0.02	-3.25	1	2	16.78	-60.03	1961.21	8.07

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]Stren

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 17 **Truck 17 - S4 + HL93**

Combine trucks? Y

			two vehicles	One Vehicle				One or two vehicles	One Vehicle						
		MPF =	1.00	1.00				1.00	1.00						
	LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	13 a	2.08	0.87	-9.75	-5.21	2	-9.25	0.15	16.84	12.44	2	26.64	0.45	3.91	0.065
	14 a	0.76	-1.89	-3.04	-3.04	1	-5.99	0.10	6.33	4.84	2	6.66	0.11	-1.89	0.031
Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	13 b	0.53	0.42	-4.92	-2.87	2	-5.34	0.09	9.12	6.82	2	13.61	0.23	1.30	0.022
	14 b	-0.19	-1.02	-1.25	-1.25	1	-3.46	0.06	3.58	2.81	2	3.06	0.05	-1.77	0.029

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]SummaryRFLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 18 - S5 + HL93					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	1.58	Top Slab Centerline	**1.58**	1.60	3.45	6.57

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]SummaryASLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 18 - S5 + HL93	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.55	0.28

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I

Rating Factors

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 18 **Truck 18 - S5 + HL93**

Combine trucks? y

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.00	1.00
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	LL+I (Min)	Allowable Mn** (kip-ft) Max.	Min.	Rating Factor RF (Max Live Load)	RF (Min. Live Load)
Top Slab Centerline	5 c	1.11	-0.12	0.17	6.18	-1.11	5.33	-0.74	2	2	14.63	-9.80	1.58	7.51
Top Slab Thickness Change (Between Webs)	5 b	0.99	-0.15	0.12	6.22	-1.58	5.83	-0.98	2	2	14.63	-22.90	1.60	11.30
Top Slab at Web	5 a	-2.26	-0.18	-0.43	4.40	-4.82	4.40	-4.82	1	1	16.78	-60.03	3.45	8.65
Top Slab at Cantilever	6 a	-2.60	-2.15	-0.40	0.14	-5.97	-0.03	-4.69	2	2	16.78	-60.03	126.23	6.57

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]Stren

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 18 **Truck 18 - S5 + HL93**

Combine trucks? Y

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.00				1.00	1.00					
	LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Loads	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	13 a	2.08	0.87	-11.26	-6.75	2	-11.29	0.19	20.83	16.43	2	32.03	0.55	3.91	0.065
	14 a	0.76	-1.89	-3.76	-3.76	1	-6.96	0.12	7.87	6.38	2	8.74	0.15	-1.89	0.031
Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	13 b	0.53	0.42	-5.74	-3.71	2	-6.45	0.11	11.25	8.95	2	16.49	0.28	1.30	0.022
	14 b	-0.19	-1.02	-1.52	-1.52	1	-3.82	0.06	4.43	3.66	2	4.21	0.07	-1.77	0.029

5.9.5 Inventory Rating Evaluations
AASHTO Lanes

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]SummaryRFLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 1 - HL93-TRUCK					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Inventory - Strength I	1.53	Top Slab Centerline	**1.53**	1.60	5.72	6.34

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]SummaryASLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 1 - HL93-TRUCK	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Inventory - Strength I	0.40	0.20

URS

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Inventory - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.75	1.75	1.75	1.75

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
Top Slab Centerline	5 c	1.11	-0.12	0.17	4.91	-0.64	4.87	-0.48	2	2	14.63	-9.80	1.53	10.04
Top Slab Thickness Change (Between Webs)	5 b	0.99	-0.15	0.12	4.40	-1.11	4.81	-0.67	1	2	14.63	-22.90	1.60	12.41
Top Slab at Web	5 a	-2.26	-0.18	-0.43	1.63	-5.07	1.96	-5.63	1	1	16.78	-60.03	5.99	5.72
Top Slab at Cantilever	6 a	-2.60	-2.15	-0.40	0.08	-4.76	-0.01	-4.78	2	1	16.78	-60.03	170.41	6.34

URS

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]Stren

Area of Steel Required at Webs due to Transverse Bending

Inventory - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

	two vehicles	One Vehicle	One or two vehicles	One Vehicle
MPF =	1.00	1.20	1.00	1.20

LF =	1.25	1.50	1.75		Minimum Live Load Moment			1.75		Maximum Live Load Moment			Dead Loads	
SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
Calculate Area of Steel Required at Top of Webs														
13 a	2.08	0.87	-7.27	-5.28	2	-8.81	0.15	11.26	8.23	2	23.61	0.40	3.91	0.065
14 a	0.76	-1.89	-2.22	-2.66	1	-6.55	0.11	5.54	4.86	2	7.81	0.13	-1.89	0.031
Calculate Area of Steel Required at Middle of Webs														
SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
13 b	0.53	0.42	-3.65	-2.58	2	-5.09	0.08	5.93	4.36	2	11.68	0.20	1.30	0.022
14 b	-0.19	-1.02	-0.93	-1.12	1	-3.72	0.06	2.94	2.60	2	3.38	0.06	-1.77	0.029

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]SummaryRFLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 2 - HL93-TANDEM					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Inventory - Strength I	1.64	Top Slab Centerline	**1.64**	1.78	4.64	5.23

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]SummaryASLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 1/27/09

DESCRIPTION: **Superstructure - Transverse Analysis** CHECKED BY: TSP - IC RJB DATE: Jan 09 - Aug 09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 2 - HL93-TANDEM	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Inventory - Strength I	0.34	0.16

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Inventory - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 2 **Truck 2 - HL93-TANDEM**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.75	1.75	1.75	1.75

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
Top Slab Centerline	5 c	1.11	-0.12	0.17	4.59	-0.58	4.52	-0.42	2	2	14.63	-9.80	1.64	11.08
Top Slab Thickness Change (Between Webs)	5 b	0.99	-0.15	0.12	3.92	-1.18	4.31	-0.70	1	2	14.63	-22.90	1.78	11.67
Top Slab at Web	5 a	-2.26	-0.18	-0.43	0.18	-6.76	0.22	-6.94	1	1	16.78	-60.03	54.29	4.64
Top Slab at Cantilever	6 a	-2.60	-2.15	-0.40	0.17	-5.79	0.00	-5.41	2	2	16.78	-60.03	80.19	5.23

URS

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	1/27/09
Portion	Superstructure - Transverse Analysis	Check	TSP - IC RJB	Date	Jan 09 - Aug 09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_AASHTO_lanes_5.75.44 Revised Length\[Transverse Load Rating Section EL VC.XLS]Stren

Area of Steel Required at Webs due to Transverse Bending

Inventory - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 2 **Truck 2 - HL93-TANDEM**

Combine trucks? N

	two vehicles	One Vehicle	One or two vehicles	One Vehicle
MPF =	1.00	1.20	1.00	1.20

LF =	1.25	1.50	1.75		Minimum Live Load Moment			1.75		Maximum Live Load Moment			Dead Loads	
SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
13 a	2.08	0.87	-7.23	-5.88	2	-8.74	0.15	9.18	7.00	2	19.97	0.34	3.91	0.065
14 a	0.76	-1.89	-1.82	-2.18	1	-5.71	0.10	5.32	4.72	2	7.42	0.12	-1.89	0.031

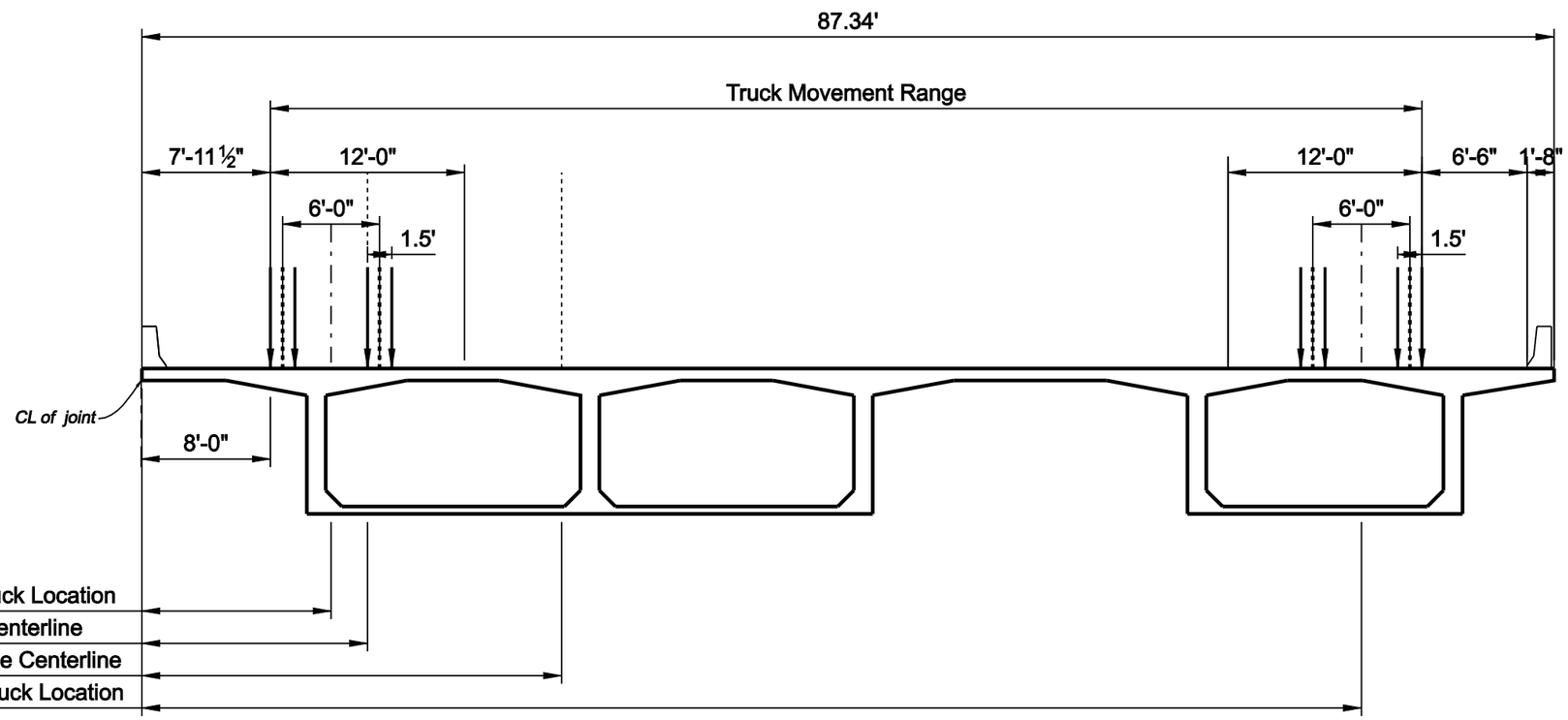
Calculate Area of Steel Required at Top of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
13 b	0.53	0.42	-3.45	-2.69	2	-4.74	0.08	4.69	3.56	2	9.51	0.16	1.30	0.022
14 b	-0.19	-1.02	-0.76	-0.91	1	-3.37	0.06	2.68	2.38	2	2.92	0.05	-1.77	0.029

Calculate Area of Steel Required at Middle of Webs

5.9.6 Striped Lanes Location

TRUCK LOCATION - NO TRAFFIC ON SHOULDERS



Design by: PT 9/09
Independent Check by: RJB 9/09

HALF SIZE PRINT - 11x17

No.	Date	App.	Revisions

Designed by -
Drawn by R.V.A.
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C.A. No. EB 00000002

TYPICAL SECTION - Transverse Analysis

SECTION IVA

DRAWING NO. -
SHEET NO. -

5.9.6/ 1

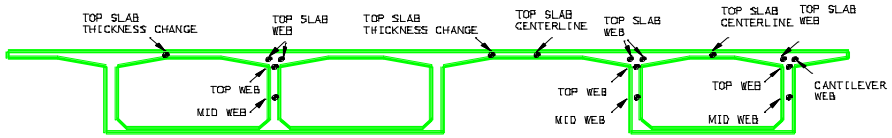
5.9.7 Rating Summary Striped Lanes

URS

PROJECT: Cline Avenue-Single Box Portion of Section IVA-(Case VC) CALCS BY: PT DATE: 08/09

ESCRIPTION: **Striped Lanes - Transverse Analysis** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length



Cline Avenue			Inventory	Operating										
			LFR Design Loads	LFR Design Loads	INDOT Legal Loads*			INDOT Permit Loads						
			HL93 or Tandem*	HI93 or Tandem*	Single Vehicle (SV)			Super Loads						
					R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Gross Vehicle Weight (tons)			32	32	45	45	63	67	67.1	129	133.5	175	152.5	240
Longitudinal	Factored	Flexure												
		Shear												
	Service	Flexure												
		Principal Stress												
Transverse	Factored	Top Slab Centerline	1.55	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Top Slab Thickness Change	1.60	2.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Top Slab Webs & Cantilever	4.64	6.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Overall Rating Factor	1.55	2.00	0.00	0.00
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)		64.11	0.00	0.00

* Max number of lanes loaded = 2

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VC EL STRIPED LANES.XLS]Truck Data

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)**

Import Brug Data | Delete Load Rating Factors | Calculate Load Rating Factors | Print Load Rating Results | View Single LC Results

CALCS BY: PT DATE: 08/09

CHECKED BY: IC by RJB DATE: 08/09

DESCRIPTION: **Striped Lanes - Transverse Analysis**

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

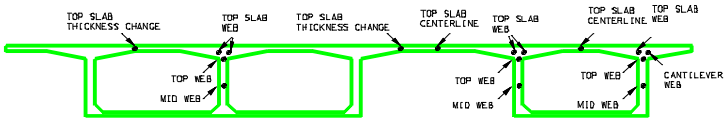
Summary of Rating Factors:

	Combine Trucks?	Truck Description		Operating - Strength I		View Single LC Results	Operating - Strength I						AS required - With Live Load		PRINT	Calculate Rating Factors
	Y or N	Rating Truck ID	Truck Name	Brug File with 2 or more vehicles	Brug File with a single vehicle	Y or N	RF	RF Controlling Location	Top Slab Centerline	Top Slab (Thickness Change Section)	Top Slab Webs	Cantilever at Webs	Top of Web	Middle of Web	Y or N	Y or N
HL93- DESIGN LOADS	N	1	HL93-TRUCK	IV_A_SL_HL93_TRUCK_EL.OUT	_IV_A_SL_HL93_TRUCK_EL.OUT	N	2.00	Top Slab Centerline	2.00	2.07	7.41	31.13	0.26	0.13	N	Y
	N	2	HL93-TANDEM	V_A_SL_HL93_TANDEM_EL.OU	IV_A_SL_HL93_TANDEM_EL.OU	N	2.16	Top Slab Centerline	2.16	2.31	6.01	19.93	0.22	0.10	N	Y
INDOT DESIGN LOADS	N	3	R1	IV_A_SL_R1_EL.OUT	1_IV_A_SL_R1_EL.OUT	N									N	N
	N	4	R2	IV_A_SL_R2_EL.OUT	1_IV_A_SL_R2_EL.OUT	N									N	N
	N	5	R3	IV_A_SL_R3_EL.OUT	1_IV_A_SL_R3_EL.OUT	N									N	N
	N	6	NOT USED	n/a	n/a	N									N	N
	N	7	NOT USED	n/a	n/a	N									N	N
	N	8	NOT USED	n/a	n/a	N									N	N
	N	9	NOT USED	n/a	n/a	N									N	N
	N	10	NOT USED	n/a	n/a	N									N	N
	N	11	NOT USED	n/a	n/a	N									N	N
INDOT DESIGN LOADS	Y	12	R4 + HL93	IV_A_SL_R4_EL.OUT	1_IV_A_SL_R4_EL.OUT	N									N	N
	Y	13	R5 + HL93	IV_A_SL_R5_EL.OUT	1_IV_A_SL_R5_EL.OUT	N									N	N
INDOT PERMIT LOADS	Y	14	S1 + HL93	IV_A_SL_S1_EL.OUT	1_IV_A_SL_S1_EL.OUT	N									N	N
	Y	15	S2 + HL93	IV_A_SL_S2_EL.OUT	1_IV_A_SL_S2_EL.OUT	N									N	N
	Y	16	S3 + HL93	IV_A_SL_S3_EL.OUT	1_IV_A_SL_S3_EL.OUT	N									N	N
	Y	17	S4 + HL93	IV_A_SL_S4_EL.OUT	1_IV_A_SL_S4_EL.OUT	N									N	N
	Y	18	S5 + HL93	IV_A_SL_S5_EL.OUT	1_IV_A_SL_S5_EL.OUT	N									N	N
	N	19	NOT USED	n/a	n/a	N									N	N
	N	20	NOT USED	n/a	n/a	N									N	N
	N	21	NOT USED	n/a	n/a	N									N	N
	N	22	NOT USED	n/a	n/a	N									N	N
	N	23	NOT USED	n/a	n/a	N									N	N
	N	24	NOT USED	n/a	n/a	N									N	N
	N	25	NOT USED	n/a	n/a	N									N	N
	N	26	NOT USED	n/a	n/a	N									N	N

LRFR Load Factors For Segmental Bridges				Multiple Presence Factor	
LOAD CASE	DL	SDL	LL	one lane	two lanes
Operating - Strength I	1.25	1.50	1.35	1.20	1.00

Brug plates with reversed moment sign and reversed LL Max/Min
11
12
14

	Multiple Presence Factor	
LOAD CASE	one lane	two lanes
Operating - Strength I	1.00	1.00



URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VC EL STRIPED LANES.XLS]Truck Data

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)**

DESCRIPTION: **Striped Lanes - Transverse Analysis**

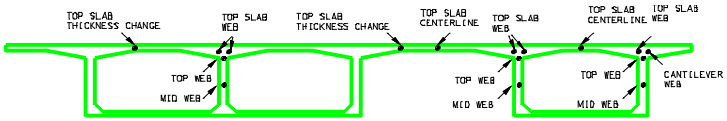
Import Brug Data | Delete Load Rating Factors | Calculate Load Rating Factors | Print Load Rating Results | View Single LC Results

CALCS BY: PT DATE: 08/09

CHECKED BY: IC by RJB DATE: 08/09

	Combine Trucks?	Truck Description		Inventory - Strength I		PRINT	Operating - Strength I						AS required		PRINT	Calculate Rating Factors
	Y or N	Rating Truck ID	Truck Name	RF	RF Controlling Location	Y or N	RF	RF Controlling Location	Top Slab Centerline	Top Slab (Thickness Change Section)	Top Slab Webs	Cantilever at Webs	Top of Web	Middle of Web	Y or N	Y or N
HS20- DESIGN LOADS	N	1	HL93-TRUCK	IV_A_SL_HL93_TRUCK_EL.OUT	_IV_A_SL_HL93_TRUCK_EL.OUT	N	1.55	Top Slab Centerline	1.55	1.60	5.72	24.01	0.31	0.16	Y	Y
	N	2	HL93-TANDEM	V_A_SL_HL93_TANDEM_EL.OU	IV_A_SL_HL93_TANDEM_EL.OU	Y	1.66	Top Slab Centerline	1.66	1.78	4.64	15.38	0.27	0.13	N	Y

LFR Load Factors For Segmental Bridges - NC DOT				Multiple Presence Factor	
LOAD CASE	DL	SDL	LL	one lane	two lanes
Inventory - Strength I	1.25	1.50	1.75	1.20	1.00

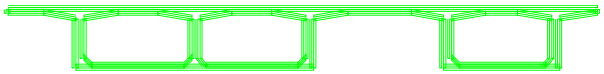


URS

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Striped Lanes - Transverse Analysis** CHECKED BY: IC by RJB DATE: 08/09

Area of Steel Requirements



LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

			Middle of Web		Top of Web	
Section	Inventory / Operating	Combined Name	A_b req'd (in^2/ft)	$A_{b\ Dead}$ req'd	A_b req'd (in^2/ft)	$A_{b\ Dead}$ req'd (in^2/ft)
HL-93	Inventory	HL-93 Inventory	0.16	0.03	0.31	0.07
HL-93	Operating	HL-93 Operating	0.13	0.03	0.26	0.07
HL-93-s	Operating	HL-93-s Operating	0.13	0.03	0.26	0.07

5.9.8 Load Summary Striped Lanes

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FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spre

Project Cline Avenue-Single Box Portion of Section IVA-(Case VC)

Portion

MAXIMUM loads for section(s) 11 12 14 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces st

SERVICE FORCES **Live Load Loading (1 or 2 Vehicles)**

	Truck 1 - HL93-TRUCK		Truck 1 - HL93-TRUCK		Truck 2 - HL93-TANDEM		Truck 2 - HL93-TANDEM	
	Maximum		Minimum		Maximum		Minimum	
GTSTRUDL	Positive Moment		Negative Moment		Positive Moment		Negative Moment	
SECTION NODE NO.	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)
1 a	0.00	0.87	0.00	-0.28	0.00	0.56	0.00	-0.53
1 b	0.00	0.06	0.00	-3.90	0.00	0.12	0.00	-4.99
2 a	0.00	-0.11	0.00	-6.37	0.00	-0.07	0.00	-7.62
2 b	0.00	3.86	0.00	-1.32	0.00	3.44	0.00	-1.13
2 c	0.00	4.86	0.00	-0.49	0.00	4.66	0.00	-0.42
3 a	0.00	1.63	0.00	-8.73	0.00	0.21	0.00	-9.19
3 b	0.00	3.83	0.00	-1.97	0.00	3.37	0.00	-1.47
3 c	0.00	5.16	0.00	-0.80	0.00	4.86	0.00	-0.65
4 a	0.00	4.36	0.00	-13.16	0.00	2.80	0.00	-13.42
4 b	0.00	5.04	0.00	-5.05	0.00	4.15	0.00	-4.24
4 c	0.00	6.72	0.00	-0.24	0.00	6.46	0.00	-0.21
5 a	0.00	1.63	0.00	-4.69	0.00	0.18	0.00	-6.61
5 b	0.00	4.40	0.00	-0.87	0.00	3.92	0.00	-0.92
5 c	0.00	4.82	0.00	-0.64	0.00	4.51	0.00	-0.58
6 a	0.00	0.08	0.00	-1.18	0.00	0.17	0.00	-1.83
7 a	0.00	0.64	0.00	-0.67	0.00	0.46	0.00	-0.49
7 b	0.00	0.55	0.00	-0.58	0.00	0.39	0.00	-0.42
7 c	0.00	0.03	0.00	-0.05	0.00	0.02	0.00	-0.04
8 a	0.00	1.11	0.00	-0.90	0.00	0.85	0.00	-0.66
8 b	0.00	0.94	0.00	-0.78	0.00	0.69	0.00	-0.57
8 c	0.00	0.05	0.00	-0.07	0.00	0.04	0.00	-0.06
9 a	0.00	0.66	0.00	-0.43	0.00	0.61	0.00	-0.35
9 b	0.00	0.53	0.00	-0.36	0.00	0.45	0.00	-0.27
9 c	0.00	0.04	0.00	-0.08	0.00	0.03	0.00	-0.06
10 a	0.00	4.65	0.00	-2.32	0.00	4.81	0.00	-1.58
10 b	0.00	2.45	0.00	-1.03	0.00	2.39	0.00	-0.71
11 a	0.00	9.11	0.00	-7.92	0.00	7.94	0.00	-7.04
11 b	0.00	4.18	0.00	-3.81	0.00	3.56	0.00	-3.31
12 a	0.00	8.81	0.00	-11.10	0.00	7.61	0.00	-9.82
12 b	0.00	4.69	0.00	-5.71	0.00	3.90	0.00	-4.85
13 a	0.00	8.45	0.00	-7.27	0.00	6.78	0.00	-7.23
13 b	0.00	4.68	0.00	-3.65	0.00	3.63	0.00	-3.45
14 a	0.00	5.54	0.00	-0.10	0.00	5.32	0.00	-0.11
14 b	0.00	2.94	0.00	-0.16	0.00	2.68	0.00	-0.15

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FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spre

Project Cline Avenue-Single Box Portion of Section IVA-(Case VC)

Portion

MAXIMUM loads for section(s) 11 12 14 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces st

SERVICE FORCES **Live Load Loading (1 Vehicle Only)**

	Truck 1 - HL93-TRUCK		Truck 1 - HL93-TRUCK		Truck 2 - HL93-TANDEM		Truck 2 - HL93-TANDEM	
	Maximum		Minimum		Maximum		Minimum	
GTSTRUDL	Positive Moment		Negative Moment		Positive Moment		Negative Moment	
SECTION NODE NO.	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)	F (Kip)	M (Kip-ft)
1 a	0.00	0.85	0.00	-0.26	0.00	0.52	0.00	-0.48
1 b	0.00	-0.01	0.00	-3.09	0.00	0.00	0.00	-3.62
2 a	0.00	-0.11	0.00	-5.03	0.00	-0.07	0.00	-6.05
2 b	0.00	3.86	0.00	-0.84	0.00	3.44	0.00	-0.82
2 c	0.00	4.05	0.00	-0.34	0.00	3.83	0.00	-0.29
3 a	0.00	1.03	0.00	-6.48	0.00	0.21	0.00	-7.15
3 b	0.00	3.62	0.00	-1.30	0.00	3.27	0.00	-1.12
3 c	0.00	4.18	0.00	-0.46	0.00	3.92	0.00	-0.38
4 a	0.00	2.29	0.00	-7.60	0.00	1.30	0.00	-9.20
4 b	0.00	4.05	0.00	-2.90	0.00	3.46	0.00	-2.81
4 c	0.00	4.88	0.00	-0.23	0.00	4.69	0.00	-0.19
5 a	0.00	1.63	0.00	-4.69	0.00	0.18	0.00	-5.78
5 b	0.00	4.01	0.00	-0.23	0.00	3.59	0.00	-0.15
5 c	0.00	4.06	0.00	-0.40	0.00	3.77	0.00	-0.35
6 a	0.00	0.07	0.00	-1.05	0.00	0.14	0.00	-1.64
7 a	0.00	0.64	0.00	-0.37	0.00	0.46	0.00	-0.27
7 b	0.00	0.54	0.00	-0.32	0.00	0.39	0.00	-0.23
7 c	0.00	0.00	0.00	-0.04	0.00	0.00	0.00	-0.03
8 a	0.00	0.61	0.00	-0.48	0.00	0.50	0.00	-0.36
8 b	0.00	0.51	0.00	-0.42	0.00	0.38	0.00	-0.31
8 c	0.00	0.03	0.00	-0.05	0.00	0.02	0.00	-0.04
9 a	0.00	0.39	0.00	-0.43	0.00	0.38	0.00	-0.35
9 b	0.00	0.31	0.00	-0.36	0.00	0.27	0.00	-0.27
9 c	0.00	0.02	0.00	-0.06	0.00	0.02	0.00	-0.05
10 a	0.00	3.41	0.00	-2.32	0.00	3.50	0.00	-1.58
10 b	0.00	1.83	0.00	-1.03	0.00	1.75	0.00	-0.71
11 a	0.00	5.66	0.00	-5.02	0.00	5.38	0.00	-4.94
11 b	0.00	2.68	0.00	-2.46	0.00	2.32	0.00	-2.17
12 a	0.00	5.38	0.00	-6.27	0.00	5.12	0.00	-6.19
12 b	0.00	2.89	0.00	-3.20	0.00	2.46	0.00	-2.92
13 a	0.00	6.86	0.00	-4.40	0.00	5.83	0.00	-4.90
13 b	0.00	3.63	0.00	-2.15	0.00	2.97	0.00	-2.24
14 a	0.00	4.05	0.00	-0.05	0.00	3.93	0.00	-0.08
14 b	0.00	2.17	0.00	-0.09	0.00	1.98	0.00	-0.10

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Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	08/09
Portion	Striped Lanes - Transverse Analysis	Check	IC by RJB	Date	08/09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VC EL STRIPED LANES.X

SERVICE FORCES

MAXIMUM loads for section(s) 11 12 14 are those listed in Brug for MINIMUM loads.

The sign for the moments on Brug for such section(s) are reversed, the sign for the forces stay the same. Loads were corrected manually.

SECTION	GTStrudl NODE NO.	Selfweight F (Kip)	Selfweight M (Kip-ft)	Surcharge (WS) F (Kip)	Surcharge (WS) M (Kip-ft)	Surcharge (Barrier) F (Kip)	Surcharge (Barrier) M (Kip-ft)
1 a		0.00	-3.30	0.00	-0.74	0.00	-3.07
1 b		0.00	-6.45	0.00	-1.30	0.00	-4.16
2 a		0.00	-3.08	0.00	-0.48	0.00	0.11
2 b		0.00	0.39	0.00	0.07	0.00	-0.17
2 c		0.00	0.55	0.00	0.10	0.00	-0.34
3 a		0.00	-5.51	0.00	-0.95	0.00	-0.17
3 b		0.00	-0.64	0.00	-0.10	0.00	-0.15
3 c		0.00	0.34	0.00	0.11	0.00	-0.14
4 a		0.00	-9.68	0.00	-1.19	0.00	-1.20
4 b		0.00	-2.09	0.00	-0.12	0.00	-0.66
4 c		0.00	1.64	0.00	0.33	0.00	-0.15
5 a		0.00	-2.26	0.00	-0.43	0.00	-0.18
5 b		0.00	0.99	0.00	0.12	0.00	-0.15
5 c		0.00	1.11	0.00	0.17	0.00	-0.12
6 a		0.00	-2.60	0.00	-0.40	0.00	-2.15
7 a		0.00	-0.95	0.00	0.07	0.00	0.37
7 b		0.00	-0.44	0.00	0.07	0.00	0.33
7 c		0.00	0.90	0.00	0.00	0.00	0.02
8 a		0.00	-2.07	0.00	-0.08	0.00	-0.05
8 b		0.00	-1.41	0.00	-0.07	0.00	-0.04
8 c		0.00	0.92	0.00	0.00	0.00	0.01
9 a		0.00	-1.25	0.00	0.03	0.00	-0.22
9 b		0.00	-0.72	0.00	0.02	0.00	-0.19
9 c		0.00	0.76	0.00	0.00	0.00	0.01
10 a		0.00	-3.36	0.00	-0.77	0.00	-4.03
10 b		0.00	-2.52	0.00	-0.42	0.00	-2.20
11 a		0.00	-0.62	0.00	-0.07	0.00	0.55
11 b		0.00	-0.22	0.00	-0.03	0.00	0.19
12 a		0.00	-6.68	0.00	-0.77	0.00	-1.01
12 b		0.00	-4.31	0.00	-0.41	0.00	-0.56
13 a		0.00	2.08	0.00	-0.10	0.00	0.97
13 b		0.00	0.53	0.00	-0.05	0.00	0.47
14 a		0.00	0.76	0.00	0.18	0.00	-2.07
14 b		0.00	-0.19	0.00	0.09	0.00	-1.11

5.9.9 Operating Rating Evaluations
Striped Lanes

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V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VC EL STRIPED LANES.XLS]Summary

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Striped Lanes - Transverse Analysis** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 1 - HL93-TRUCK					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	2.00	Top Slab Centerline	**2.00**	2.07	7.41	31.13

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VC EL STRIPED LANES.XLS]SummaryASLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Striped Lanes - Transverse Analysis** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 1 - HL93-TRUCK	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.26	0.13

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	08/09
Portion	Striped Lanes - Transverse Analysis	Check	IC by RJB	Date	08/09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VC EL STRIPED LANES.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
Top Slab Centerline	5 c	1.11	-0.12	0.17	4.82	-0.64	4.87	-0.48	1	2	14.63	-9.80	2.00	13.02
Top Slab Thickness Change (Between Webs)	5 b	0.99	-0.15	0.12	4.40	-0.87	4.81	-0.28	1	2	14.63	-22.90	2.07	20.52
Top Slab at Web	5 a	-2.26	-0.18	-0.43	1.63	-4.69	1.96	-5.63	1	1	16.78	-60.03	7.77	7.41
Top Slab at Cantilever	6 a	-2.60	-2.15	-0.40	0.08	-1.18	0.08	-1.26	1	1	16.78	-60.03	210.38	31.13

URS

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	08/09
Portion	Striped Lanes - Transverse Analysis	Check	IC by RJB	Date	08/09

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VC EL STRIPED LANES.XLS]StrengthI(W)L

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.20				1.00	1.20					
LF =	1.25	1.50	1.35		Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Load Moments	

Calculate Area of Steel Required at Top of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
13 a	2.08	0.87	-7.27	-5.28	2	-5.91	0.10	8.45	8.23	2	15.32	0.26	3.91	0.065
14 a	0.76	-1.89	-0.10	-0.06	2	-2.02	0.03	5.54	4.86	2	5.59	0.09	-1.89	0.031

Calculate Area of Steel Required at Middle of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
13 b	0.53	0.42	-3.65	-2.58	2	-3.63	0.06	4.68	4.36	2	7.62	0.13	1.30	0.022
14 b	-0.19	-1.02	-0.16	-0.11	2	-1.99	0.03	2.94	2.60	2	2.20	0.04	-1.77	0.029

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VC EL STRIPED LANES.XLS]Summary

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Striped Lanes - Transverse Analysis** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 2 - HL93-TANDEM					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Operating - Strength I	2.16	Top Slab Centerline	**2.16**	2.31	6.01	19.93

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VC EL STRIPED LANES.XLS]SummaryASLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Striped Lanes - Transverse Analysis** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 2 - HL93-TANDEM	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Operating - Strength I	0.22	0.10

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	08/09
Portion	Striped Lanes - Transverse Analysis	Check	IC by RJB	Date	08/09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VC EL STRIPED LANES.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Operating - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 2 **Truck 2 - HL93-TANDEM**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.35	1.35	1.35	1.35

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
Top Slab Centerline	5 c	1.11	-0.12	0.17	4.51	-0.58	4.52	-0.42	1	2	14.63	-9.80	2.16	14.37
Top Slab Thickness Change (Between Webs)	5 b	0.99	-0.15	0.12	3.92	-0.92	4.31	-0.18	1	2	14.63	-22.90	2.31	19.40
Top Slab at Web	5 a	-2.26	-0.18	-0.43	0.18	-6.61	0.22	-6.94	1	1	16.78	-60.03	70.37	6.01
Top Slab at Cantilever	6 a	-2.60	-2.15	-0.40	0.17	-1.83	0.17	-1.97	2	1	16.78	-60.03	103.95	19.93

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Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	08/09
Portion	Striped Lanes - Transverse Analysis	Check	IC by RJB	Date	08/09

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VC EL STRIPED LANES.XLS]StrengthI(W)L

Area of Steel Required at Webs due to Transverse Bending

Operating - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Truck ID 2 **Truck 2 - HL93-TANDEM**

Combine trucks? N

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.20				1.00	1.20					
	LF =	1.25	1.50	1.35	Minimum Live Load Moment			1.35		Maximum Live Load Moment			Dead Load Moments	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	13 a	2.08	0.87	-7.23	-5.88	2	-5.85	0.10	6.78	7.00	1	13.35	0.22	3.91	0.065
	14 a	0.76	-1.89	-0.11	-0.10	2	-2.04	0.03	5.32	4.72	2	5.29	0.09	-1.89	0.031
Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	13 b	0.53	0.42	-3.45	-2.69	2	-3.36	0.06	3.63	3.56	2	6.20	0.10	1.30	0.022
	14 b	-0.19	-1.02	-0.15	-0.12	2	-1.97	0.03	2.68	2.38	2	1.85	0.03	-1.77	0.029

5.9.10 Inventory Rating Evaluations
Striped Lanes

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VC EL STRIPED LANES.XLS]Summary

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Striped Lanes - Transverse Analysis** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 1 - HL93-TRUCK					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Inventory - Strength I	1.55	Top Slab Centerline	**1.55**	1.60	5.72	24.01

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VC EL STRIPED LANES.XLS]SummaryASLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Striped Lanes - Transverse Analysis** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 1 - HL93-TRUCK	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Inventory - Strength I	0.31	0.16

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	08/09
Portion	Striped Lanes - Transverse Analysis	Check	IC by RJB	Date	08/09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VC EL STRIPED LANES.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Inventory - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.75	1.75	1.75	1.75

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
Top Slab Centerline	5 c	1.11	-0.12	0.17	4.82	-0.64	4.87	-0.48	1	2	14.63	-9.80	1.55	10.04
Top Slab Thickness Change (Between Webs)	5 b	0.99	-0.15	0.12	4.40	-0.87	4.81	-0.28	1	2	14.63	-22.90	1.60	15.83
Top Slab at Web	5 a	-2.26	-0.18	-0.43	1.63	-4.69	1.96	-5.63	1	1	16.78	-60.03	5.99	5.72
Top Slab at Cantilever	6 a	-2.60	-2.15	-0.40	0.08	-1.18	0.08	-1.26	1	1	16.78	-60.03	162.29	24.01

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	08/09
Portion	Striped Lanes - Transverse Analysis	Check	IC by RJB	Date	08/09

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VC EL STRIPED LANES.XLS]StrengthI(W)L

Area of Steel Required at Webs due to Transverse Bending

Inventory - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Truck ID 1 **Truck 1 - HL93-TRUCK**

Combine trucks? N

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

			two vehicles	One Vehicle				One or two vehicles	One Vehicle					
		MPF =	1.00	1.20				1.00	1.20					
LF =	1.25	1.50	1.75		Minimum Live Load Moment			1.75		Maximum Live Load Moment			Dead Load Moments	

Calculate Area of Steel Required at Top of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
13 a	2.08	0.87	-7.27	-5.28	2	-8.81	0.15	8.45	8.23	2	18.70	0.31	3.91	0.065
14 a	0.76	-1.89	-0.10	-0.06	2	-2.06	0.03	5.54	4.86	2	7.81	0.13	-1.89	0.031

Calculate Area of Steel Required at Middle of Webs

SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
13 b	0.53	0.42	-3.65	-2.58	2	-5.09	0.08	4.68	4.36	2	9.49	0.16	1.30	0.022
14 b	-0.19	-1.02	-0.16	-0.11	2	-2.05	0.03	2.94	2.60	2	3.38	0.06	-1.77	0.029

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VC EL STRIPED LANES.XLS]Summary

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Striped Lanes - Transverse Analysis** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Rating Factors

	Truck 2 - HL93-TANDEM					
	RF	RF Controlling Location	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs	Cantilever at Webs
Inventory - Strength I	1.66	Top Slab Centerline	**1.66**	1.78	4.64	15.38

URS

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VC EL STRIPED LANES.XLS]SummaryASLegal

PROJECT: **Cline Avenue-Single Box Portion of Section IVA-(Case VC)** CALCS BY: PT DATE: 08/09

DESCRIPTION: **Striped Lanes - Transverse Analysis** CHECKED BY: IC by RJB DATE: 08/09

LOADS WERE CALCULATED USING BRUG 5.75.44 - and Effective Span Length

Area of Steel Required at Webs due to Transverse Bending

	Truck 2 - HL93-TANDEM	
	Top of Web (in^2/ft)	Middle of Web (in^2/ft)
Inventory - Strength I	0.27	0.13

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	08/09
Portion	Striped Lanes - Transverse Analysis	Check	IC by RJB	Date	08/09

FILE: V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VC EL STRIPED LANES.XLS]StrengthIL

** The Ultimate Moment Capacities are based on #4 and #5 rebar together @ 10 inches in top of web, and #4 and #5 rebar alternated @ 10 inches at CL of top slab
#4 rebar @ 10 inches for the soffit, and #5 rebar @ 10 inches for the webs.

Inventory - Strength I **Rating Factors**

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

Truck ID 2 **Truck 2 - HL93-TANDEM**

Combine trucks? N

					One or two vehicles		One vehicle	
			MPF =		1.00	1.00	1.20	1.20
	LF =	1.25	1.50	1.50	1.75	1.75	1.75	1.75

	SECTION	Selfweight kip-ft	Barrier kip-ft	WS kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	LL+I (Max.) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles LL+I (Max.)	Controlling # vehicles LL+I (Min)	Allowable Mn** (kip-ft) Max.	Allowable Mn** (kip-ft) Min.	Rating Factor RF (Max Live Load)	Rating Factor RF (Min. Live Load)
Top Slab Centerline	5 c	1.11	-0.12	0.17	4.51	-0.58	4.52	-0.42	1	2	14.63	-9.80	1.66	11.08
Top Slab Thickness Change (Between Webs)	5 b	0.99	-0.15	0.12	3.92	-0.92	4.31	-0.18	1	2	14.63	-22.90	1.78	14.97
Top Slab at Web	5 a	-2.26	-0.18	-0.43	0.18	-6.61	0.22	-6.94	1	1	16.78	-60.03	54.29	4.64
Top Slab at Cantilever	6 a	-2.60	-2.15	-0.40	0.17	-1.83	0.17	-1.97	2	1	16.78	-60.03	80.19	15.38

URS

Project	Cline Avenue-Single Box Portion of Section IVA-(Case VC)	Design	PT	Date	08/09
Portion	Striped Lanes - Transverse Analysis	Check	IC by RJB	Date	08/09

V:\Projects\Cline Avenue\Load Rating Analysis\Transverse Analysis\Spreadsheet_striped_lanes_5.75.44 Revised Length\[Transverse Load Rating Section VC EL STRIPED LANES.XLS]StrengthI(W)L

Area of Steel Required at Webs due to Transverse Bending

Inventory - Strength I

Concrete Strength, 5000 psi

Steel Strength, Fsy: 60,000 psi

Truck ID 2 **Truck 2 - HL93-TANDEM**

Combine trucks? N

Worksheet source

One or two vehicles:	LLMultiple
One vehicle with HL93:	LLHL93
One or two vehicles:	LLSingle
SW, WS, Barrier:	DC&PTBrug

			two vehicles	One Vehicle				One or two vehicles	One Vehicle						
		MPF =	1.00	1.20				1.00	1.20						
	LF =	1.25	1.50	1.75		Minimum Live Load Moment			1.75		Maximum Live Load Moment			Dead Load Moments	
Calculate Area of Steel Required at Top of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	13 a	2.08	0.87	-7.23	-5.88	2	-8.74	0.15	6.78	7.00	1	16.15	0.27	3.91	0.065
	14 a	0.76	-1.89	-0.11	-0.10	2	-2.08	0.03	5.32	4.72	2	7.42	0.12	-1.89	0.031
Calculate Area of Steel Required at Middle of Webs	SECTION	M (DL) kip-ft	M (SDL) kip-ft	LL+I (Min) kip-ft	LL+I (Min) kip-ft	Controlling # vehicles	Mu (min) kip-ft	As (min) in^2/ft	LL+I (Max) kip-ft	LL+I (Max) kip-ft	Controlling # vehicles	Mu (max) kip-ft	As (min) in^2/ft	Mu (max) kip-ft	As (min) in^2/ft
	13 b	0.53	0.42	-3.45	-2.69	2	-4.74	0.08	3.63	3.56	2	7.65	0.13	1.30	0.022
	14 b	-0.19	-1.02	-0.15	-0.12	2	-2.03	0.03	2.68	2.38	2	2.92	0.05	-1.77	0.029