

Structure and Bridge

LOAD RATING SUMMARY FORM FOR STRUCTURES

Route: West Commerce Street
 Over: Peak Creek
 VA Structure No.: 8008
 FED. ID: 000000000021258
 Town: Pulaski
 District: Salem
 Rated By: MRM Date: 03/25/2019
 Checked By: APS Date: 04/03/2019
 VDOT Reviewer: _____

PE Seal



CALCULATION TOOLS AND METHOD USED: BrR 6.7 LRFR

REASON FOR RATING:

	GVW (TONS)	RATING FACTOR	CONTROLLING MEMBERS	CONTROLLING LOCATION	CONTROLLING FORCE
DESIGN LOAD					
HL-93 (INV)	N/A	0.240	Beam 2	Mid Span	Flexure
HL-93 (OPR)	N/A	0.311	Beam 2	Mid Span	Flexure
		TONS			
HS-20 (INV)	36	11	Beam 2	Mid Span	Flexure
HS-20 (OPR)	36	14	Beam 2	Mid Span	Flexure
LEGAL LOADS		TONS	**		
VA Type 3	27	12	Beam 2	Mid Span	Flexure
VA Type 3S2	40	19	Beam 2	Mid Span	Flexure
*LANE	40		***		
PERMIT LOAD		TONS			
BP-90	45	21	Beam 2	Mid Span	Flexure
BP-115	57.5	23	Beam 2	Mid Span	Flexure
SH VEHICLES		TONS			
NRL:	40	12	Beam 2	Mid Span	Flexure
SU4:	27	11	Beam 2	Mid Span	Flexure
SU5:	31	11	Beam 2	Mid Span	Flexure
SU6:	34.75	11	Beam 2	Mid Span	Flexure
SU7:	38.75	12	Beam 2	Mid Span	Flexure
EV2 VEHICLES		TONS			
Single Axle	16.75	8	Beam 2	Mid Span	Flexure
Gross Weight	28.75	15	Beam 2	Mid Span	Flexure
EV3 VEHICLES		TONS			
Single Axle	15.5	6	Beam 2	Mid Span	Flexure
Tandem Axles	31	12	Beam 2	Mid Span	Flexure
Gross Weight	43	17	Beam 2	Mid Span	Flexure

* Not applicable for single spans less than and equal to 200 feet.

** For LFR or ASD: Denote if it is a mid range or operating level.

*** Not applicable for LF/AS rating methods.

Structure and Bridge

LOAD RATING SUMMARY FORM FOR STRUCTURES

INSPECTION REPORT USED FOR THIS RATING: 06/18/2018

ASSUMPTIONS/COMMENTS BY LOAD RATING ENGINEER:

This load rating is an update to the load rating dated 09/16/2016. See the assumptions sheet for that rating for additional details of this load rating. The following changes were made in this load rating:

- Updated traffic per VDOT traffic data (2017):
 - ADT = 2,000 vpd
 - Directional % = 53.3%
 - Truck % = 3%
- Added Emergency Vehicles to analysis.
- Deterioration: Section loss was input per inspection report dated 12/18/2016 because the deterioration input was more detailed.
- April 2022 Revision: At the request of VDOT, we revised the calculation for EV2 w/SU7 and EV3 w/SU7
 - o BrR is currently placing the adjacent vehicle in the numerator of the load rating equation and VDOT asked that we move the adjacent vehicle load to the denominator of the equation. Please see the attached hand calculations and BrR load values for details of the calculations.

Rating Results Summary

Bridge Rating Results													
System of Units <input checked="" type="radio"/> US Customary <input type="radio"/> SI / Metric		Lane/Impact Loading Type <input checked="" type="radio"/> As Requested <input type="radio"/> Detailed		Display Format Single rating level per row									
Bridge Id	Vehicle	Rating Level	Rating Factor	Rating Method	Capacity (Ton)	Time Stamp	Rated By	Impact	Lane	Up To Date	DB	Vehicle Path	
21258	HS 20-44	Inventory	0.311	LRFR	11.20	Tuesday, March 26, 2019 12:45:02	bridge	As Requested	As Requested	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
21258	HS 20-44	Operating	0.403	LRFR	14.51	Tuesday, March 26, 2019 12:45:02	bridge	As Requested	As Requested	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
21258	HL-93 (US)	Inventory	0.240	LRFR	8.64	Tuesday, March 26, 2019 12:45:02	bridge	As Requested	As Requested	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
21258	HL-93 (US)	Operating	0.311	LRFR	11.20	Tuesday, March 26, 2019 12:45:02	bridge	As Requested	As Requested	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
21258	VA Type 3	Legal	0.481	LRFR	12.98	Tuesday, March 26, 2019 12:45:02	bridge	As Requested	As Requested	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
21258	VA Type 3S2	Legal	0.479	LRFR	19.14	Tuesday, March 26, 2019 12:45:02	bridge	As Requested	As Requested	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
21258	NRL	Legal	0.300	LRFR	12.01	Tuesday, March 26, 2019 12:45:02	bridge	As Requested	As Requested	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
21258	SU4	Legal	0.420	LRFR	11.34	Tuesday, March 26, 2019 12:45:02	bridge	As Requested	As Requested	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
21258	SU5	Legal	0.381	LRFR	11.81	Tuesday, March 26, 2019 12:45:02	bridge	As Requested	As Requested	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
21258	SU6	Legal	0.341	LRFR	11.86	Tuesday, March 26, 2019 12:45:02	bridge	As Requested	As Requested	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
21258	SU7	Legal	0.313	LRFR	12.12	Tuesday, March 26, 2019 12:45:02	bridge	As Requested	As Requested	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
21258	BP-115	Permit	0.408	LRFR	23.45	Tuesday, March 26, 2019 12:45:02	bridge	As Requested	As Requested	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
21258	BP-90	Permit	0.469	LRFR	21.11	Tuesday, March 26, 2019 12:45:02	bridge	As Requested	As Requested	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
21258	EV2 One_Lane	Permit	0.675	LRFR	19.40	Tuesday, March 26, 2019 12:45:02	bridge	As Requested	As Requested	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
21258	EV2 w/SU7	Permit	0.000	LRFR	0.00	Tuesday, March 26, 2019 12:45:02	bridge	As Requested	As Requested	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
21258	EV3 One_Lane	Permit	0.441	LRFR	18.97	Tuesday, March 26, 2019 12:45:02	bridge	As Requested	As Requested	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
21258	EV3 w/SU7	Permit	0.000	LRFR	0.00	Tuesday, March 26, 2019 12:45:02	bridge	As Requested	As Requested	<input checked="" type="checkbox"/>	<input type="checkbox"/>		

Show up-to-date results only

View Structure Rating Results Save All Print Close

SCHWARTZ & ASSOCIATES, INC.

Consulting Engineers

Heritage Business Center

7331 Timberlake Road, Lynchburg, VA 24502

(434) 237-6584

JOB 125-8008 (21258) Load Rating
 SHEET NO. 1 OF 1
 CALCULATED BY APS DATE 4/26/22
 CHECKED BY PLJ DATE 4/26/22
 SCALE _____ COMM. NO. _____

Modified Rating Factors for EV's LRFR

Values from BR (Beam 2 @ 34.2607')

Stresses

DC = 16.29 ✓

FR = 33 ksi ✓

DW = 1.64 ✓

EV₂ LL = 9.65 ✓

EV₃ LL = 14.76 ✓

Adj. LL = 8.06 ✓

- BR is currently placing adjacent vehicle in numerator of load rating equation
- VDOT has asked that we recalculate EV rating with adjacent vehicle in denominator
- We will also use the modified EV Live Load factor of 1.1 per latest VDOT guidance

Load factors

DC = 1.25

DW = 1.50

LL = 1.10 (modified per VDOT)

Modified Load Rating Factors

$$EV_2 = \frac{FR - DC - DW}{EV_{2LL} + Adj. LL} = \frac{33 - 1.25(16.29) - 1.50(1.64)}{1.1(9.65 + 8.06)} = \underline{0.522} \checkmark$$

$$EV_3 = \frac{FR - DC - DW}{EV_{3LL} + Adj. LL} = \frac{33 - 1.25(16.29) - 1.50(1.64)}{1.1(14.76 + 8.06)} = \underline{0.405} \checkmark$$

Load Rating Values

EV₂ Single axle = 0.522 × 16.75 = 8 Tons ✓

EV₂ Gross Weight = 0.522 × 28.75 = 15 Tons ✓

EV₃ Single Axle = 0.405 × 15.5 = 6 Tons ✓

EV₃ Tandem Axle = 0.405 × 31 = 12 Tons ✓

EV₃ Gross Weight = 0.405 × 43 = 17 Tons ✓

Component: Top Flange

Load	Load Combo	Limit State	Flange Type	LL (kip-ft)	Adv. LL (kip-ft)	BC	DW	DW-WS	LL	EDC (ksi)	EDW (ksi)	EDW-WS (ksi)	ELL (ksi)	EL (ksi)	Adv. ELL (ksi)	Phi	FR (ksi)	Phi	FR (ksi)	Capacity (ton)
PermitSpec	1	STR-II	Pos	302.0	---	1.25	1.50	1.50	1.50	-15.16	-1.52	0.00	-5.98	0.00	---	1.00	-33.00	---	0.840	24.18
PermitSpec	2	STR-II	Pos	302.0	302.28	1.25	1.50	1.50	1.50	-15.16	-1.52	0.00	-5.98	0.00	-7.50	1.00	-33.00	---	0.840	24.18
PermitSpec	3	STR-II	Pos	302.0	0.00	1.25	1.50	1.50	1.50	-15.16	-1.52	0.00	-5.98	0.00	---	1.00	-33.00	---	0.840	24.18
PermitSpec	4	STR-II	Pos	302.0	---	1.25	1.50	1.50	1.50	-15.16	-1.52	0.00	-5.98	0.00	---	1.00	-33.00	---	0.840	24.18
PermitSpec	5	STR-II	Pos	302.0	302.28	1.25	1.50	1.50	1.50	-15.16	-1.52	0.00	-5.98	0.00	-7.50	1.00	-33.00	---	0.840	24.18
PermitSpec	6	STR-II	Pos	302.0	0.00	1.25	1.50	1.50	1.50	-15.16	-1.52	0.00	-5.98	0.00	---	1.00	-33.00	---	0.840	24.18

Component: Bot Flange

Load	Load Combo	Limit State	Flange Type	LL (kip-ft)	Adv. LL (kip-ft)	BC	DW	DW-WS	LL	EDC (ksi)	EDW (ksi)	EDW-WS (ksi)	ELL (ksi)	EL (ksi)	Adv. ELL (ksi)	Phi	FR (ksi)	Phi	FR (ksi)	Capacity (ton)
PermitSpec	1	STR-II	Pos	302.0	---	1.25	1.50	1.50	1.50	16.29	1.64	0.00	5.65	0.00	---	1.00	33.00	---	0.876	29.49
PermitSpec	2	STR-II	Pos	302.0	302.36	1.25	1.50	1.50	1.50	16.29	1.64	0.00	5.65	0.00	0.06	1.00	33.00	---	0.876	29.49
PermitSpec	3	STR-II	Pos	302.0	0.00	1.25	1.50	1.50	1.50	16.29	1.64	0.00	5.65	0.00	---	1.00	33.00	---	0.876	29.49
PermitSpec	4	STR-II	Pos	302.0	---	1.25	1.50	1.50	1.50	16.29	1.64	0.00	5.65	0.00	---	1.00	33.00	---	0.876	29.49
PermitSpec	5	STR-II	Pos	302.0	302.36	1.25	1.50	1.50	1.50	16.29	1.64	0.00	5.65	0.00	0.06	1.00	33.00	---	0.876	29.49
PermitSpec	6	STR-II	Pos	302.0	0.00	1.25	1.50	1.50	1.50	16.29	1.64	0.00	5.65	0.00	---	1.00	33.00	---	0.876	29.49

Load Combination Legend:

- 1 EYZ One Lane - Permit Truck
- 2 EYZ W/SUV - Permit Truck
- 3 EYZ One Lane - Permit Truck
- 4 EYZ W/SUV - Permit Truck

Code Vehicle