

**LOAD RATING ANALYSIS
BRIDGE No. CUY-00480-06.120
SFN 1814168
West 220th St. Over I-480**

**Prepared for:
Ohio Department of Transportation
District 12
555 E. 98th St.
Garfield Heights, OH 44125**



**Prepared by:
MS Consultants, Inc.
333 E. Federal Street
Youngstown, Ohio 44503**

January 10, 2025



BRIDGE LOAD RATING SUMMARY REPORT

OFFICE OF STRUCTURAL ENGINEERING

OHIO DEPARTMENT OF TRANSPORTATION

SFN (SNBI Bridge Number)	Ohio Bridge Number (Bridge Asset Name)	District	GPS Coordinates						
			LATITUDE:	LONGITUDE:					
1814168	CUY-00480-06.120	12	41.4248056	-81.8646083					
Original Year Built	Year Re-built	Total length	Structure Type XXX	Feature Intersected					
1980	2027	254 ft	302	I-480					
SPECIAL ASSUMPTIONS & COMMENTS	Deck replacement of an existing four span steel beam bridge. New composite reinforced deck Loading: HL93 Future Wearing Surface not included. Controlling Beam: Interior Beam 5 at 0.0 L Span 4 Limit State: Strength I Steel Flexure Stress								
	Please type or select on right using drop down arrow								
Load Rating Purpose:	2 - Rehabilitation								
Bridge Appraisal Rating (0-9):	To be determined by inspection								
Load rating Software:	3 - AASHTO BrR								
Software version:	7.4.1.3001								
Rating Source:	1 - Plan information available for load rating analysis								
Load Rating Method:	LRFR - Load & Resistance Factor Rating (RF) - Code 8								
Design Loading:	A - HL93								
STRUCTURE RATING SUMMARY									
OHIO & AASHTO LEGAL VEHICLES									
Legal Load	GVW (Tons)	No of Axles	Rating Factor RF	Safe Weight (Tons)					
2F1	15	2	5.033	15.00					
3F1	23	3	3.297	23.00					
5C1	40	5	2.660	40.00					
Type 3	25	3	3.129	25.00					
Type 3-3	40	6	2.577	40.00					
Type 3S2	36	5	2.554	36.00					
SPECIALIZED HAULING VEHICLES (SHV)									
SU4/4F1	27	4	2.844	27.00					
SU5	31	5	2.515	31.00					
SU6	34.75	6	2.254	34.75					
SU7	38.75	7	2.044	38.75					
DESIGN AND OPERATING RATINGS									
Loading Type	Rating by RF								
	Inventory	Operating							
HL93 Loading	1.178	1.527							
Recommendation	No Load Posting is Recommended								
Sign Posting Recommendation:									
EMERGENCY VEHICLES (EV)									
Check box if rating for EV3 ☒									
EV2	28.75	2	2.690	28.75					
EV3	43	3	2.094	43.00					
Permit Load (PL) Analysis **									
Loading Type	GVW (Tons)	No of Axles	Rating Factor	Calculated Load (Tons)					
PL 60T	60	6	3.234	194.04					
PL 65T	65	7	2.649	172.19					
PL Analysis Method									
Load & Resistance Factor Rating (LRFR)									
Controlling Legal Load RF									
150% 1.50									
AGENCY/FIRM/OFFICE									
ms consultants, inc.									
Name	PE Number	Phone Number	Email	Report Date:					
Rated By	Samuel J Ranno	PE 57211	330-744-5321	sranno@msconsultants.com					
Reviewed By	Larry A Webster	PE 73070	330-744-5321	lwebster@msconsultants.com					

** ODOT bridges to be analyzed for permit trucks by policy.

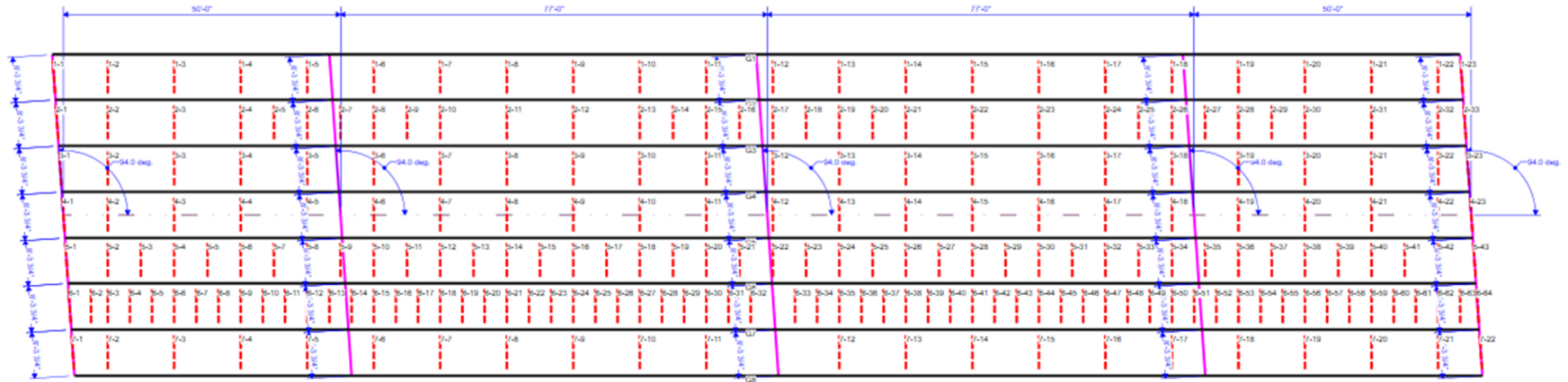
Analysis for permit trucks is optional for non-ODOT bridges and at owner's discretion.

BR-100 (01/2024)

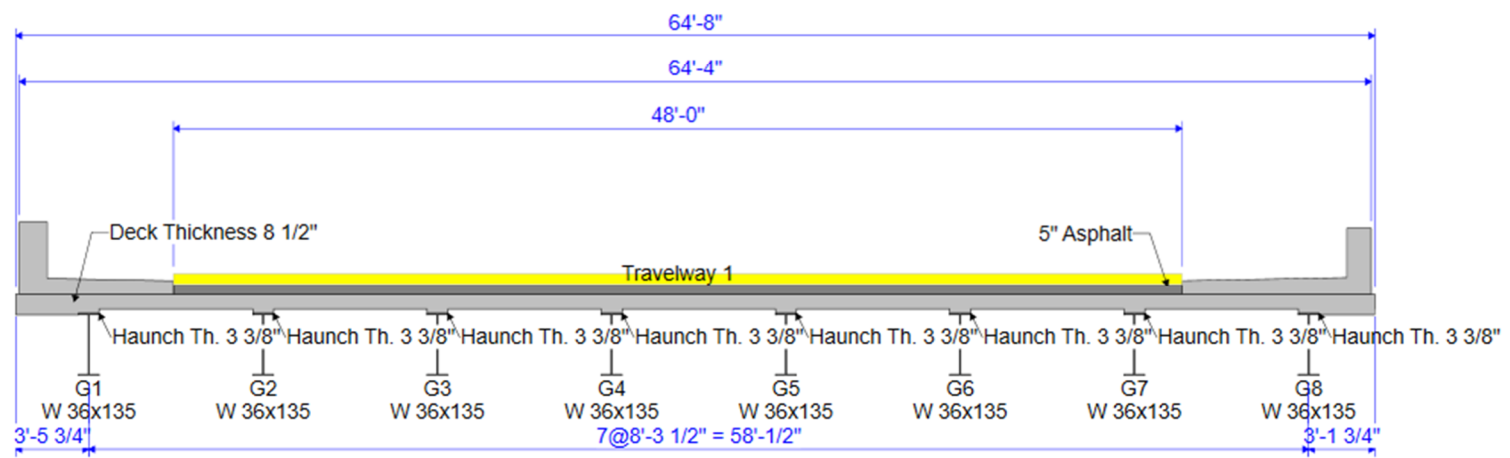
Bridge Rating Results Report

Bridge ID	Vehicle	Rating level	Rating factor	Rating method	Capacity (Ton)	Time stamp	Rated by	Impact	Lane	Up to date	DB	Vehicle path
1814168	EV2	Legal	2.690	LRFR	77.326	Friday, January 10, 2025 1:53:24 PM	brr	As Requested	As Requested	☒	☐	
1814168	EV3	Legal	2.094	LRFR	90.027	Friday, January 10, 2025 1:53:24 PM	brr	As Requested	As Requested	☒	☐	
1814168	HL-93 (US)	Inventory	1.178	LRFR	42.408	Friday, January 10, 2025 1:53:24 PM	brr	As Requested	As Requested	☒	☐	
1814168	HL-93 (US)	Operating	1.527	LRFR	54.973	Friday, January 10, 2025 1:53:24 PM	brr	As Requested	As Requested	☒	☐	
1814168	OH-2F1~1	Legal	5.033	LRFR	75.488	Friday, January 10, 2025 1:53:24 PM	brr	As Requested	As Requested	☒	☐	
1814168	OH-3F1	Legal	3.297	LRFR	75.842	Friday, January 10, 2025 1:53:24 PM	brr	As Requested	As Requested	☒	☐	
1814168	OH-5C1	Legal	2.660	LRFR	106.417	Friday, January 10, 2025 1:53:24 PM	brr	As Requested	As Requested	☒	☐	
1814168	PL 60T	Permit	3.234	LRFR	194.048	Friday, January 10, 2025 1:53:24 PM	brr	As Requested	As Requested	☒	☐	
1814168	PL 65T	Permit	2.649	LRFR	172.213	Friday, January 10, 2025 1:53:24 PM	brr	As Requested	As Requested	☒	☐	
1814168	SU4	Legal	2.844	LRFR	76.789	Friday, January 10, 2025 1:53:24 PM	brr	As Requested	As Requested	☒	☐	
1814168	SU5	Legal	2.515	LRFR	77.961	Friday, January 10, 2025 1:53:24 PM	brr	As Requested	As Requested	☒	☐	
1814168	SU6	Legal	2.254	LRFR	78.316	Friday, January 10, 2025 1:53:24 PM	brr	As Requested	As Requested	☒	☐	
1814168	SU7	Legal	2.044	LRFR	79.222	Friday, January 10, 2025 1:53:24 PM	brr	As Requested	As Requested	☒	☐	
1814168	Type 3	Legal	3.129	LRFR	78.225	Friday, January 10, 2025 1:53:24 PM	brr	As Requested	As Requested	☒	☐	
1814168	Type 3-3	Legal	2.577	LRFR	103.080	Friday, January 10, 2025 1:53:24 PM	brr	As Requested	As Requested	☒	☐	
1814168	Type 3S2	Legal	2.554	LRFR	91.937	Friday, January 10, 2025 1:53:24 PM	brr	As Requested	As Requested	☒	☐	

1814168
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 W. 220th St. / Ir-480 (W220th)
 7/15/2024

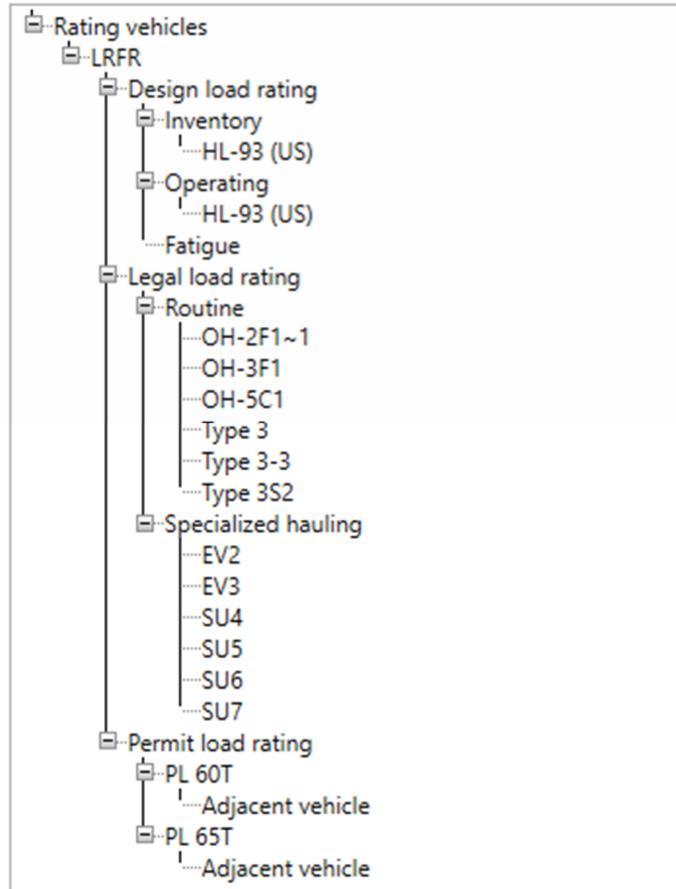


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ANALYSIS SETTINGS

Vehicle summary



Vehicle Properties



Vehicle	Tandem train	Scale factor	Impact	Single lane loaded	Legal pair	Override	Legal live load factor	Frequency	Loading condition	Override	Permit live load factor
EV2	☐	1.000	☐	☐	☐	☒	1.300	Single...	Mixed...	☐	
EV3	☐	1.000	☐	☐	☐	☒	1.100	Unlimi...	Mixed...	☐	
HL-93 (US)	☐	1.000	☐	☐	☐	☐	0.000	Single...	Mixed...	☐	0.000
OH-2F1~1	☐	1.000	☐	☐	☐	☐		Single...	Mixed...	☐	
OH-3F1	☐	1.000	☐	☐	☐	☐		Single...	Mixed...	☐	
OH-5C1	☐	1.000	☐	☐	☐	☐	0.000	Single...	Mixed...	☐	0.000
PL 60T	☐	1.000	☐	☐	☐	☐		Single...	Mixed...	☐	
PL 65T	☐	1.000	☐	☐	☐	☐		Single...	Mixed...	☐	
SU4	☐	1.000	☐	☐	☐	☐	0.000	Single...	Mixed...	☐	0.000
SU5	☐	1.000	☐	☐	☐	☐	0.000	Single...	Mixed...	☐	0.000
SU6	☐	1.000	☐	☐	☐	☐	0.000	Single...	Mixed...	☐	0.000
SU7	☐	1.000	☐	☐	☐	☐	0.000	Single...	Mixed...	☐	0.000
Type 3	☐	1.000	☐	☐	☐	☐		Single...	Mixed...	☐	
Type 3-3	☐	1.000	☐	☐	☐	☐		Single...	Mixed...	☐	
Type 3S2	☐	1.000	☐	☐	☐	☐		Single...	Mixed...	☐	

Permit lane load: kip/ft Adjacent vehicle live load factor:

☐ Exclude permit lane load from permit vehicle location

CONTROL OPTIONS

- LRFR



Points of interest

☒ Generate at tenth points

☒ Generate at section change points

☒ Generate at user-defined points

☐ Generate at stiffeners

☐ Allow moment redistribution

☐ Use Appendix A6 for flexural resistance

☒ Allow plastic analysis

☐ Evaluate remaining fatigue life

☐ Ignore long. reinf. in negative moment capacity

☐ Include field splices in rating

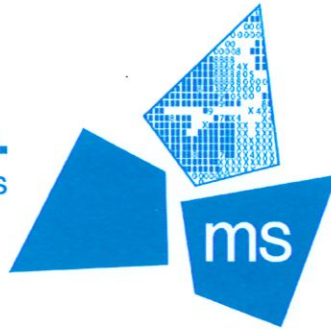
☐ Consider deck reinf. development length

☐ Consider tension-field action in stiffened web end panels

☐ Must consider user input lateral bending stress

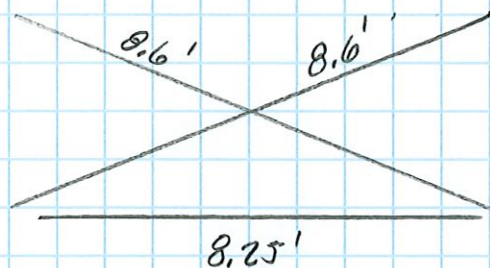


Distribution factor application method



BrR X-frame & Utility Loading

All Bays (Intermediate X-frames)



$\angle 3 \times 3 \times 5/16$
(6.1 lb/ft)

$$Wt = (8.6 + 8.6 + 8.25) \times 6.1 = 155 \text{ lb.}$$

Bay 2 Bottom Frame

$\angle 3 \times 3 \times 5/16$ between Inter X-frames

$$Wt = 6.1 \times 8.25 \approx 50 \text{ lb (Over Piers)}$$

Bay 6

Add the existing $\angle 3 \frac{1}{2} \times 3 \frac{1}{2} \times 5/16$ as per exist plans.

$$Wt = 7.2 \times 8.25 = 59 \text{ lb. (ADDED TO BAY 6)}$$

Bay 5 Bottom Frame

$$\text{Assume } MC6 \times 18, \quad 8.25' \times 18 \approx 150 \text{ lb.}$$



MEMBER LOADS

12" GAS LINE

Self Wt = 106 lb/ft (DL1)

Roller guide = 39.6 spread over 12' spa

$$\text{Unit Wt} = 106 + \frac{39.6}{12} = 110 \text{ lb/ft (to B5)}$$

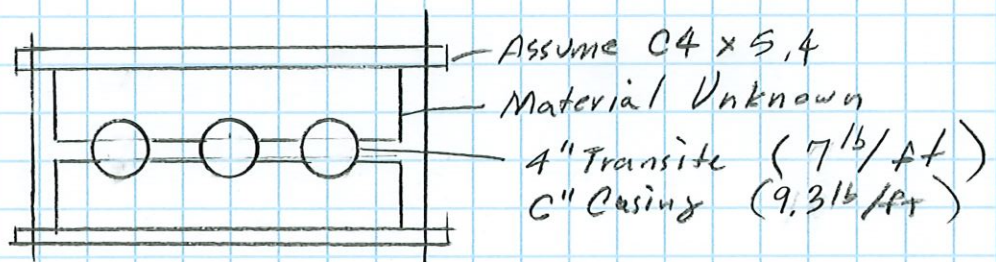
8" GAS LINE

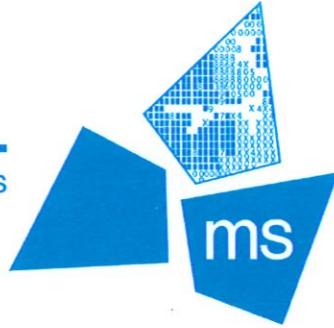
Self Wt = 68 lb/ft (DL1)

Roller guide = 25.6 spread over 12' Spa

$$\text{Unit Wt} = 68 + \frac{25.6}{12} = 70 \text{ lb/ft (to B6)}$$

CEI DUCTS





job no 60-08398 sheet 3 of
made by SJR date 1-04-24
checked LAW date 4-3-24
office 9-town
project W 220th

CEI PIPES: $16.3' \times 3 \approx 49' \text{ lb/ft}$

channel: $2 \times 5.4 = 10.8 \text{ lb} \times 1.10 \text{ Contingency}$
 $\approx 11.9 \text{ lb}$

Use $\left(49 + \frac{11.9}{4}\right) \div 2 = 26' \text{ lb/ft} \text{ (To B6 \& B7)}$