Montana Department of Transportation

Bridge Load Rating Summary

Insert Consultant Logo Here

Rating prepared by:

General Bridge Information

MDT Bridge ID	**03862**	MDT District	BUTTE	Year Built	1997
NBI Bridge ID	L34307004+08001	County	PARK	Design Load	MS 18 (HS 20)
Feature Intersected	BIG CREEK 063	Location	11M SW EMIGRANT	Deck Type	Corrugated Steel
Facility Carried	NF 132-BIG CR RD	Inspection Date	5/8/2019	Wearing Surface	Gravel...
Route Number	34307	Accumulated Miles	4.52	Depth of Cover (inches)	6
Structure Length (feet)	37	Bridge Owner	County Hwy Agency	Maintenance Responsibility	County Hwy Agency

Span Data

Main Span(s)		Approach Span(s)	
Number of Spans	1	Number of Spans	0
Material Type	Steel	Material Type	Not Applicable
Superstructure Type	Stringer|Multi-beam or Girder	Superstructure Type	Not Applicable

EXAMPLE
Steel Girder/Corrugated Steel Deck

Load Rating Information

Load Rating Method Used	LRFR	Load Rating Program Used	BrR
Load Rating Status	Final	Version	6.8.3.3001

Truck / Load Type	Vehicle Weight *(Tons)*	Rating Factor	Controlling Load†	Controlling Member	Controlling Location‡	Limit State	Safe Load Capacity *(Tons)*	Calculated Safe Posting Load* *(Tons)*
HL-93 Inventory	36	0.403	1	Deck	n/a	Strength-I Simple Steel Flexure	15	
HL-93 Operating	36	0.523	1	Deck	n/a	Strength-I Simple Steel Flexure	19	
Type 3	25	0.916		Deck	n/a	Strength-I Simple Steel Flexure	23	**22**
Type 3S2	36	1.005		Deck	n/a	Strength-I Simple Steel Flexure	36	**NA**
Type 3-3	40	0.974		Deck	n/a	Strength-I Simple Steel Flexure	39	**39**
SU4	27	0.916		Deck	n/a	Strength-I Simple Steel Flexure	25	**24**
SU5	31	0.916		Deck	n/a	Strength-I Simple Steel Flexure	28	**27**
SU6	34.75	0.916		Deck	n/a	Strength-I Simple Steel Flexure	32	**31**
SU7	38.75	0.916		Deck	n/a	Strength-I Simple Steel Flexure	35	**34**
EV2	28.75	0.350	Single/Multi	Deck	n/a	Strength-I Simple Steel Flexure	10	**REFER TO LOAD POSTING FORM**
EV3	43	0.350	Single/Multi	Deck	n/a	Strength-I Simple Steel Flexure	15	**REFER TO LOAD POSTING FORM**

†1 = Tru
2 = Tan
3 = (0.9
EVs = S

Note on Summary Sheet if controlling corrugated steel deck results are overridden (see example wording)

Don't need to include overall bridge rating results from Explorer. Instead, please include rating result printouts for each member alternative. See deck sheet for further example/info

Preference - highlight member at top of each sheet, highlight controlling rating factors

Include Calculations/Additional Assumptions/ Measurements sheets like normal

Include vehicle template as normal

** Recommended values based on MBE Equation 6A.8.3-1. If posting is required, refer to supplemental Load Posting Form for final determination on load posting values.*
***If RF < 0.3, vehicle type should not be allowed on span (MBE 6A.8.3)*
****Minimum permissible posting load is 3 tons. Refer to Load Posting Form for documentation of engineering judgement if posted at alternate level*

Posting Required for Legal Vehicles?	**Yes**

Posting is required if Rating Factor is < 1 for any of the AASHT

Posting Required for Emergency Vehicles?	**No**

*Posting is required if Rating Factor is < 1 for either EV **and** th an interstate or within 1 mile from any interstate interchange*

Load Rating by:	
Date:	
QC by:	
Date:	
QA by:	EXAMPLE

Comments and Assumptions *Attach*

Include:
Basis for Load Rating (i.e. measurements from xxxx year, as-built plans/shop drawings/construction plans)
References (i.e. MBE edition, AASHTO LRFD edition)
Anything unique about rating (i.e. alternate superstructure was created in BrR for xxx reason, mixed materials)
Anything that needs to be flagged for attention (i.e. reduced capacity for timber members, EV live load factor (if different than default 1.3), removal of optional limit state checks)

The intent of this section is to provide a brief overview/summary; it's encouraged to attach more detailed documentation of engineering judgement and calculations as additional pages. Please include a note referencing any additional comments/assumptions/calculations (i.e. "Additional assumptions and calculations are detailed within the attached load rating report)

Example wording:

Per MDT guidance, both deck analysis methods are considered conservative. The least conservative deck results were used to determine controlling rating factors.

Date Sealed:

Rating Results Summary Report

Name:
Struct-Def: 34.5 ft - Steel Span 1

Bridge ID: 03862
Member: Deck

Deck results don't include indication of member - please add

NBI: L34307004+08001

Live Load	Live Load Type	Rating Method	Rating Level	Load Rating	Rating Factor	Location	Limit State	Impact	Lane
HL-93 (US)	Axle Load	LRFR	Inventory	8.60	0.239	6.333	STRENGTH-I Cont Steel Flex	As Requested	As Requested
HL-93 (US)	Axle Load	LRFR	Operating	11.15	0.310	6.333	STRENGTH-I Cont Steel Flex	As Requested	As Requested
HL-93 (US)	Tandem	LRFR	Inventory	11.01	0.306	6.333	STRENGTH-I Cont Steel Flex	As Requested	As Requested
HL-93 (US)	Tandem	LRFR	Operating	14.27	0.396	6.333	STRENGTH-I Cont Steel Flex	As Requested	As Requested
Lane-Type Legal Load	Axle Load	LRFR	Legal	30.76	0.769	6.333	STRENGTH-I Cont Steel Flex	As Requested	As Requested
Type 3	Axle Load	LRFR	Legal	13.57	0.543	6.333	STRENGTH-I Cont Steel Flex	As Requested	As Requested
Type 3-3	Axle Load	LRFR	Legal	23.07	0.577	6.333	STRENGTH-I Cont Steel Flex	As Requested	As Requested
Type 3S2	Axle Load	LRFR	Legal	21.43	0.595	6.333	STRENGTH-I Cont Steel Flex	As Requested	As Requested
SU4	Axle Load	LRFR	Legal	14.65	0.543	6.333	STRENGTH-I Cont Steel Flex	As Requested	As Requested
SU5	Axle Load	LRFR	Legal	16.83	0.543	6.333	STRENGTH-I Cont Steel Flex	As Requested	As Requested
SU6	Axle Load	LRFR	Legal	18.86	0.543	6.333	STRENGTH-I Cont Steel Flex	As Requested	As Requested
SU7	Axle Load	LRFR	Legal	21.03	0.543	6.333	STRENGTH-I Cont Steel Flex	As Requested	As Requested
EV2m (Single Lane)	Axle Load	LRFR	Legal	8.83	0.307	6.333	STRENGTH-I Cont Steel Flex	As Requested	As Requested
EV3m (Single Lane)	Axle Load	LRFR	Legal	14.28	0.332	6.333	STRENGTH-I Cont Steel Flex	As Requested	As Requested
EV2m (Multi-Lane	Axle Load	LRFR	Permit	8.83	0.307	6.333	STRENGTH-II Cont Steel Fle	As Requested	As Requested
EV3m (Multi-Lane	Axle Load	LRFR	Permit	14.28	0.332	6.333	STRENGTH-II Cont Steel Fle	As Requested	As Requested
HL-93 (US)	Axle Load	LRFR	Inventory	14.52	0.403	15.333	STRENGTH-I Simple Steel Fl	As Requested	As Requested
HL-93 (US)	Axle Load	LRFR	Operating	18.82	0.523	15.333	STRENGTH-I Simple Steel Fl	As Requested	As Requested
HL-93 (US)	Tandem	LRFR	Inventory	18.58	0.516	15.333	STRENGTH-I Simple Steel Fl	As Requested	As Requested
HL-93 (US)	Tandem	LRFR	Operating	24.09	0.669	15.333	STRENGTH-I Simple Steel Fl	As Requested	As Requested
Lane-Type Legal Load	Axle Load	LRFR	Legal	38.94	1.298	15.333	STRENGTH-I Simple Steel Fl	As Requested	As Requested
Type 3	Axle Load	LRFR	Legal	22.91	0.916	15.333	STRENGTH-I Simple Steel Fl	As Requested	As Requested
Type 3-3	Axle Load	LRFR	Legal	38.94	0.974	15.333	STRENGTH-I Simple Steel Fl	As Requested	As Requested
Type 3S2	Axle Load	LRFR	Legal	36.18	1.005	15.333	STRENGTH-I Simple Steel Fl	As Requested	As Requested
SU4	Axle Load	LRFR	Legal	24.74	0.916	15.333	STRENGTH-I Simple Steel Fl	As Requested	As Requested
SU5	Axle Load	LRFR	Legal	28.40	0.916	15.333	STRENGTH-I Simple Steel Fl	As Requested	As Requested
SU6	Axle Load	LRFR	Legal	31.84	0.916	15.333	STRENGTH-I Simple Steel Fl	As Requested	As Requested
SU7	Axle Load	LRFR	Legal	35.50	0.916	15.333	STRENGTH-I Simple Steel Fl	As Requested	As Requested
EV2m (Single Lane)	Axle Load	LRFR	Legal	14.91	0.519	15.333	STRENGTH-I Simple Steel Fl	As Requested	As Requested
EV3m (Single Lane)	Axle Load	LRFR	Legal	24.10	0.560	15.333	STRENGTH-I Simple Steel Fl	As Requested	As Requested
EV2m (Multi-Lane	Axle Load	LRFR	Permit	14.91	0.519	15.333	STRENGTH-II Simple Steel Fl	As Requested	As Requested
EV3m (Multi-Lane	Axle Load	LRFR	Permit	24.10	0.560	15.333	STRENGTH-II Simple Steel Fl	As Requested	As Requested

BrR will report these lower/controlling values

MDT guidance is to use the least conservative deck results

Please cross out lower rating values and include a note - example wording:
BrR analyzes the deck as both a simple and continuous span. MDT considers both methods to be conservative, so lower ratings are ignored.

Legacy AASHTO Deck LRFR Engine Version 6.8.3.3001
Analysis Preference Setting: None
Analysis Time: 10/17/2019 14:45:45
Print Time: 10/17/2019 14:46:57

Analyzed By: ops$u5801

Rating Results Summary Report

Name:
Struct-Def: 34.5 ft - Steel Span 1

Bridge ID: 03862
Member: G1

NBI: L34307004+08001
Member Alt: Exterior Steel Girder

Live Load	Live Load Type	Rating Method	Rating Level	Load Rating (Ton)	Rating Factor	Location (ft)	Location Span-(%)	Limit State	Impact	Lane
HL-93 (US)	Truck + Lane	LRFR	Inventory	82.08	2.280	20.70	1 - (60.0)	SERVICE-II Steel Flexure Stress	As R	As
HL-93 (US)	Truck + Lane	LRFR	Operatin	106.71	2.964	20.70	1 - (60.0)	SERVICE-II Steel Flexure Stress	As R	As
HL-93 (US)	Tandem + Lan	LRFR	Inventory	75.75	2.104	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
HL-93 (US)	Tandem + Lan	LRFR	Operatin	98.47	2.735	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
Lane-Type Legal Load	Truck + Lane	LRFR	Legal	3960.00	99.000	0.00	1 - (0.0)	STRENGTH-I Steel Flexure	As R	As
SU4	Axle Load	LRFR	Legal	77.55	2.872	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
SU5	Axle Load	LRFR	Legal	84.58	2.728	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
SU6	Axle Load	LRFR	Legal	85.73	2.467	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
SU7	Axle Load	LRFR	Legal	90.66	2.340	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
Type 3	Axle Load	LRFR	Legal	85.92	3.437	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
Type 3-3	Axle Load	LRFR	Legal	167.55	4.189	20.70	1 - (60.0)	SERVICE-II Steel Flexure Stress	As R	As
Type 3S2	Axle Load	LRFR	Legal	128.17	3.560	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
EV2m (Multi-Lane	Axle Load	LRFR	Permit	129.16	4.492	20.70	1 - (60.0)	SERVICE-II Steel Flexure Stress	As R	As
EV2m (Single Lane)	Axle Load	LRFR	Legal	82.79	2.880	20.70	1 - (60.0)	SERVICE-II Steel Flexure Stress	As R	As
EV3m (Multi-Lane	Axle Load	LRFR	Permit	127.90	2.974	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
EV3m (Single Lane)	Axle Load	LRFR	Legal	81.99	1.907	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As

AASHTO LRFR Engine Version 6.8.3.3001
Analysis Preference Setting: None
Analysis Time: 10/17/2019 14:45:45
Print Time: 10/17/2019 14:47:25

Analyzed By: ops$u5801

Rating Results Summary Report

Name:
Struct-Def: 34.5 ft - Steel Span 1

Bridge ID: 03862
Member: G2

NBI: L34307004+08001
Member Alt: Interior Steel Girder

Live Load	Live Load Type	Rating Method	Rating Level	Load Rating (Ton)	Rating Factor	Location (ft)	Location Span-(%)	Limit State	Impact	Lane
HL-93 (US)	Truck + Lane	LRFR	Inventory	116.63	3.240	13.80	1 - (40.0)	SERVICE-II Steel Flexure Stress	As R	As
HL-93 (US)	Truck + Lane	LRFR	Operatin	151.62	4.212	13.80	1 - (40.0)	SERVICE-II Steel Flexure Stress	As R	As
HL-93 (US)	Tandem + Lan	LRFR	Inventory	107.66	2.990	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
HL-93 (US)	Tandem + Lan	LRFR	Operatin	139.96	3.888	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
Lane-Type Legal Load	Truck + Lane	LRFR	Legal	3960.00	99.000	0.00	1 - (0.0)	STRENGTH-I Steel Flexure	As R	As
SU4	Axle Load	LRFR	Legal	110.22	4.082	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
SU5	Axle Load	LRFR	Legal	120.20	3.878	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
SU6	Axle Load	LRFR	Legal	121.84	3.506	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
SU7	Axle Load	LRFR	Legal	128.86	3.325	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
Type 3	Axle Load	LRFR	Legal	122.11	4.885	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
Type 3-3	Axle Load	LRFR	Legal	238.07	5.952	13.80	1 - (40.0)	SERVICE-II Steel Flexure Stress	As R	As
Type 3S2	Axle Load	LRFR	Legal	182.17	5.060	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
EV2m (Multi-Lane	Axle Load	LRFR	Permit	187.57	6.524	13.80	1 - (40.0)	SERVICE-II Steel Flexure Stress	As R	As
EV2m (Single Lane)	Axle Load	LRFR	Legal	120.24	4.182	13.80	1 - (40.0)	SERVICE-II Steel Flexure Stress	As R	As
EV3m (Multi-Lane	Axle Load	LRFR	Permit	185.79	4.321	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
EV3m (Single Lane)	Axle Load	LRFR	Legal	119.09	2.770	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As

AASHTO LRFR Engine Version 6.8.3.3001
Analysis Preference Setting: None
Analysis Time: 10/17/2019 14:45:45
Print Time: 10/17/2019 14:47:40

Analyzed By: ops$u5801

Rating Results Summary Report

Name:
Struct-Def: 34.5 ft - Steel Span 1

Bridge ID: 03862
Member: G7

NBI: L34307004+08001
Member Alt: Exterior Steel Girder

Live Load	Live Load Type	Rating Method	Rating Level	Load Rating (Ton)	Rating Factor	Location (ft)	Location Span-(%)	Limit State	Impact	Lane
HL-93 (US)	Truck + Lane	LRFR	Inventory	82.12	2.281	13.80	1 - (40.0)	SERVICE-II Steel Flexure Stress	As R	As
HL-93 (US)	Truck + Lane	LRFR	Operatin	106.76	2.965	13.80	1 - (40.0)	SERVICE-II Steel Flexure Stress	As R	As
HL-93 (US)	Tandem + Lan	LRFR	Inventory	75.79	2.105	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
HL-93 (US)	Tandem + Lan	LRFR	Operatin	98.52	2.737	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
Lane-Type Legal Load	Truck + Lane	LRFR	Legal	3960.00	99.000	0.00	1 - (0.0)	STRENGTH-I Steel Flexure	As R	As
SU4	Axle Load	LRFR	Legal	77.59	2.874	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
SU5	Axle Load	LRFR	Legal	84.62	2.730	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
SU6	Axle Load	LRFR	Legal	85.77	2.468	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
SU7	Axle Load	LRFR	Legal	90.71	2.341	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
Type 3	Axle Load	LRFR	Legal	85.96	3.438	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
Type 3-3	Axle Load	LRFR	Legal	167.63	4.191	13.80	1 - (40.0)	SERVICE-II Steel Flexure Stress	As R	As
Type 3S2	Axle Load	LRFR	Legal	128.24	3.562	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
EV2m (Multi-Lane	Axle Load	LRFR	Permit	129.22	4.495	13.80	1 - (40.0)	SERVICE-II Steel Flexure Stress	As R	As
EV2m (Single Lane)	Axle Load	LRFR	Legal	82.83	2.881	13.80	1 - (40.0)	SERVICE-II Steel Flexure Stress	As R	As
EV3m (Multi-Lane	Axle Load	LRFR	Permit	127.96	2.976	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
EV3m (Single Lane)	Axle Load	LRFR	Legal	82.03	1.908	17.25	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As

AASHTO LRFR Engine Version 6.8.3.3001
Analysis Preference Setting: None
Analysis Time: 10/17/2019 14:45:45
Print Time: 10/17/2019 14:47:57

Analyzed By: ops$u5801

Include additional sheets (as needed) for:

- Calculations
    - *Include any calculations not included in the rating program's analysis (i.e. LLDFs, dead loads, section loss, etc.). Include appropriate references to equations and relevant code articles, and format with a level of detail that's easy to follow for checking purposes.*

- Additional Assumptions/Comments
    - Details about unique rating processes/checks
        - *i.e. additional superstructure definition used for alternate rating, check for failed girder condition, etc.*
    - BrR issues that affect model
        - *Include JIRA ticket (if applicable), brief statement of issue and how model/rating is affected, workaround procedure performed*
    - Document all rationale and justification
        - *i.e. reduction of timber member capacity, removal of optional limit state checks, EV live load factor override, etc.*

Vehicle Templates – please include following:

***Only the analysis template that's applicable to rating methodology used needs to be attached. For mixed material/mixed code bridges, please include both.*

- Vehicle Summary (Analysis Template)
- Vehicle Properties (Advanced Settings)
    - *Hint – cannot adjust size of this window; may have to adjust column widths to fit in one screenshot*
    - *Note – this will need to be updated for LRFR if EV live load factor is changed*
- Any non-standard library vehicle definitions
    - For ASR/LFR
        - Use standard definitions for all vehicles
        - No additional screenshots necessary, please note that standard vehicle definitions were used for all vehicles
    - For LRFR
        - Use modified contact area for EVs
        - Include screenshots of agency defined vehicles (i.e. EVs, Adjacent Type 3-3)

Note – please ensure that the attached template is the actual template used in the rating

Example Vehicle Template for LRFR Analysis

Analysis Settings:

Vehicle Summary:

- Rating Vehicles
  - LRFR
    - Design Load Rating
      - Inventory
        - HL-93 (US)
      - Operating
        - HL-93 (US)
      - Fatigue
        - LRFD Fatigue Truck (US)
    - Legal Load Rating
      - Routine
        - Lane-Type Legal Load
        - Type 3
        - Type 3-3
        - Type 3S2
      - Specialized Hauling
        - SU4
        - SU5
        - SU6
        - SU7
        - EV2m (Single Lane)
        - EV3m (Single Lane)
    - Permit Load Rating
      - EV2m (Multi-Lane)
        - Adjacent Vehicle
          - Adjacent Type 3-3
      - EV3m (Multi-Lane)
        - Adjacent Vehicle
          - Adjacent Type 3-3

Advanced Settings:

Vehicle Properties

Vehicle	Tandem Train	Scale Factor	Impact	Single Lane Loade	Lega Pair	Override	Legal Live Load	Frequency	Loading Condition	Override	Permit Live Load
HL-93 (US)	☐	1		☐	☐	☐		Single Trip	Mixed with traffi	☐	
Lane-Type Legal Load	☐	1		☐	☑	☐		Single Trip	Mixed with traffi	☐	
LRFD Fatigue Truck (US)	☐	1		☐	☐	☐		Single Trip	Mixed with traffi	☐	
SU4	☐	1		☐	☐	☐		Single Trip	Mixed with traffi	☐	
SU5	☐	1		☐	☐	☐		Single Trip	Mixed with traffi	☐	
SU6	☐	1		☐	☐	☐		Single Trip	Mixed with traffi	☐	
SU7	☐	1		☐	☐	☐		Single Trip	Mixed with traffi	☐	
Type 3	☐	1		☐	☐	☐		Single Trip	Mixed with traffi	☐	
Type 3-3	☐	1		☐	☐	☐		Single Trip	Mixed with traffi	☐	
Type 3S2	☐	1		☐	☐	☐		Single Trip	Mixed with traffi	☐	
EV2m (Multi-Lane)	☐	1		☐	☐	☐		Single Trip	Mixed with traffi	☑	1.3
EV2m (Single Lane)	☐	1		☑	☐	☑	1.3	Single Trip	Mixed with traffi	☐	
EV3m (Multi-Lane)	☐	1		☐	☐	☐		Single Trip	Mixed with traffi	☑	1.3
EV3m (Single Lane)	☐	1		☑	☐	☑	1.3	Single Trip	Mixed with traffi	☐	

Permit lane load: kip/ft

Adjacent vehicle live load factor: 1.300

☐ Exclude permit lane load from permit vehicle location

EVs and Adjacent Type 3-3 are Agency Defined vehicles – see next page

Standard library definitions used for all other vehicles

Example Vehicle Template for LRFR Analysis – Agency Defined Vehicles









