Montana Department of Transportation

Bridge Load Rating Summary

Insert Consultant Logo Here

Rating prepared by:

General Bridge Information

MDT Bridge ID	**02847**	MDT District	MISSOULA	Year Built	2017
NBI Bridge ID	000000000002847	County	FLATHEAD	Design Load	MS 18 (HS 20)
Feature Intersected	MORAN CREEK 053	Location	3M SE POLEBRIDGE	Deck Type	Corrugated Steel
Facility Carried	NORTH FORK RD	Inspection Date	8/20/2019	Wearing Surface	Bituminous...
Route Number	15175	Accumulated Miles	10.3	Depth of Cover (inches)	5
Structure Length (feet)	52	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	0.689	1	Deck	n/a	Strength-I Simple Steel Flexure	25	
HL-93 Operating	36	0.893	1	Deck	n/a	Strength-I Simple Steel Flexure	32	
Type 3	25	1.556		Deck	n/a	Strength-I Simple Steel Flexure	39	**NA**
Type 3S2	36	1.664		Deck	n/a	Strength-I Simple Steel Flexure	60	**NA**
Type 3-3	40	1.717		Deck	n/a	Strength-I Simple Steel Flexure	69	**NA**
SU4	27	1.445		Exterior Girder (G1)	1 - (50.0)	Service-II Steel Flexure Stress	39	**NA**
SU5	31	1.334		Exterior Girder (G1)	1 - (50.0)	Service-II Steel Flexure Stress	41	**NA**
SU6	34.75	1.198		Exterior Girder (G1)	1 - (50.0)	Service-II Steel Flexure Stress	42	**NA**
SU7	38.75	1.108		Exterior Girder (G1)	1 - (50.0)	Service-II Steel Flexure Stress	43	**NA**
EV2	28.75	0.886	Single/Multi	Deck	n/a	Strength-I Simple Steel Flexure	25	**REFER TO LOAD POSTING FORM**
EV3	43	0.958	Single/Multi	Deck	n/a	Strength-I Simple Steel Flexure	41	**REFER TO LOAD POSTING FORM**

†1 = Tru
2 = Tan
3 = (0.9
EVs = S

** 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*

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

Posting Required for Legal Vehicles?	**No**

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:	
Date:	

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 tha
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: 51.25ft - Steel Span

Bridge ID: 02847
Member: Deck

NBI: 000000000002847

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

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	24.81	0.689	4.555	STRENGTH-I Cont Steel Flexu	As Requested	As Requested
HL-93 (US)	Axle Load	LRFR	Operating	32.16	0.893	4.555	STRENGTH-I Cont Steel Flexu	As Requested	As Requested
HL-93 (US)	Tandem	LRFR	Inventory	31.76	0.882	4.555	STRENGTH-I Cont Steel Flexu	As Requested	As Requested
HL-93 (US)	Tandem	LRFR	Operating	41.17	1.144	4.555	STRENGTH-I Cont Steel Flexu	As Requested	As Requested
Lane-Type Legal Load	Axle Load	LRFR	Legal	88.72	2.218	4.555	STRENGTH-I Cont Steel Flexu	As Requested	As Requested
Type 3	Axle Load	LRFR	Legal	39.14	1.566	4.555	STRENGTH-I Cont Steel Flexu	As Requested	As Requested
Type 3-3	Axle Load	LRFR	Legal	66.54	1.664	4.555	STRENGTH-I Cont Steel Flexu	As Requested	As Requested
Type 3S2	Axle Load	LRFR	Legal	61.82	1.717	4.555	STRENGTH-I Cont Steel Flexu	As Requested	As Requested
SU4	Axle Load	LRFR	Legal	42.27	1.566	4.555	STRENGTH-I Cont Steel Flexu	As Requested	As Requested
SU5	Axle Load	LRFR	Legal	48.54	1.566	4.555	STRENGTH-I Cont Steel Flexu	As Requested	As Requested
SU6	Axle Load	LRFR	Legal	54.41	1.566	4.555	STRENGTH-I Cont Steel Flexu	As Requested	As Requested
SU7	Axle Load	LRFR	Legal	60.67	1.566	4.555	STRENGTH-I Cont Steel Flexu	As Requested	As Requested
EV2m (Single Lane)	Axle Load	LRFR	Legal	25.48	0.886	4.555	STRENGTH-I Cont Steel Flexu	As Requested	As Requested
EV3m (Single Lane)	Axle Load	LRFR	Legal	41.18	0.958	4.555	STRENGTH-I Cont Steel Flexu	As Requested	As Requested
EV2m (Multi-Lane	Axle Load	LRFR	Permit	25.48	0.886	4.555	STRENGTH-II Cont Steel Flexu	As Requested	As Requested
EV3m (Multi-Lane	Axle Load	LRFR	Permit	41.18	0.958	4.555	STRENGTH-II Cont Steel Flexu	As Requested	As Requested
HL-93 (US)	Axle Load	LRFR	Inventory	24.19	0.672	8.889	STRENGTH-I Simple Steel Fle	As Requested	As Requested
HL-93 (US)	Axle Load	LRFR	Operating	31.36	0.871	8.889	STRENGTH-I Simple Steel Fle	As Requested	As Requested
HL-93 (US)	Tandem	LRFR	Inventory	30.96	0.860	8.889	STRENGTH-I Simple Steel Fle	As Requested	As Requested
HL-93 (US)	Tandem	LRFR	Operating	40.14	1.115	8.889	STRENGTH-I Simple Steel Fle	As Requested	As Requested
Lane-Type Legal Load	Axle Load	LRFR	Legal	64.88	2.163	8.889	STRENGTH-I Simple Steel Fle	As Requested	As Requested
Type 3	Axle Load	LRFR	Legal	38.16	1.527	8.889	STRENGTH-I Simple Steel Fle	As Requested	As Requested
Type 3-3	Axle Load	LRFR	Legal	64.88	1.622	8.889	STRENGTH-I Simple Steel Fle	As Requested	As Requested
Type 3S2	Axle Load	LRFR	Legal	60.27	1.674	8.889	STRENGTH-I Simple Steel Fle	As Requested	As Requested
SU4	Axle Load	LRFR	Legal	41.22	1.527	8.889	STRENGTH-I Simple Steel Fle	As Requested	As Requested
SU5	Axle Load	LRFR	Legal	47.32	1.527	8.889	STRENGTH-I Simple Steel Fle	As Requested	As Requested
SU6	Axle Load	LRFR	Legal	53.05	1.527	8.889	STRENGTH-I Simple Steel Fle	As Requested	As Requested
SU7	Axle Load	LRFR	Legal	59.15	1.527	8.889	STRENGTH-I Simple Steel Fle	As Requested	As Requested
EV2m (Single Lane)	Axle Load	LRFR	Legal	24.84	0.864	8.889	STRENGTH-I Simple Steel Fle	As Requested	As Requested
EV3m (Single Lane)	Axle Load	LRFR	Legal	40.15	0.934	8.889	STRENGTH-I Simple Steel Fle	As Requested	As Requested
EV2m (Multi-Lane	Axle Load	LRFR	Permit	24.84	0.864	8.889	STRENGTH-II Simple Steel Fle	As Requested	As Requested
EV3m (Multi-Lane	Axle Load	LRFR	Permit	40.15	0.934	8.889	STRENGTH-II Simple Steel Fle	As Requested	As Requested

MDT guidance is to use the least conservative deck results

BrR reports these lower/controlling values

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 15:46:40
Print Time: 10/17/2019 15:51:13

Analyzed By: ops$u5801

Rating Results Summary Report

Name:
Struct-Def: 51.25ft - Steel Span

Bridge ID: 02847
Member: G1

NBI: 000000000002847
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	36.25	1.007	25.63	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
HL-93 (US)	Truck + Lane	LRFR	Operatin	47.12	1.309	25.63	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
HL-93 (US)	Tandem + Lan	LRFR	Inventory	38.76	1.077	25.63	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
HL-93 (US)	Tandem + Lan	LRFR	Operatin	50.39	1.400	25.63	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	39.01	1.445	25.63	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
SU5	Axle Load	LRFR	Legal	41.34	1.334	25.63	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
SU6	Axle Load	LRFR	Legal	41.62	1.198	25.63	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
SU7	Axle Load	LRFR	Legal	42.93	1.108	25.63	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
Type 3	Axle Load	LRFR	Legal	41.41	1.656	25.63	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
Type 3-3	Axle Load	LRFR	Legal	77.64	1.941	25.63	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
Type 3S2	Axle Load	LRFR	Legal	63.49	1.764	30.75	1 - (60.0)	SERVICE-II Steel Flexure Stress	As R	As
EV2m (Multi-Lane	Axle Load	LRFR	Permit	64.71	2.251	30.75	1 - (60.0)	SERVICE-II Steel Flexure Stress	As R	As
EV2m (Single Lane)	Axle Load	LRFR	Legal	41.48	1.443	30.75	1 - (60.0)	SERVICE-II Steel Flexure Stress	As R	As
EV3m (Multi-Lane	Axle Load	LRFR	Permit	62.88	1.462	25.63	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
EV3m (Single Lane)	Axle Load	LRFR	Legal	40.30	0.937	25.63	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 15:46:40
Print Time: 10/17/2019 15:50:41

Analyzed By: ops$u5801

Rating Results Summary Report

Name:
Struct-Def: 51.25ft - Steel Span

Bridge ID: 02847
Member: G2

NBI: 000000000002847
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	36.97	1.027	25.63	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
HL-93 (US)	Truck + Lane	LRFR	Operatin	48.06	1.335	25.63	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
HL-93 (US)	Tandem + Lan	LRFR	Inventory	39.53	1.098	25.63	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
HL-93 (US)	Tandem + Lan	LRFR	Operatin	51.39	1.428	25.63	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	39.79	1.474	25.63	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
SU5	Axle Load	LRFR	Legal	42.17	1.360	25.63	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
SU6	Axle Load	LRFR	Legal	42.45	1.222	25.63	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
SU7	Axle Load	LRFR	Legal	43.79	1.130	25.63	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
Type 3	Axle Load	LRFR	Legal	42.23	1.689	25.63	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
Type 3-3	Axle Load	LRFR	Legal	79.19	1.980	25.63	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
Type 3S2	Axle Load	LRFR	Legal	64.71	1.798	30.75	1 - (60.0)	SERVICE-II Steel Flexure Stress	As R	As
EV2m (Multi-Lane	Axle Load	LRFR	Permit	67.42	2.345	30.75	1 - (60.0)	SERVICE-II Steel Flexure Stress	As R	As
EV2m (Single Lane)	Axle Load	LRFR	Legal	43.22	1.503	30.75	1 - (60.0)	SERVICE-II Steel Flexure Stress	As R	As
EV3m (Multi-Lane	Axle Load	LRFR	Permit	65.56	1.525	25.63	1 - (50.0)	SERVICE-II Steel Flexure Stress	As R	As
EV3m (Single Lane)	Axle Load	LRFR	Legal	42.02	0.977	25.63	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 15:46:40
Print Time: 10/17/2019 15:50:59

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









