STRUCTURE INSPECTION REPORT

Structure # 03719
BITTERROOT RIVER 010 - W MISSOULA

Bridge Inventory Information

Bridge Inspection Date: 08/08/2017

General Location Data	
(22) Owner	02 County Hwy Agency
(6A) Feature Intersected	BITTERROOT RIVER 010
(8) NBI Structure Number	L32101000+01001
(9) Location	W MISSOULA
(MDT058) FHWA Bridge Condition	1 Poor
(MDT076) Deck Condition	1 Candidate for Deck Replacement
(MDT077) Structure Condition	2 Candidate for Repair
(SR) Sufficiency Rating	20.1

A- Location Data	
(MDT001) Agency structure name	LB-01 MACLAY BRIDGE
(1) State Code	308
(MDT027) On|Off System	0 Off System
(2) MDT Inspection District	01 MISSOULA
(MDT115) MDT Administrative District	1 Missoula
(MDT116) MDT Financial District	1 Missoula
(MDT020) MDT Maintenance Division	11 MISSOULA
(MDT078) MDT Maintenance Section	none Not a State Maintained Bridge
(3) County Code	063 MISSOULA
(MDT117) Border Bridge - Neighboring County Code	000 NONE
(4) Place Code	00000 Rural Area
(7) Facility Carried by Structure	NORTH AVE W
(21) Maintenance Responsibility	02 County Hwy Agency
(MDT031) Railroad Over/Underpass	0 Not Applicable
(MDT032) Railroad Owner	NA Not Applicable
(MDT014) Interchange Indicator	0 Not an Interchange
(MDT015) Interstate Ramp Indicator	0 Not a Ramp
(MDT114) MPO	Missoula MPO Planning
(112) Nbis Bridge Length	Y Long Enough
(MDT120) Environment	
Bridge within a Reservation Boundary	

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B- Construction Data	
(27) Year Built	1935
(106) Year Reconstructed	1964
(MDT102) Years Rehabilitated	
(MDT019) MDT Original Drawing Number	RECORDSE
(MDT103) MDT Rehab Drawing Numbers	
(MDT097) Plans in SMS?	Y Yes
(MDT098) Shop Drawings in SMS	
(MDT017) MDT Original Construction Project Number	-1
(MDT099) MDT Rehab Project Numbers	
(MDT018) MDT Original Construction Station	+0
(MDT100) MDT Rehab Stations	
(MDT021) MDT UPN	
(MDT101) MDT Rehab UPNs	
(MDT119) Date Bridge Opened|Re-Opened to Traffic	

C- Improvement Cost Data	
(75A) Type of Work Proposed	31 31 Repl-Load Capacity
(75B) Work to be Completed by	1 1 Contract
(76) Length Of Structure Improvement	377.2 ft
(94) Bridge Improvement Cost	481000
(95) Roadway Improvement Cost	240500
(96) Total Project Cost	721500
(97) Year Of Improvement Cost Estimate	2009

D- Border State Data	
(98A-1) Border Bridge-Neighboring State Code	
(98A-2) Border Bridge - Neighboring FHWA Region Code	
(98B) Border Bridge-Percent Responsibility	
(99) Border Bridge Structure Number	

E- Historical Structure Data	
(37) Historical Significance	4 4 Hist sign not determin

F - Bridge Location	
(16) Latitude (DMS)	465111.28

(17) Longitude (DMS)	1140552.44

G - Span and Dimensional Data	
(33) Bridge Median	0 0 No median
(34) Skew (degrees)	0
(35) Structure Flared	0 0 No flare
(42A) Type of Service on Bridge	1 Highway
(48) Length Of Maximum Span	180 ft
(49) Structure Length	345.9 ft
(53) Min Vert Clear Over Bridge Roadway	14.16 ft
(101) Parallel Structure Designation	N No parallel structure exists
(103) Temporary Structure Designation	
(38) Navigation Control	0 No navigation control on waterway (bridge permit not required)
(39) Navigation Vertical Clearance	000 ft
(40) Navigation Horizontal Clearance	0000 ft
(116) Minimum Navigation Vertical Clearance	ft

H - Main Span	
(43A) Main Span Material	3 Steel
(43B) Main Span Design Type	10 Truss - Thru
(45) Number Of Spans In Main Unit	2

I - Approach Span	
(44A) Approach Span Material	5 Prestressed Concrete
(44B) Approach Span Design Type	04 Tee Beam
(46) Number Of Approach Spans	2

J - Deck Data	
(50A) Left Curb|Sidewalk Width	0 ft
(50B) Right Curb|Sidewalk Width	0 ft
(52) Out-to-Out Deck Width	16 ft
(MDT006) Deck Area	5534 Area
(107) Deck Structure Type	6 Corrugated Steel
(108A) Type of Wearing Surface	6 Bituminous
(108B) Type of Membrane	0 None
(108C) Deck Protection	0 None
(MDT104) Bridge Deck Seal	

(MDT105) Polymer Overlay	
(MDT106) Mill and Overlay	
(MDT107) New Bridge Deck	
(MDT108) Experimental Deck	

K - Under Bridge Service	
(42B) Type of Service under	5 Waterway
(54A) Minimum Vertical Underclearance-Reference Feature	N Feature not a highway or railroad
(54B) Minimum Vertical Underclearance	0 ft
(55A) Min Lateral Underclear On Right-Reference Feature	N Feature not a highway or railroad
(55B) Minimum Lateral Underclearance on Right	0 ft
(56) Min Lateral Underclear On Left	0 ft
(111) Pier|abutment Protection	1 Navigation protection not required
(113) Scour Critical Status	7 Countermeasures installed to correct a previously existing probm. with scour. No longer scour crtcl
(69) Underclear, Vertical and Horizontal	N Not applicable

L - Load and Rating Data	
(MDT016) Load Rating Date	01/20/2012
(MDT022) Name of Load Rater	AKJ
(31) Design load - Live load for which the structure was designed	0 Unknown
(66) Inventory Rating	14 ton
(65) Method Used To Determine Inventory Rating	1 Load Factor (LF) reported in tons
(64) Operating Rating	23 ton
(63) Method Used to Determine Operating Rating	1 Load Factor (LF) reported in tons
(70) Legal Load Status	4 0.1-9.9% below
(MDT110) Bridge being Rated by Consultant	Removed from Contract - Internal Follow-up Needed
(MDT112) Completed Rating Model?	
(MDT065) Type 3 Truck Inventory Rating	11 ton
(MDT071) Type 3S2 Truck Inventory Rating	17 ton
(MDT068) Type 3-3 Truck Inventory Rating	22 ton
(MDT036) SU4 Truck Inventory Rating	ton
(MDT039) SU5 Truck Inventory Rating	ton
(MDT045) SU7 Truck Inventory Rating	ton
(MDT042) SU6 Truck Inventory Rating	ton
(MDT091) EV2 Truck Inventory Rating	ton

(MDT092) EV3 Truck Inventory Rating	ton
(MDT066) Type 3 Truck Operating Rating	19 ton
(MDT072) Type 3S2 Truck Operating Rating	29 ton
(MDT069) Type 3-3 Truck Operating Rating	37 ton
(MDT037) SU4 Truck Operating Rating	ton
(MDT040) SU5 Truck Operating Rating	ton
(MDT043) SU6 Truck Operating Rating	ton
(MDT046) SU7 Truck Operating Rating	ton
(MDT093) EV2 Truck Operating Rating	ton
(MDT094) EV3 Truck Operating Rating	ton
(MDT079) Truck Type 3 LRFR Rating	ton
(MDT081) Truck Type 3S2 LRFR Rating	ton
(MDT080) Truck Type 3-3 LRFR Rating	ton
(MDT082) Truck Type SU4 LRFR Rating	ton
(MDT083) Truck Type SU5 LRFR Rating	ton
(MDT084) Truck Type SU6 LRFR Rating	ton
(MDT085) Truck Type SU7 LRFR Rating	ton
(MDT095) Truck Type EV2 LRFR Rating	ton
(MDT096) Truck Type EV3 LRFR Rating	ton
(MDT124) Truck Type 3 Safe Posting Load (tons)	
(MDT125) Truck Type 3S2 Safe Posting Load (tons)	
(MDT126) Truck Type 3-3 Safe Posting Load	
(MDT127) SU4 Safe Posting Load	
(MDT128) SU5 Safe Posting Load	
(MDT129) SU6 Safe Posting Load	
(MDT130) SU7 Safe Posting Load	
(MDT133) Bridge Within Reasonable Access of Interstate	
(MDT131) EV2 Safe Posting Load (ton)	
(MDT132) EV3 Safe Posting Load	

M - General Facility Data	
(5A) Inventory Route-Record Type	1 Route carried `on` the structure
(5C) Designated Level of Service	1 Mainline
(5B) Route Signing Prefix	4 County highway
(5D) Route Number	32101

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(5E) Directional Suffix	3 South
(12) Base Highway Network	0 Not on Base Network
(13A) LRS Number	C032101N
(13B) Inventory Route, Subroute Number-Subroute Number	00
(19) Bypass|Detour Length	11 mi
(MDT009) Detour Speed	-1 mi/hr
(104) NHS Indicator	0 Not on the NHS
(MDT030) Posted speed limit (MPH)	35 mi/hr
(MDT035) Road Name	NORTH AVE WEST
(11) Accumulated Miles	0 mi
(MDT087) Decimal Mile Post	.099
(MDT113) Mile Post	0+0.099 mi
(MDT075) Roadway System	
General Roadway Notes	

N - Base Network Data	
(28B) Lanes Under the Structure	0
(32) Approach Roadway Width	20 ft
(51) Bridge Roadway Width Curb-To-Curb	14 ft
(72) Approach Roadway Alignment	3 Intolerable - Correct
(28A) Lanes on the Structure	1

O - Other NetWork Data	
(20) Toll	3 On Free Road
(100) STRAHNET Highway Designation	0 Not a STRAHNET route
(105) Federal Lands Highways	0 Not applicable
(110) National Truck Network	0 Not part of National Truck Network
(MDT048) School Bus Route	1 On School Bus Route

P - Roadway Size and Clearance Data	
(10) Minimum Vertical Clearance	14.16 ft
(47) Total Horizontal Clearance	14 ft
(102) Direction of Traffic	3 One lane bridge for 2-way traffic
(MDT007) Departmental Route	L32101
(MDT002) Both|South|West Direction	0 Both Directions
(MDT003) Both|South|West Vertical Distance	14.167 ft
(MDT051) South|West Horizontal Distance	14.009

(MDT024) North|East Direction	
(MDT026) North|East Vertical Distance	ft
(MDT025) North|East Horizontal Distance	ft

Q - Traffic Data	
(26) Functional Classification	08 Rural, Minor Collector
(MDT060) Traffic Volume Class	04
(29) Average Daily Traffic	3543
(30) Year of Average Daily Traffic	2018
(109) Average Daily Truck Traffic (%)	
(114) Future Average Daily Traffic	3720
(115) Year Of Future Avg Daily Traffic	2038

General Bridge Notes

-1type 1\cross section done because (113 is a 7) no other reason- should consider having consultant complete in future when doing there climbing\inspection.

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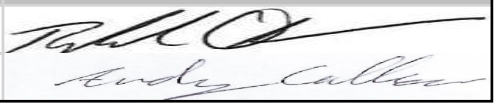
Inspection Information

Responsible Person	Name	Signature
Inspector	Todd Demski	
QC	Andy Cullison	

User	Begin	End	Comments
Todd Demski	08-08-2017 01:00 pm	08-10-2017 03:00 pm	On-site. Zach Williams assisting.
Carter Bohn	08-08-2017 01:00 pm	08-10-2017 03:00 pm	On-site. Zach Williams assisting.
Ryan Sievers	08-08-2017 01:00 pm	08-10-2017 03:00 pm	On-site. Zach Williams assisting.

Day	Weather	Temperature	Comments
08-08-2017 01:00 - 03:00	Sunny	90	Zach Williams assisting.

R- Inspection	Current Value	Previous Value
(36A) Traffic Safety Features - Bridge Railings	0	0
(36B) Traffic Safety Features - Transitions	0	N
(36C) Traffic Safety Features - Approach guardrail	N	0
(36D) Traffic Safety Features - Approach guardrail Ends	0	0
(41) Structure Open, Posted, or Closed to Traffic	P	P
(58) Deck Rating	4	5
(59) Superstructure	5	5
(60) Substructure	5	5
(MDT061) Type 1 Underwater Inspection Required	Y	
(61) Channel	7	7
(62) Culvert	N	N
(67) Structural Evaluation	4	4
(68) Deck Geometry	2	2
(69) Underclear, Vertical and Horizontal	N	N
(71) Waterway Adequacy	8	8
(MDT076) Deck Condition	1	
(MDT077) Structure Condition	2	
(MDT090) Climbing Inspection Required	Group C	Group B
(MDT118) Type 2 Underwater Consultant		
(MDT121) Functional Needs		

(MDT134) UBIV Frequency (months)		

Inspection Hours and Dates	Current Value	Previous Values
(MDT005) Date Last QA	2000-01-01	
(MDT010) FC Inspection Details	D	
(MDT011) FC Next Inspection Date	2019-08-08	2019-6-15
(MDT016) Load Rating Date	2012-01-20	
(MDT023) Next Inspection Date	2019-08-08	2019-6-15
(MDT028) Other Inspection Details	none	
Other Inspection Next Date		
(MDT034) Request Review of Load rating	5	1
(MDT050) UBIV Required	N	
Special Inspection Next Date		
(MDT058) FHWA Bridge Condition	1	1
(MDT061) Type 1 Underwater Inspection Required	Y	
(MDT062) Type 1 Underwater Inspection Date	2019-1-29	
(MDT063) Type 1 Underwater Inspection Frequency (months)	48	
(MDT064) Type 1 Underwater Inspection Next Date	2023-1-29	
(MDT074) Underwater Inspection Details	1	N
Type 2 Underwater Next Inspection Date		
(90) Inspection Date	2017-08-08	2019-6-15
(91) Regular Inspection Frequency (Months)	24	24.00
(92A-1) FC Inspection Required	Y	Y24
(92A-2) FC Inspection Frequency (Months)	24	
(92B-1) Type 2 Underwater Inspection Required	N	N
Type 2 Underwater Inspection Frequency (Months)		
(92C-1a) Other Inspection Required	N	N
Other Inspection Frequency (Months)		
Special Inspection Frequency (months)		
Special Inspection Required		
(93A) FC Inspection Date	2017-08-08	2019-6-15
Special Inspection Date		

General Inspection Notes
Rope access inspection with bridge substructure units numbers west to east and the stringers labeled north to south. The river flows south to north.

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Repair Suggestions:

Repair ID	Date Requested	Type	Status	Priority	Comments
#Error	10-17-2017	Repair suggestion	Open	High	Both movable bearings on Abutment 1 need to be replaced.
#Error	11-09-2017	Repair suggestion	Open	Low	Patch potholes in asphalt wearing surface.
#Error	11-09-2017	Repair suggestion	Open	Low	Replace joint seal above Bent 3
#Error	11-09-2017	Repair suggestion	Open	Low	Repair spalls with exposed steel reinforcement on curbs and bents.
#Error	11-09-2017	Repair suggestion	Open	High	Shim stringer ends on Span 2 Bent 3 to prevent vertical movement.

General Bridge Photos

Photo #: Pony Truss Span Underside Framing Plan Location: , Comments: Pony Truss Span Underside Framing Plan.

Generated by: MDT on 11/18/2019

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Photo #: Through Truss Span Underside Framing Plan Location: , Comments: Through Truss Span Underside Framing Plan.	
Photo #: Approach Span Underside Framing Plan Location: , Comments: Approach Span Underside Framing Plan.	

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Photo #: North Elevation Location: , Comments: North Elevation looking south at bridge.	
Photo #: South Elevation Location: , Comments: South Elevation looking north at bridge.	

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Photo #: Bridge deck overview looking west from the East Portal Location: , Comments: Bridge deck overview looking west from the East Portal.	

Element Inspection Data

Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4
16		Reinforced Concrete Top Flange (SF)	Area	1959	100.0	0.0	0.0	0.0

Current Inspection Notes:

The concrete tee beam top flange had no notable deficiencies.

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Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4
30		Steel Corrugated or Orthotropic Deck (SF) Pony Truss	Area	624	98.0	1.0	1.0	0.0
30		7000 - Damage	Area	2885	0.0	0.0	1.2	0.0
30		1000 - Corrosion	Area	2885	0.0	1.2	0.0	0.0
30		Steel Corrugated or Orthotropic Deck (SF) Thru-Truss	Area	2885	98.0	1.0	1.0	0.0

Current Inspection Notes:

Approximately 1 percent of the corrugated stay-in-place forms had welding burn through with minor surface corrosion and negligible section loss.
Approximately 5 percent of the corrugated stay-in-place forms had welding burn through allowing debris to fall through the formwork.

Current Inspection Notes:

Approximately 5 percent of the corrugated stay-in-place forms had welding burn through allowing debris to fall through the formwork.
Approximately 1 percent of the corrugated stay-in-place forms had welding burn through with minor surface corrosion and negligible section loss.

Photo #:Stay-in-Place Form Corrosion

Location:

Comments: Typical corrugagated stay-in-place forms with weld burn through and minor surface corrosion.

Element:30 - Steel Corrugated or Orthotropic Deck (SF) Thru-Truss

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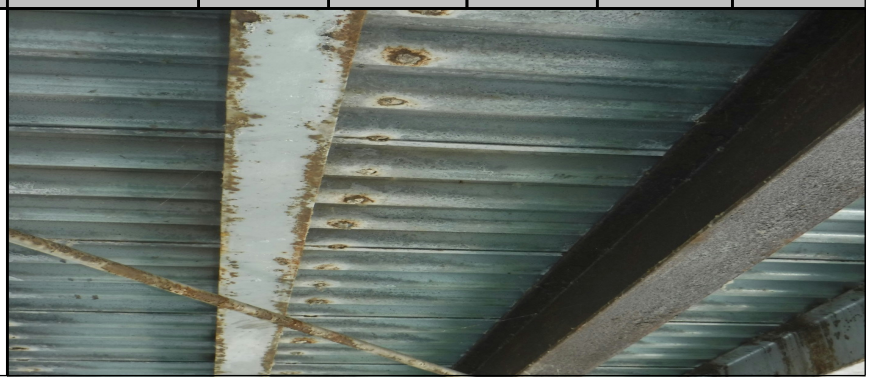
Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4
Photo #:Stay-in-Place Form Corrosion Location: Comments: Typical corrugagated stay-in-place forms with weld burn through and minor surface corrosion. Element:30 - Steel Corrugated or Orthotropic Deck (SF) Pony Truss								

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Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4
110		Reinforced Concrete Open Girder|Beam (LF) Tee Beams - Spans 3 and 4	Length	489	100.0	0.0	0.0	0.0

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Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4
113		Steel Stringer (LF) Pony Truss	Length	314	0.0	95.5	4.5	0.0
113		1000 - Corrosion	Length	1440	0.0	149.1	1.4	0.0
113		Steel Stringer (LF) Thru-Truss	Length	1440	0.0	99.6	0.4	0.0

Current Inspection Notes:

Unpainted steel stringers had minor to moderate corrosion with negligible section loss.

Current Inspection Notes:

Stringers 2, 5, and 7 over Abutment 1 heavy corrosion over the end 2 ft. with areas of through corrosion. See 2017 FC Inspection Report for table of defects.
The stringers had failed paint along their entire length with minor surface corrosion and negligible section loss.

Current Inspection Notes:

Stringers 2 and 5 over Bent 2 and Stringers 2, 4, 7, and 8 over Bent 3 had heavy corrosion with areas of through corrosion. See 2017 FC Inspection Report for table of defects.
The stringers had failed paint along their entire length with minor surface corrosion and negligible section loss.
The unpainted stringer had minor to moderate corrosion with negligible section loss.

Photo #:Stringer 2 over Abutment 1 Corrosion

Location: Stringer 2 over Abutment 1

Comments: The stringer web had heavy corrosion and section loss over a 17 in. long by 2 in. high area with a 1 in. diameter hole center 10 in. from the stringer end.

Element:113 - Steel Stringer (LF) Thru-Truss

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Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4

Photo #:Stringer 2 over Abutment 1 Corrosion

Location: Stringer 2 over Abutment 1

Comments: The stringer web had heavy corrosion and section loss over a 17 in. long by 2 in. high area with a 1 in. diameter hole center 10 in. from the stringer end.

Element:113 - Steel Stringer (LF) Pony Truss

Photo #:Stringer 7 over Bent 3 Corrosion

Location: Stringer 7 over Bent 3

Comments: The stringer web had heavy corrosion with up to 50 percent section loss over a 6 in. long by 2 in. high adjacent to the stringer end that had a 1/2 in. diameter hole 6 in. from the stringer end at the web to lower flange interface.

Element:113 - Steel Stringer (LF) Pony Truss

Photo #:Stringer 7 over Bent 3 Corrosion

Location: Stringer 7 over Bent 3

Comments: The stringer web had heavy corrosion with up to 50 percent section loss over a 6 in. long by 2 in. high adjacent to the stringer end that had a 1/2 in. diameter hole 6 in. from the stringer end at the web to lower flange interface.

Element:113 - Steel Stringer (LF) Thru-Truss

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Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4
120		Steel Truss (LF) Pony Truss	Length	79	0.0	100.0	0.0	0.0
120		7000 - Damage	Length	361	0.0	1.1	0.0	0.0
120		1020 - Connection	Length	361	0.0	0.3	0.3	0.0
120		1000 - Corrosion	Length	361	0.0	121.9	0.0	0.0
120		Steel Truss (LF) Thru-Truss	Length	361	0.0	99.7	0.3	0.0

Current Inspection Notes:

The north truss had three members with minor impact damage on L2'-U2', L2'-U1', L0'-U1'.
The truss members had minor to moderate surface corrosion throught.
Span 2, North Truss, Gusset Plate U1': the exterior gusset plate had two misdrilled 3/4 in. diameter holes.

Current Inspection Notes:

Span 1, North Truss, Vertical L1-U1: the exterior flange of the vertical was bent 1 in. to the north due to impact damage approximately 5 ft. above the bridge deck.
The truss members had minor to moderate surface corrosion throught.
Span 1, South Truss, Top Chord at U4: one bolt was sheared off on the horizontal brace to top chord connection plate.

Photo #:Span 2, North Truss, Gusset Plate U1' Missing Rivet

Location: Span 2, North Truss, Gusset Plate U1'.

Comments: The exterior gusset plate had two misdrilled 3/4 in. diameter holes.

Element:120 - Steel Truss (LF) Pony Truss

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Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4

Photo #:Span 1, South Truss, Top Chord at U4 Sheared Bolt

Location: Span 1, South Truss, Top Chord at U4.

Comments: One bolt was sheared off on the horizontal brace to top chord connection plate.

Element:120 - Steel Truss (LF) Thru-Truss

Photo #:Span 1, North Truss, Vertical L1-U1 Impact

Location: Span 1, North Truss, Vertical L1-U1.

Comments: The exterior flange of the vertical was bent 1 in. to the north due to impact damage approximately 5 ft. above the bridge deck.

Element:120 - Steel Truss (LF) Thru-Truss

Photo #:Span 1, North Truss, Vertical L1-U1 Impact

Location: Span 1, North Truss, Vertical L1-U1.

Comments: The exterior flange of the vertical was bent 1 in. to the north due to impact damage approximately 5 ft. above the bridge deck.

Element:120 - Steel Truss (LF) Pony Truss

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Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4

Photo #:Span 2, North Truss, Gusset Plate U1' Missing Rivet

Location: Span 2, North Truss, Gusset Plate U1'.

Comments: The exterior gusset plate had two misdrilled 3/4 in. diameter holes.

Element:120 - Steel Truss (LF) Thru-Truss

Photo #:Span 2, North Truss, Vertical L2'-U2' Impact

Location: Span 2, North Truss, Vertical L2'-U2'.

Comments: The interior flange of the vertical was bent 1 in. over a 6 in. length due to impact damage.

Element:120 - Steel Truss (LF) Pony Truss

Photo #:Span 2, North Truss, Vertical L2'-U2' Impact

Location: Span 2, North Truss, Vertical L2'-U2'.

Comments: The interior flange of the vertical was bent 1 in. over a 6 in. length due to impact damage.

Element:120 - Steel Truss (LF) Thru-Truss

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Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4
Photo #:Span 1, South Truss, Top Chord at U4 Sheared Bolt Location: Span 1, South Truss, Top Chord at U4. Comments: One bolt was sheared off on the horizontal brace to top chord connection plate. Element:120 - Steel Truss (LF) Pony Truss								

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Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4
152		Steel Floor Beam (LF) Pony Truss	Length	33	0.0	100.0	0.0	0.0
152		7000 - Damage	Length	161	0.0	0.6	0.0	0.0
152		1000 - Corrosion	Length	161	0.0	120.5	0.0	0.0
152		Steel Floor Beam (LF) Thru-Truss	Length	161	0.0	100.0	0.0	0.0

Current Inspection Notes:

The floor beams had minor surface corrosion and negligible section loss throughout.

Current Inspection Notes:

The bottom west flange of Floor Beam 1' on Span 1 had bent upwards 1/2 in. over a 6 in. length approximately 16 in. from the north end.
The floor beams had minor surface corrosion and negligible section loss throughout.

Photo #:Floor Beam 1' on Span 1 Impact

Location: The bottom west flange of Floor Beam 1' on Span 1.

Comments: The flange had bent upwards 1/2 in. over a 6 in. length approximately 16 in. from the north end.

Element:152 - Steel Floor Beam (LF) Pony Truss

Photo #:Floor Beam 1' on Span 1 Impact

Location: The bottom west flange of Floor Beam 1' on Span 1.

Comments: The flange had bent upwards 1/2 in. over a 6 in. length approximately 16 in. from the north end.

Element:152 - Steel Floor Beam (LF) Thru-Truss

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Structure # 03719
W MISSOULA - BITTERROOT RIVER 010

Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4
205		Reinforced Concrete Column (EA)	Each	3	100.0	0.0	0.0	0.0

Current Inspection Notes:

The concrete columns on Bent 4 had no notable deficiencies.

STRUCTURE INSPECTION REPORT

Structure # 03719
W MISSOULA - BITTERROOT RIVER 010

Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4
210		Reinforced Concrete Pier Wall (LF) Bent 2	Length	22	40.9	59.1	0.0	0.0
210		1130 - Cracking (RC and Other)	Length	22	59.1	22.7	0.0	0.0
210		1120 - Efflorescence/Rust Staining	Length	22	0.0	27.3	0.0	0.0
210		1080 - Delamination/Spall/Patched Area	Length	22	0.0	63.6	0.0	0.0
210		Reinforced Concrete Pier Wall (LF) Bent 3	Length	22	68.2	31.8	0.0	0.0

Current Inspection Notes:

The west elevation had seven areas of delaminations up to 60 in. wide by 12 in. high, edges had minor spalling up to 1 in. deep.
The east elevation had five areas of delaminations up to 15 in. wide by 30 in. wide, edges had minor spalling up to 1 in. deep.
The entire surface of the pier wall had hairline temperature and shrinkage cracks.

Current Inspection Notes:

A 5 ft. long horizontal crack up to 1/16 in. wide was located near the bottom, northeast corner.
Bent 3 had a 12 in. wide by 10 in. high area of delamination on the top, southeast corner of the bent.
Minor efflorescence build up on noses o fthe pier.

Photo #:Bent 3 Cracking

Location: Bent 3

Comments: A 5 ft. long horizontal crack up to 1/16 in. wide was located near the bottom, northeast corner.

Element:210 - Reinforced Concrete Pier Wall (LF) Bent 3

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STRUCTURE INSPECTION REPORT

Structure # 03719
W MISSOULA - BITTERROOT RIVER 010

Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4

Photo #:Bent 3 Delamination

Location:

Comments: Bent 3 had a 12 in. wide by 10 in. high area of delamination on the top, southeast corner of the bent.

Element:210 - Reinforced Concrete Pier Wall (LF) Bent 3

Photo #:Bent 3 Delamination

Location:

Comments: Bent 3 had a 12 in. wide by 10 in. high area of delamination on the top, southeast corner of the bent.

Element:210 - Reinforced Concrete Pier Wall (LF) Bent 2

Photo #:Bent 3 Cracking

Location: Bent 3

Comments: A 5 ft. long horizontal crack up to 1/16 in. wide was located near the bottom, northeast corner.

Element:210 - Reinforced Concrete Pier Wall (LF) Bent 2

STRUCTURE INSPECTION REPORT

Structure # 03719
W MISSOULA - BITTERROOT RIVER 010

Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4
215		Reinforced Concrete Abutment (LF) A1	Length	66	98.5	1.5	0.0	0.0
215		1130 - Cracking (RC and Other)	Length	66	0.0	1.5	0.0	0.0
215		Reinforced Concrete Abutment (LF) A5	Length	66	100.0	0.0	0.0	0.0

Current Inspection Notes:

Abutment 1 had one full height, vertical crack up to 1/8 in. wide in the middle of the abutment.

Current Inspection Notes:

Abutment 5 had no notable deficiencies.

Photo #:Abutment 1 Cracking

Location:

Comments: Abutment 1 had one full height, vertical crack up to 1/8 in. wide in the middle of the abutment.

Element:215 - Reinforced Concrete Abutment (LF) A5

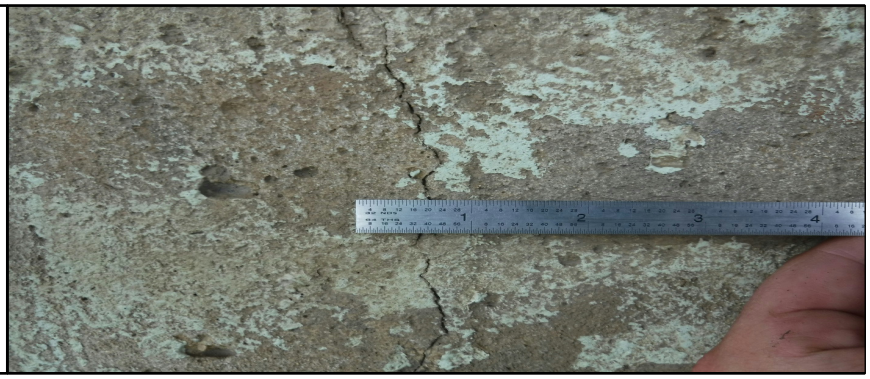
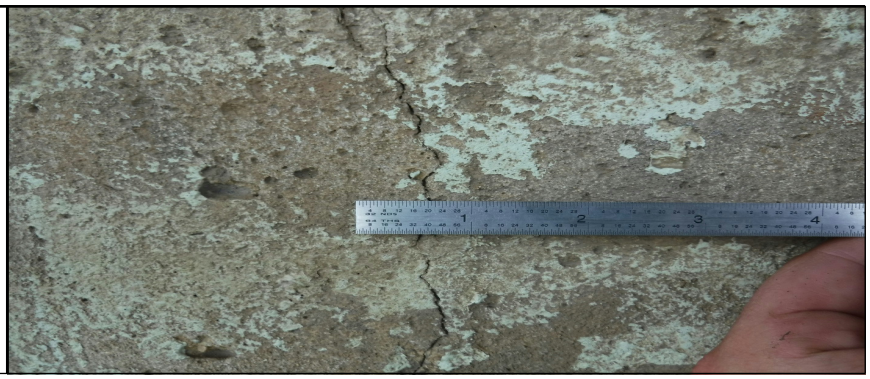


Photo #:Abutment 1 Cracking

Location:

Comments: Abutment 1 had one full height, vertical crack up to 1/8 in. wide in the middle of the abutment.

Element:215 - Reinforced Concrete Abutment (LF) A1



STRUCTURE INSPECTION REPORT

Structure # 03719
W MISSOULA - BITTERROOT RIVER 010

Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4
234		Reinforced Concrete Cap (LF)	Length	22	86.4	0.0	13.6	0.0
234		1090 - Exposed Rebar	Length	22	0.0	0.0	13.6	0.0
234		1080 - Delamination/Spall/Patched Area	Length	22	0.0	0.0	13.6	0.0
234		Reinforced Concrete Cap (LF) Bent 2	Length	22	100.0	0.0	0.0	0.0

Current Inspection Notes:

The exposed reinforcing steel in the spall had moderate corrosion with negligible section loss.
Bent 4 had a 3 ft. wide by 2 ft. high spall with exposed reinforcing steel on the west face of the bent cap.

Current Inspection Notes:

The concrete pier cap on Bent 2 had no notable deficiencies.

Photo #:Bent 3 Spall

Location:

Comments: Bent 4 had a 3 ft. wide by 2 ft. high spall with exposed reinforcing steel on the west face of the bent cap. The exposed reinforcing steel had moderate corrosion with negligible section loss.

Element:234 - Reinforced Concrete Cap (LF)

Photo #:Bent 3 Spall

Location:

Comments: Bent 4 had a 3 ft. wide by 2 ft. high spall with exposed reinforcing steel on the west face of the bent cap. The exposed reinforcing steel had moderate corrosion with negligible section loss.

Element:234 - Reinforced Concrete Cap (LF) Bent 2

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STRUCTURE INSPECTION REPORT

Structure # 03719
W MISSOULA - BITTERROOT RIVER 010

Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4
302		Compression Joint (LF)	Length	16	0.0	0.0	100.0	0.0
302		2370 - Metal Deterioration or Damage	Length	16	0.0	0.0	31.3	0.0
302		2330 - Seal Damage	Length	16	0.0	0.0	90.0	0.0

Current Inspection Notes:

The joint had separated from the Span 2 deck up to 3/4 in. over a 4 ft. length.
The joint had a 1/2 in. bend over a 6 in. length in the south wheel path.
The rubber seal had failed over 90 percent of its length.

Photo #:Joint 3 over Bent 3 Failed Seal

Location: Joint 3 over Bent 3

Comments: The rubber seal had failed over 90 percent of its length.

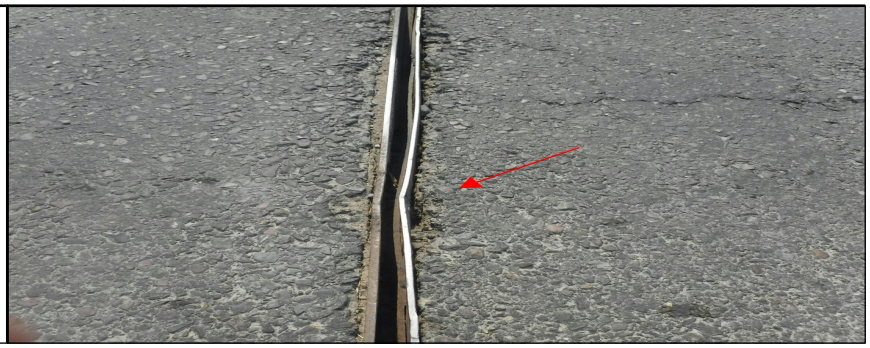
Element:302 - Compression Joint (LF)

Photo #:Joint over Bent 3

Location: Joint 3 over Bent 3

Comments: The joint had separated from the Span 2 deck up to 3/4 in. over a 4 ft. length.

Element:302 - Compression Joint (LF)



STRUCTURE INSPECTION REPORT

Structure # 03719
W MISSOULA - BITTERROOT RIVER 010

Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4
311		Movable Bearing (roller, sliding, etc.) (EA)	Each	2	0.0	0.0	100.0	0.0
311		2240 - Loss of Bearing Area	Each	2	0.0	0.0	0.0	100.0
311		1000 - Corrosion	Each	2	0.0	0.0	100.0	100.0
311		Movable Bearing (roller, sliding, etc.) (EA) A1	Each	2	0.0	0.0	0.0	100.0

Current Inspection Notes:

The Bent 3, Span 2 slider bearings were left unpainted and had moderate corrosion with pitting up to 1/16 in. deep.

Current Inspection Notes:

Both movable bearings on Abutment 1 had total loss of bearing due to heavy corrosion which had severed the roller keeps which allowed more than 50 percent of the rollers to displace from underneath the bearing.
Both bearings on Abutment 1 had heavy corrosion with up to 25 percent section loss to the anchor rods and complete failure of the roller keepers.

Photo #:Abutment 1, North Truss Corrosion

Location: Abutment 1, North Truss.

Comments: Heavy corrosion with up to 25 percent section loss to the anchor rods on the North Truss, Abutment 1 mvable bearing.

Element:311 - Movable Bearing (roller, sliding, etc.) (EA) A1

STRUCTURE INSPECTION REPORT

Structure # 03719
W MISSOULA - BITTERROOT RIVER 010

Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4

Photo #:Abutment 1, South Truss Roller Bearing

Location: Abutment 1, South Truss

Comments: Three rollers on the South Truss, Abutment 1 bearing which had been displaced from underneath the bearing due to the roller keeper being severed.

Element:311 - Movable Bearing (roller, sliding, etc.) (EA)

Photo #:Abutment 1, North Truss Corrosion

Location: Abutment 1, North Truss.

Comments: Heavy corrosion with up to 25 percent section loss to the anchor rods on the North Truss, Abutment 1 mvable bearing.

Element:311 - Movable Bearing (roller, sliding, etc.) (EA)

Photo #:Bent 3, North Truss, Span 2 slider bearing

Location: Bent 3, North Truss, Span 2 slider bearing.

Comments: Bent 3, North Truss, Span 2 slider bearing left unpainted with moderate corrosion and pitting up to 1/16 in. deep.

Element:311 - Movable Bearing (roller, sliding, etc.) (EA) A1

STRUCTURE INSPECTION REPORT

Structure # 03719
W MISSOULA - BITTERROOT RIVER 010

Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4

Photo #:Bent 3, North Truss, Span 2 slider bearing

Location: Bent 3, North Truss, Span 2 slider bearing.

Comments: Bent 3, North Truss, Span 2 slider bearing left unpainted with moderate corrosion and pitting up to 1/16 in. deep.

Element:311 - Movable Bearing (roller, sliding, etc.) (EA)

Photo #:Abutment 1, South Truss Roller Bearing

Location: Abutment 1, South Truss

Comments: Three rollers on the South Truss, Abutment 1 bearing which had been displaced from underneath the bearing due to the roller keeper being severed.

Element:311 - Movable Bearing (roller, sliding, etc.) (EA) A1

STRUCTURE INSPECTION REPORT

Structure # 03719
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Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4
313		Fixed Bearing (EA)	Each	2	0.0	100.0	0.0	0.0
313		1000 - Corrosion	Each	2	0.0	200.0	0.0	0.0
313		Fixed Bearing (EA) B2	Each	2	0.0	100.0	0.0	0.0
Current Inspection Notes:								
The Bent 2, Span 1 bearings had failed painted coating and minor surface corrosion with negligible section loss.								
Current Inspection Notes:								
The Bent 2, Span 2 bearings had failed painted coating and minor surface corrosion with negligible section loss.								

STRUCTURE INSPECTION REPORT

Structure # 03719
W MISSOULA - BITTERROOT RIVER 010

Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4
330		Steel Bridge Rail (LF)	Length	79	0.0	100.0	0.0	0.0
330		7000 - Damage	Length	246	0.0	5.7	0.0	0.0
330		1000 - Corrosion	Length	246	0.0	278.9	0.0	0.0

Current Inspection Notes:

The vertical angle on the South Rail between Panel Point 4' and 3' was bent 1-1/2 in. over a 2 ft. length due to impact damage on Span 1.
The bottom angle on the North Rail at Panel Point 1' was bent 3/4 in. upwards on Span 2.
Approximately 5 percent of the painted coating had failed with minor surface corrosion and negligible section loss along the rail length, primarily on the vertical steel plate at the bridge deck.
Three vertical members had impact damage that bent the interior flange 3/4 in. over a 6 in. length on the North Rail near the East Approach in Span 4.
The top rail was bent downward 1-1/2 in. over a 5 ft. length on the South Rail at the East End of the bridge deck.
The North Curb on Span 4 had section loss up to 1-1/2 in. on the top and interior faces with no exposed reinforcing stee.
The North Curb had section loss up to 5 in. with exposed longitudinal and stirrup reinforcing steel for 4 ft. over Bent 4
The steel rail had failed painted coating with minor surface corrosion and negligible section loss along its entire length, primarily on the vertical steel plate at the bridge deck.
The steel rail had failed painted coating with minor surface corrosion and negligible section loss along its entire length.

Photo #:Bridge Rail Impact - Photo 2

Location:

Comments: Three vertical members had impact damage that bent the interior flange 3/4 in. over a 6 in. length with gouging on the North Rail near the East Approach in Span 4.

Element:330 - Steel Bridge Rail (LF)

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Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4

Photo #:Curb Spalling - Photo 2

Location:

Comments: The North Curb had section loss up to 5 in. with exposed longitudinal and stirrup reinforcing steel for 4 ft. over Bent 4.

Element:330 - Steel Bridge Rail (LF)

Photo #:Curb Spalling - Photo 1

Location:

Comments: The North Curb on Span 4 had section loss up to 1-1/2 in. on the top and interior faces with no exposed reinforcing steel.

Element:330 - Steel Bridge Rail (LF)

Photo #:Bridge Rail Impact - Photo 1

Location:

Comments: The vertical angle on the South Rail between Panel Point 4' and 3' was bent 1-1/2 in. over a 2 ft. length due to impact damage on Span 1.

Element:330 - Steel Bridge Rail (LF)

STRUCTURE INSPECTION REPORT

Structure # 03719
W MISSOULA - BITTERROOT RIVER 010

Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4
Photo #:Bridge Rail Impact - Photo 3 Location: Comments: The bottom angle on the North Rail at Panel Point 1' was bent 3/4 in. upwards on Span 2. Element:330 - Steel Bridge Rail (LF)								

STRUCTURE INSPECTION REPORT

Structure # 03719
W MISSOULA - BITTERROOT RIVER 010

Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4
510	16	Wearing Surfaces (SF)	Area	1959	0.0	99.2	0.8	0.0
510	30	3220 - Crack (Wearing Surface)	Area	2885	0.0	5.0	0.0	0.0
510	30	3210 - Delamination/Patched Area/Pothole (Wearing Surfaces)	Area	2885	0.0	1.0	0.1	0.0
510	30	1190 - Abrasion/Wear (PSC|RC)	Area	2885	0.0	121.6	0.0	0.0
510	16	3220 - Crack (Wearing Surface)	Area	1959	0.0	0.0	0.8	0.0
510	16	1190 - Abrasion/Wear (PSC|RC)	Area	1959	0.0	100.0	0.0	0.0
510	30	Wearing Surfaces (SF)	Area	624	-362.3	462.0	0.3	0.0

Current Inspection Notes:

Transverse cracking up to 1/8 in. wide that spanned the entire width of the bridge deck that were spaced approximately 20 ft. at the floor beam locations.
An 18 in. long by 6 in. wide area of the overlay had spalled with penetration up to 1 in. located 6 ft. from the west end of the deck in the south wheel path.
Approximately 1 percent of the wearing surface had been repaired with cold patch that was had map cracking up to 1/8 in. wide.
The bituminous overlay that had minor wear over the entire surface area of the wearing surface.
Transverse cracks up to 1/2 in. wide were located directly over Bent 3 and 4.
The bituminous overlay had minor wear over the entire surface area of the wearing surface.

Photo #:Wearing Surface Cracking - Photo 2

Location:

Comments: Transverse crack up to 1/2 in. wide over Bent 4.

Element:510 - Wearing Surfaces (SF)

STRUCTURE INSPECTION REPORT

Structure # 03719
W MISSOULA - BITTERROOT RIVER 010

Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4
Photo #:Wearing Surface Cracking - Photo 1 Location: Comments: Typical transverse and map cracking up to 1/8 in. wide on Span 1 wearing surface. Note cold patch repair of pothole. Element:510 - Wearing Surfaces (SF)								

STRUCTURE INSPECTION REPORT

Structure # 03719

W MISSOULA - BITTERROOT RIVER 010

Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4
515	113	Steel Protective Coating (SF)	Area	720	-163.2	55.0	69.4	138.8
515	820	3440 - Effectiveness (Steel Protective Coatings)	Area	500	0.0	0.0	40.0	40.0
515	820	3420 - Peeling/Bubbling/ Cracking (Steel Protective Coatings)	Area	500	0.0	20.0	0.0	0.0
515	330	3440 - Effectiveness (Steel Protective Coatings)	Area	160	0.0	0.0	129.4	300.0
515	330	3420 - Peeling/Bubbling/ Cracking (Steel Protective Coatings)	Area	160	0.0	56.9	0.0	0.0
515	313	3440 - Effectiveness (Steel Protective Coatings)	Area	2	0.0	0.0	20.0	20.0
515	313	3410 - Chalking (Steel Protective Coatings)	Area	2	0.0	160.0	0.0	0.0
515	311	3440 - Effectiveness (Steel Protective Coatings)	Area	2	0.0	0.0	10.0	125.0
515	311	3410 - Chalking (Steel Protective Coatings)	Area	2	0.0	65.0	0.0	0.0
515	30	3440 - Effectiveness (Steel Protective Coatings)	Area	2885	0.0	0.0	0.0	2.1
515	152	3440 - Effectiveness (Steel Protective Coatings)	Area	115	0.0	0.0	269.6	269.6
515	152	3420 - Peeling/Bubbling/ Cracking (Steel Protective Coatings)	Area	115	0.0	134.8	0.0	0.0

STRUCTURE INSPECTION REPORT

Structure # 03719
W MISSOULA - BITTERROOT RIVER 010

Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4
515	120	3440 - Effectiveness (Steel Protective Coatings)	Area	400	0.0	0.0	352.5	235.0
515	120	3410 - Chalking (Steel Protective Coatings)	Area	400	0.0	1175.0	0.0	0.0
515	113	3440 - Effectiveness (Steel Protective Coatings)	Area	120	0.0	0.0	506.3	1112.5
515	113	3420 - Peeling/Bubbling/ Cracking (Steel Protective Coatings)	Area	120	0.0	1856.3	0.0	0.0
515	120	Steel Protective Coating (SF)	Area	9000	39.3	50.0	0.7	10.0
515	152	Steel Protective Coating (SF)	Area	660	82.5	3.5	7.0	7.0
515	30	Steel Protective Coating (SF)	Area	624	95.0	0.0	0.0	5.0
515	311	Steel Protective Coating (SF)	Area	2	0.0	65.0	10.0	25.0
515	313	Steel Protective Coating (SF)	Area	2	0.0	80.0	10.0	10.0
515	330	Steel Protective Coating (SF)	Area	750	75.0	10.0	4.3	10.7
515	820	Steel Protective Coating (SF)	Area	500	0.0	20.0	40.0	40.0

Current Inspection Notes:

STRUCTURE INSPECTION REPORT

Structure # 03719
W MISSOULA - BITTERROOT RIVER 010

Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4

Element 820 - Vertical Cross-Frame: Approximately 40 percent of the painted coating had failed with exposed primer.
Element 330 - Steel Bridge Rail - Approximately 20 percent of the painted coating had failed on the steel rail with exposed primer underneath.
Element 330 - Steel Bridge Rail - Approximately 5 percent of the painted coating had failed on the steel rail with exposed primer underneath.
Element 113 - Steel Stringers: Approximately 15 percent of the painted coating on the stringers had failed with exposed primer underneath.
Element 313 - Fixed Bearings: The remaining painted coating was chalking.
Element 120 - Steel Truss: Approximately 50 percent of the painted coating was chalking.
Element 311 - Movable Bearing - The remaining painted coating was chalking.
Element 152 - Steel Floor Beams: Approximately 40 percent of the painted coating on the floor beams had failed with exposed primer underneath.
Element 330 - Steel Bridge Rail - Approximately 10 percent of the painted coating was bubbling and peeling.
Element 820 - Vertical Cross-Frame: Approximately 40 percent of the painted coating had failed with minor surface corrosion and negligible section loss.
Element 313 - Fixed Bearings: Approximately 10 percent of the painted coating on the fixed bearings had failed with minor surface corrosion and negligible section loss to the steel underneath.
Element 113 - Steel Stringers: Approximately 30 percent of the painted coating on the stringers had failed with moderate corrosion with up to 1/16 in. thick rust scale.
Element 113 - Steel Stringers: The remaining painted coating was bubbling and peeling on the steel stringers.
Element 313 - Fixed Bearings: Approximately 10 percent of the painted coating on the fixed bearings had failed with exposed primer underneath.
Element 820 - Vertical Cross-Frame: The remaining painted coating was bubbling and peeling.
Element 152 - Steel Floor Beams: Approximately 40 percent of the painted coating on the floor beams had failed with minor surface corrosion and negligible section loss.
Element 330 - Steel Bridge Rail - Approximately 50 percent of the painted coating had failed on the steel rail with minor surface corrosion and negligible section loss.
Element 120 - Steel Truss: Approximately 15 percent of the painted coating had failed with exposed primer underneath.
Element 113 - Steel Stringers: Approximately 15 percent of the painted coating on the stringers that were painted had failed with exposed primer underneath.
The pony truss movable bearings had no protective coating.
Element 30 - Steel Corrugated Deck - Approximately 1 percent of the corrugated deck had weld burn through with minor surface corrosion and negligible section loss.
Element 120 - Steel Truss: Approximately 10 percent of the painted coating had failed on the truss members with minor surface corrosion and negligible section loss.
Element 311 - Movable Bearing - Approximately 25 percent of the painted coating had failed with moderate to heavy corrosion with advance section loss.
Element 311 - Movable Bearing - Approximately 10 percent of the painted coating had failed with exposed primer underneath.
Element 152 - Steel Floor Beams: The remaining painted coating was bubbling and peeling.
Element 330 - Steel Bridge Rail - Approximately 5 percent of the painted coating had failed on the steel rail with minor surface corrosion and negligible section loss.
Element 30 - Steel Corrugated Deck - Approximately 5 percent of the corrugated deck had weld burn through with minor surface corrosion and negligible section loss.
Element 113 - Steel Stringers: Approximately 30 percent of the painted coating on the stringers that were painted had failed with moderate corrosion with up to 1/16 in. thick rust scale.
Element 113 - Steel Stringers: The unpainted steel stringers had no protective coating.

STRUCTURE INSPECTION REPORT

Structure # 03719
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Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4
820		Steel Truss Vertical Cross-Frame (LF) Thru-Truss	Length	272	0.0	100.0	0.0	0.0
820		7000 - Damage	Length	272	0.0	0.7	0.0	0.0
820		1000 - Corrosion	Length	272	0.0	100.0	0.0	0.0

Current Inspection Notes:

Panel Point 3': the lower, horizontal bracing member was bent 2 in. to the east and upward and downward 1 in. due to impact damage.
The vertical cross-frame had failed paint with minor surface corrosion along its entire length.

Photo #:Cross Bracing Impact

Location: Panel Point 3': the lower, horizontal bracing member.

Comments: The lower, horizontal bracing member was bent 2 in. to the east and upward and downward 1 in. due to impact damage.

Element:820 - Steel Truss Vertical Cross-Frame (LF) Thru-Truss

STRUCTURE INSPECTION REPORT

Structure # 03719
W MISSOULA - BITTERROOT RIVER 010

Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4
950		Steel Approach Guardrail - East Approach	Length	60	0.0	0.0	0.0	0.0

STRUCTURE INSPECTION REPORT

Structure # 03719
W MISSOULA - BITTERROOT RIVER 010

Element #	Parent Element	Name	Unit	Quantity	%CS 1	%CS 2	%CS 3	%CS 4
960		Steel Approach Guardrail Ends - East Approach	Each	2	0.0	0.0	0.0	0.0

General Inspection Notes	
Previous Inspection Notes	
Current Inspection Notes	

MONTANA
MDT
DEPARTMENT OF TRANSPORTATION

Bridge No. L32101000+01001
Missoula, Montana
Condition Evaluation Report:
Routine and Fracture Critical Inspection
Inspection Date: August 8 and 10, 2017

Prepared By:

FICKETT

Structural Solutions

Formerly Fish & Associates, Inc.

250 East Wisconsin Avenue, Suite 1800
Milwaukee, WI 53202

Table of Contents

1 EXECUTIVE SUMMARY

The Maclay Bridge had the following NBI ratings: Item 58 Deck – (6) Satisfactory Condition; Item 59 Superstructure – (5) Fair Condition; Item 60 Substructure – (5) Fair Condition. The following conclusions and recommendations are suggested to maintain the long term serviceability of the bridge.

- The approaches should be monitored during future inspections for additional cracking and cold patch deterioration
- The bituminous overlay should be monitored during future inspections for additional wear, cracking, and potholes; it is recommended the potholes be patched throughout the bridge deck
- The corrugated forms should be monitored during future inspections for additional corrosion
- The areas of seepage through the concrete top flange gaps should be monitored during future inspections for signs of cracking and spalling.
- The rail should be monitored during future inspections for corrosion and impact damage
- The areas of spalling with exposed reinforcing steel on the concrete curb should be repaired, and the remainder of the curb should be monitored during future inspections for cracking, spalling, and delaminations
- The deteriorated seal on the joint at Bent 3 should be replaced and the joint should be monitored during future inspections for additional impact damage, seal separation, and seal deterioration
- The floor beams should be monitored during future inspections for additional failed paint and corrosion
- The stringer ends should be cleaned each inspection cycle to prevent trapped moisture from the debris accumulation, and monitored during future inspections for additional section loss. The stringer ends on Span 2, Bent 3 should be shimmed to remove the movement from passing vehicles. The stringers should also be monitored during future inspections for additional failed painted coating and corrosion

- The approach span concrete beams should be monitored during future inspections for cracking and spalling

- The abutments and bents should be monitored during future inspections for cracking, delaminations, and spalling

- The roller bearings on Abutment 1 should be replaced and the remaining bearings should be monitored during future inspections for additional failed painted coating and corrosion

- The truss should be monitored during future inspections for additional failed painted coating, missing hardware, and impact damage

- The cross bracing should be monitored during future inspections for additional failed painted coating and impact damage

2 INTRODUCTION

The inspection of the Maclay Bridge (Bridge No. L32101000+01001) for the Montana Department of Transportation was performed on August 8 and 10th, 2017 by Fickett Structural Solutions. The following SPRAT (Society of Professional Rope Access Technicians) trained team members performed the inspection services:

- Fickett Structural Solutions
  - Todd Demski, PE, CWI, SPRAT III
  - Ryan Sievers, PE, CWI, SPRAT II
  - Zach Williams, CWI, SPRAT I
  - Traa Haase, EIT

Prior to arriving on-site, our inspection team converted the plans to an editable PDF format for ease of use during inspection. Tablets were used to record and review all inspection notes and photographs. After the inspection was complete, all notes were placed on the Maclay Bridge Plans in MicroStation to give MDT a visual representation of deficiencies on the bridge. The bridge was accessed using SPRAT certified techniques. No scaffolding, ladders, lifts, or under bridge inspection vehicles were required to access any portion of the bridge during this inspection cycle.

The inspection was performed in accordance with the following documents:

- MDT Bridge Inspection and Rating Manual, December 2015
- Bridge Inspector's Reference Manual, (Federal Highway Administration), 2012

The following tasks were performed at the Maclay Bridge by the inspection engineers from Fickett:

- Mobilization to the site daily and set up traffic control to warn oncoming motorists that work is being performed on the bridge
- Hands-on inspection of all steel members in the plane of the primary truss lines, and secondary bracing member connections
- Cursory inspection of secondary bracing members
- Hands-on inspection of the floor system
- Obtain all applicable photographs and note all deficiencies using tablets
- Perform element level inspection and NBI inspection

During inspection the bridge was inspected for:

- Steel deficiencies including corrosion, section loss, cracking of welds or base metal, bolting or welding issues, and load induced distortion or damage
- Concrete deficiencies including delamination, spalls, patched areas, exposed rebar, cracking, abrasion, wear, and load induced distortion or damage
- Substructure deficiencies including wing wall tipping, settlement, and scour
- Joint deficiencies including leakage, seal adhesion/damage/cracking, debris impaction, adjacent deck or header damage, and damage
- Bearing deficiencies including corrosion, connection issues, movement, alignment, loss of bearing area, and damage

3 CONDITION FINDINGS

The following sections outline the general conditions for each of the structure components inspected during the 2017 inspection cycle. Specific defects and member specific photographs for each structure component can be found in the Appendices.

3.1 APPROACH, DECK, BRIDGE RAIL, AND SIGNAGE

Both the East and West Approaches consisted of asphalt pavement with minor wear over the entire surface area of the approaches (**Photo 18**). The West Approach had a 5 ft. long by bridge width area of cold patch which was sound with no noted cracking (**Photo 19**). A 1/4 in. wide by full width transverse crack was noted approximately 18 ft. from the west transition (**Photo 20**). A 1/2 in. wide by full width transverse crack was noted approximately 4 ft. from the east transition (**Photo 21**).

The asphalt wearing surface covered the deck and had minor wear throughout (**Photo 22**). The following defects were found on the wearing surface:

- Span 1: An 18 in. long by 6 in. wide area of the overlay had formed a pothole with penetration up to 1 in. located 6 ft. from the west end of the deck in the south wheel path (**Photo 23**)
- Span 1: The end 6 ft. by bridge width adjacent to the West Approach had cold patch with minor wear and hairline map cracking (**Photo 24**)
- Span 1: Transverse cracking up to 1/8 in. wide by full width spaced approximately 20 ft. apart at the floor beam locations (**Photo 25**)
- Span 1: Approximately 1 percent of the wearing surface had been repaired with cold patch that had map cracking up to 1/8 in. wide
- Span 3: A transverse crack up to 1/2 in. wide was located over Bent 4 (**Photo 26**)
- Span 4: A transverse crack up to 1/2 in. wide was located over Abutment 5 (**Photo 27**)

The underside of the deck in Spans 1 and 2 were galvanized, corrugated stay-in-place formwork that had welding burn through holes on throughout its surface area with minor surface corrosion and negligible section loss to the burn hole edges (**Photo 28**). These areas of burn

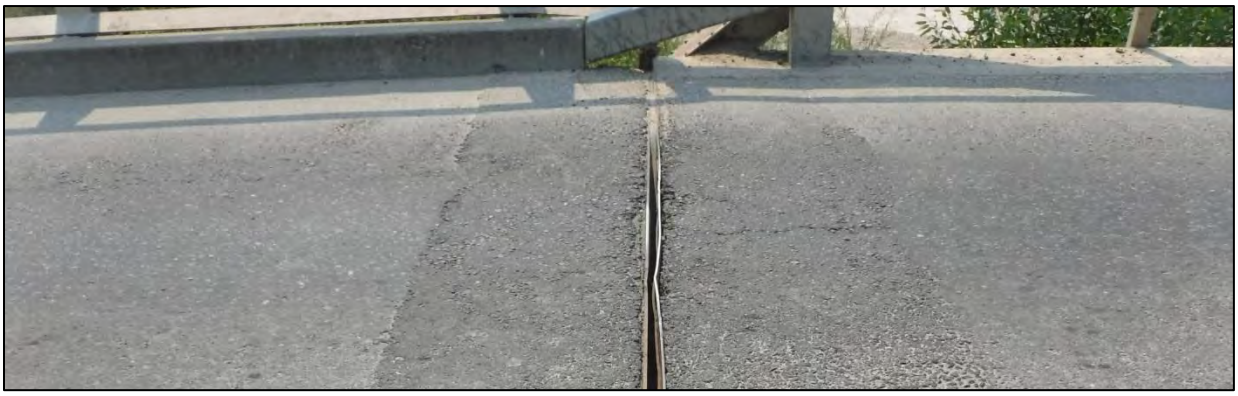
through allowed debris to fall through the stay-in-place formwork on to the floor beams. The underside of the deck in Spans 3 and 4 were top flanges of tee beams with isolated areas of efflorescence seeping through the construction joints (**Photo 29**).

A 5-1/2 in. high by 8 in. wide concrete curb spanned both edges of Spans 3 and 4. The North Curb on Span 4 had section loss up to 1-1/2 in. on the top and interior faces with no exposed reinforcing steel (**Photo 30**). The North Curb had section loss up to 5 in. with exposed longitudinal and stirrup reinforcing steel for 4 ft. over Bent 4 (**Photo 31**).

The bridge rail in Spans 1 and 2 consisted of a 6 in. by 6 in. galvanized steel rail located 10 in. above the bridge deck. Three 2 in. angles spanned the length of the bridge deck and were riveted to the vertical members (**Photo 32**). Approximately 50 percent of the painted coating on the railing had failed with minor surface corrosion and negligible section loss, 20 percent failed with exposed primer, 10 percent was bubbling and peeling, and the remaining painted coating was in good condition. Lateral displacement up to 3 in. between verticals was typical along the length of the rail. The vertical angle on the South Rail in Span 1 between Panel Point 4' and 3' was bent 1-1/2 in. over a 2 ft. length due to impact damage (**Photo 33**). The bottom angle on the North Rail in Span 2 at Panel Point 1' was bent 3/4 in. upwards (**Photo 34**).

The bridge rail in Spans 3 and 4 consisted of a 6 in. diameter top rail, a 12 in. tall W-beam mid rail and a 5 in. vertical steel plate at the bridge deck (**Photo 35**). Approximately 5 percent of the painted coating had failed with minor surface corrosion and negligible section loss primarily on the vertical steel plate at the bridge deck, 5 percent failed with exposed primer, and the remaining painted coating was in good condition. Three vertical members had impact damage that bent the interior flange 3/4 in. over a 6 in. length with gouging on the North Rail near the East Approach (**Photo 36**). The top rail was bent downward 1-1/2 in. over a 5 ft. length on the east end of the South Rail.

3.2 JOINTS



Joint 1 over Abutment 1 was a 11 ft. long by 30 in. wide metal plate bolted to the bridge deck on the east side of the joint (**Photo 38**).

Joint 2 over Bent 2 was an open joint. The joint edge had two 3/4 in. bends over a 1 ft. section in the south wheel path (**Photo 39**). The joint opening measured at 1/2 in. on the South Rail on a 90 degree day.

Joint 3 over Bent 3 was a compression joint that was fully compressed on the South Rail on a 90 degree day (**Photo 40**). The rubber seal had failed on 90 percent of its length (**Photo 41**). The joint had separated from the Span 2 header over a 4 ft. length (**Photo 42**). The joint edge had a 1/2 in. bend over a 6 in. length in the south wheel path.

3.3 FLOOR SYSTEM

The floor beams were steel rolled beam sections connected to the lower chord by a pinned connection. Approximately 40 percent of the painted coating on the floor beams had failed with minor surface corrosion and negligible section loss, 40 percent had failed with exposed primer underneath, and the remaining painted coating was bubbling and peeling. The bottom west flange of Floor Beam 1' on Span 1 had bent upwards 1/2 in. over a 6 in. length approximately 16 in. from the north end (**Photo 43**).

The stringers were steel rolled beams, and were bearing on the top flange of the floor beams. Approximately 90 percent of the stringers were painted, while the other 20 percent of the stringers were replaced with an unpainted steel stringer. Approximately 30 percent of the painted coating on the stringers had failed with moderate corrosion with up to 1/16 in. thick rust scale, 15 percent had failed with exposed primer underneath, and the remaining painted coating was bubbling and peeling.

The 20 percent of the stringers that were left unpainted and had minor to moderate corrosion with negligible section loss (**Photo 44**). The stringer ends at Abutment 1, Bent 2, and Bent 3 had debris accumulation on top of the abutment seat and bent caps, and around the ends of the stringer webs and bottom flanges. The inspector cleaned the debris from around the stringer ends for inspection. The specific stringer defects can be seen in **Table 1**.

Span	Bent	Stringer	Comment	Photo
1	1	7	The stringer web had heavy corrosion and section loss over a 17 in. long by 2 in. high area with a 1 in. diameter hole center 10 in. from the stringer end	**Photo 45**
1	1	4	The stringer web had heavy corrosion and up to 50 percent section loss over a 10 in. long by 1 in. high hole adjacent to the stringer end	**Photo 46**
1	1	2	The stringer web had heavy corrosion and section loss over a 14 in. long by 2 in. high area with a 2 in. long by 1/2 in. high hole center 2 in. from the stringer end	**Photo 47**
2	2	2	The stringer web had heavy corrosion and section loss with two holes; 7 in. long by 1 in. high and 6 in. long by 2 in. high centered 16 in. from the stringer end	**Photo 48**
2	2	5	The south face had a 16 in. long by 2 in. high area of pack rust up to 1/4 in. thick on the bottom of the web located 12 in. from the end of the stringer	**Photo 49**
2	3	All	The hollow pipe that the stringers were bearing on had movement up to 1/4 in. when vehicles passed. The south anchor rod for the south pipe had failed and this edge of the pipe had vertical movement up to 1/2 in. when vehicles passed	**Photo 50**
2	3	2	The stringer web had heavy corrosion with up to 1/8 in. thick rust scale on both sides of the stringer web at the web to lower flange interface adjacent to the stringer end	**Photo 51**
2	3	4	The stringer web had heavy corrosion and section loss with a 5 in. long by 1 in. high through hole near the stringer end. The bottom flange was knife edged in this area	**Photo 52**
2	3	4	A gap was noted between the bottom flange and the supporting bearing seat of the abutment. Significant movement was observed when traffic passed over this area (gap closes with passing traffic)	N/A
2	3	7	The stringer web had heavy corrosion with up to 50 percent section loss over a 6 in. long by 2 in. high adjacent to the stringer end that had a 1/2 in. diameter hole 6 in. from the stringer end at the web to lower flange interface	**Photo 53**
2	3	8	The stringer web had heavy corrosion and section loss with three through holes ranging in size from 1/4 in. to 1/2 in. in diameter located at the web to lower flange interface at the stringer end	**Photo 54**

Table 1: Stringer End Defects

The approach spans were concrete Tee beams. The concrete beams had superficial cracking, but no notable deficiencies.

3.4 ABUTMENTS, WING WALLS, AND EMBANKMENTS

Abutment 1 (**Photo 13**) was constructed of reinforced concrete. The abutment had one full height, vertical crack up to 1/8 in. wide in the middle of the abutment (**Photo 55**). The abutment had rust staining under the truss due to corrosion from the steel members above the abutment.

Abutment 5 (**Photo 17**) was constructed of reinforced concrete and had no notable deficiencies.

3.5 BENTS

The bents were constructed of reinforced concrete. At the time of inspection, the bents were located on dry land and could be fully inspected.

Bent 2 (**Photo 14**) had random hairline temperature and shrinkage cracking over its entire surface area. The west elevation had seven areas of delaminations up to 60 in. wide by 12 in. high. The east elevation had five areas of delaminations up to 15 in. wide by 30 in. wide. The edges of the delaminations were spalling with up to 1 in. of penetration and no exposed reinforcing steel (**Photo 56**).

Bent 3 (**Photo 15**) had random hairline map cracking throughout its surface area with minor efflorescence build-up in random, isolated areas. The top, southeast corner of the bent had a 12 in. wide by 10 in. high area of delamination (**Photo 57**). A 5 ft. long horizontal crack up to 1/16 in. wide was located near the bottom, northeast corner of the bent (**Photo 58**).

Bent 4 (**Photo 16**) had a 3 ft. wide by 2 ft. high spall with exposed reinforcing steel on the west face of the bent cap. The exposed reinforcing steel had moderate corrosion with negligible section loss (**Photo 59**).

3.6 BEARINGS

Abutment 1, North Truss roller bearing (**Photo 60**) had a failed painted coating on approximately 25 percent of the surface area with moderate corrosion and pitting up to 1/16 in. to the steel underneath, 10 percent had failed with exposed primer underneath, and the remaining paint was chalking. The heavy corrosion was under the rollers and roller keeper (**Photo 61**). The roller keeper had split due to heavy corrosion and the nested roller assembly had failed. Two of the rollers along with a portion of the keeper were out from underneath the truss to the west of the bearing and one roller was sticking out from underneath the bearing to the east of the bearing (**Photo 62**). The anchor rods had up to 25 percent section loss at the concrete interface due to heavy corrosion. The top plate was displaced 1-7/8 in. to the west (in expansion) in relation to the bottom plate.

Abutment 1, South Truss roller bearing (**Photo 63**) had a failed painted coating on approximately 25 percent of the surface area with moderate corrosion and pitting up to 1/16 in. to the steel underneath, 10 percent had failed with exposed primer underneath, and the remaining paint was chalking. The heavy corrosion was under the rollers and roller keeper. The roller keeper had split due to heavy corrosion and the nested roller assembly had failed. The roller keeper had broken away from the bearing due to heavy corrosion and was pushed against the abutment backwall (**Photo 64**). Half of the rollers were still within the bearing, but were not fully in contact with the bearing plates. The top plate was displaced 1-1/2 in. to the west (in expansion) in relation to the bottom plate.

Bent 2, North Truss, Span 1 fixed bearing (**Photo 65**) and Span 2 fixed bearing (**Photo 67**) had a failed painted coating on approximately 5 percent of the surface area with minor surface

corrosion and negligible section loss, 10 percent had failed with exposed primer underneath, and the remaining painted coating was chalking.

Bent 2, South Truss, Span 1 fixed bearing (**Photo 66**) and Span 2 fixed bearing (**Photo 68**) had a failed painted coating on approximately 10 percent of the surface area with minor surface corrosion and negligible section loss, 15 percent had failed with exposed primer underneath, and the remaining painted coating was chalking.

Bent 3, North Truss sliding bearing (**Photo 69**) was unpainted and had moderate corrosion with pitting up to 1/16 in. deep. The top plate was displaced 1-3/8 in. to the east (in expansion) in relation upper flange of the bearing.

Bent 3, South Truss sliding bearing (**Photo 70**) was unpainted and had moderate corrosion with pitting up to 1/16 in. deep. The top plate was displaced 1-3/4 in. to the east (in expansion) in relation upper flange of the bearing.

3.7 TRUSS MEMBERS

The verticals and upper chords were built up steel members consisting of C-channels with supporting lacing bars, batten plates, rolled beams. The diagonals consisted of eyebars connected at either end by a pinned connection. The pony truss consisted of built up steel members consisting of rolled members with supporting lacing bars and batten plates. Approximately 5 percent of the painted coating had failed on the truss members with minor surface corrosion and negligible section loss, 5 percent had failed with exposed primer underneath, 5 percent was chalking, and the remaining painted coating was in good condition.

- Span 1, North Truss, Vertical L1-U1: the exterior flange of the vertical was bent 1 in. to the north due to impact damage approximately 5 ft. above the bridge deck (**Photo 71**)
- Span 1, South Truss, Top Chord at U4: one bolt was sheared off of the horizontal brace to top chord connection plate (**Photo 72**)
- Span 2, North Truss, Vertical L2'-U2': the interior flange of the vertical was bent 1 in. over a 6 in. length due to impact damage (**Photo 73**)
- Span 2, North Truss, Diagonal L2'-U1': the interior flange was bent 1-3/8 in. over a 24 in. length due to impact damage (**Photo 74**)
- Span 2, North Truss, Gusset Plate U1': the exterior gusset plate had two misdrilled 3/4 in. diameter holes (**Photo 75**)
- Span 2, North Truss, Member L0'-U1': the diagonal had seven areas of impact damage up to 3/4 in. long and 1/4 in. of defection spaced over a 15 in. length (**Photo 76**)

The lower chord of the main truss consisted of two steel eyebars connected at each panel point by a pinned connection. Approximately 15 of the painted coating had failed on the lower chord with moderate corrosion with negligible section loss, 25 percent had failed with exposed primer underneath, and the remaining painted coating was bubbling and peeling.

3.8 BRACING

Approximately 40 percent of the painted coating on the bracing had failed with minor surface corrosion and negligible section loss, 40 percent had failed with exposed primer underneath, and the remaining painted coating was bubbling and peeling.

- Panel Point 3': the lower, horizontal bracing member was bent 2 in. to the east, and bent upward and downward 1 in. due to impact damage (**Photo 77**)

4 CONCLUSIONS AND RECOMMENDATIONS

The Maclay Bridge had the following NBI ratings: Item 58 Deck – (6) Satisfactory Condition; Item 59 Superstructure – (5) Fair Condition; Item 60 Substructure – (5) Fair Condition. The various components/elements associated with this bridge are in varying conditions as described below. The following conclusions and recommendations are suggested to maintain the long term serviceability of the bridge.

The approaches were in fair condition with transverse cracking up to 1/2 in. wide and deteriorated cold patch repairs. It is recommended that the approaches be monitored during future inspections for additional cracking and cold patch deterioration.

The bituminous overlay was in fair condition with minor wear, transverse cracking, and numerous isolated potholes. It is recommended the potholes be patched throughout the bridge deck. It is recommended that the bituminous overlay be monitored during future inspections for additional wear, cracking, and potholes.

The corrugated steel stay-in-place forms on the underside of the deck were in satisfactory condition with areas of weld burn through with corrosion and negligible section loss. It is recommended that the corrugated forms be monitored during future inspections for additional corrosion.

The concrete top flange was in good condition with areas of seepage through the construction joints. It is recommended that the areas of seepage be monitored during future inspections for signs of cracking and spalling.

The bridge rail was in fair condition with failed painted coating and minor corrosion with negligible section loss and areas of impact damage that did not result in cracking or tearing of the steel. It is recommended that the rail be monitored during future inspections for additional corrosion and impact damage. The areas of spalling with exposed reinforcing steel on the concrete curb should be repaired, and the remainder of the curb should be monitored during future inspections for additional spalling.

The joints were in fair condition with areas of impact damage and separation from the bridge deck. The seal on the joint over Bent 3 had deteriorated and failed on over 90 percent of its length. The minor areas of impact damage to the joint headers should be monitored for separation from the wearing surface. It is recommended that the deteriorated seal on the joint at Bent 3 be replaced and that the joint be monitored during future inspections for additional impact damage, seal separation, and seal deterioration.

The floor beams were in satisfactory condition with failed painted coating and minor surface corrosion with negligible section loss. It is recommended that the floor beams be monitored

during future inspections for additional failed paint and corrosion.

The stringers were in fair to poor condition with areas of heavy corrosion with section loss and through holes on the stringer ends over the abutments and piers on Spans 1 and 2. It is recommended that the stringer ends be cleaned of debris during each inspection cycle for proper inspection and to prevent trapped moisture, and be monitored during future inspections for additional section loss. The stringer ends on Span 2, Bent 3 had ¼ in. to ½ in. of vertical movement from passing vehicles. The stringers should be shimmed to remove the excess movement from passing vehicles. It is also recommended that the stringers be monitored during future inspection for additional failed painted coating and corrosion.

The approach span girders were in good condition with superficial, hairline cracking but no other notable deficiencies. It is recommended that the approach span concrete beams be monitored during future inspections for cracking.

The abutments were in satisfactory to good condition with cracking up to 1/8 in. wide on Abutment 1 and no notable deficiencies on Abutment 5. It is recommended that the abutments be monitored during future inspections for cracking and spalling.

The bents were in fair condition with cracking up to 1/16 in. wide, delaminations, and spalling with exposed reinforcing steel. It is recommended that the bents be monitored during future inspections for cracking, delaminations, and spalling.

The bearings were in poor condition with failed painted coating and moderate to heavy corrosion. Both of the roller bearings on Abutment 1 had failed due to heavy corrosion and significant section loss to the anchor rods and nested rollers. The roller bearings were no longer functioning as intended with a majority of the rollers no longer between the bearing plates. It is recommended that the roller bearings on Abutment 1 be replaced, and that the remaining bearings be monitored during future inspections for additional failed painted coating and corrosion.

The truss members were in satisfactory condition with failed painted coating and minor corrosion. The truss members had areas of impact damage, missing connection hardware, and misdrilled holes. It is recommended that the truss be monitored during future inspections for additional failed painted coating, missing hardware, and impact damage.

The cross bracing members were in fair condition with failed painted coating and minor surface corrosion with isolated areas of impact damage. It is recommended that the cross bracing be monitored during future inspections for additional failed painted coating and impact damage.

The above summarizes our inspection findings on the 2017 Maclay Bridge Inspection services. Per FHWA requirements, the Maclay Bridge should be inspected at intervals not to exceed 24 months. If you have any questions regarding the report, please do not hesitate to contact me.

Respectfully Submitted,
Fickett Structural Solutions, INC.

Todd Demski, PE, CWI
Project Manger

5 APPENDICES

APPENDIX A: OVERVIEW PHOTOS

Photo 1: South Elevation looking north at bridge

Photo 2: North Elevation looking south at bridge

Photo 3: Looking downstream (north) at mid span

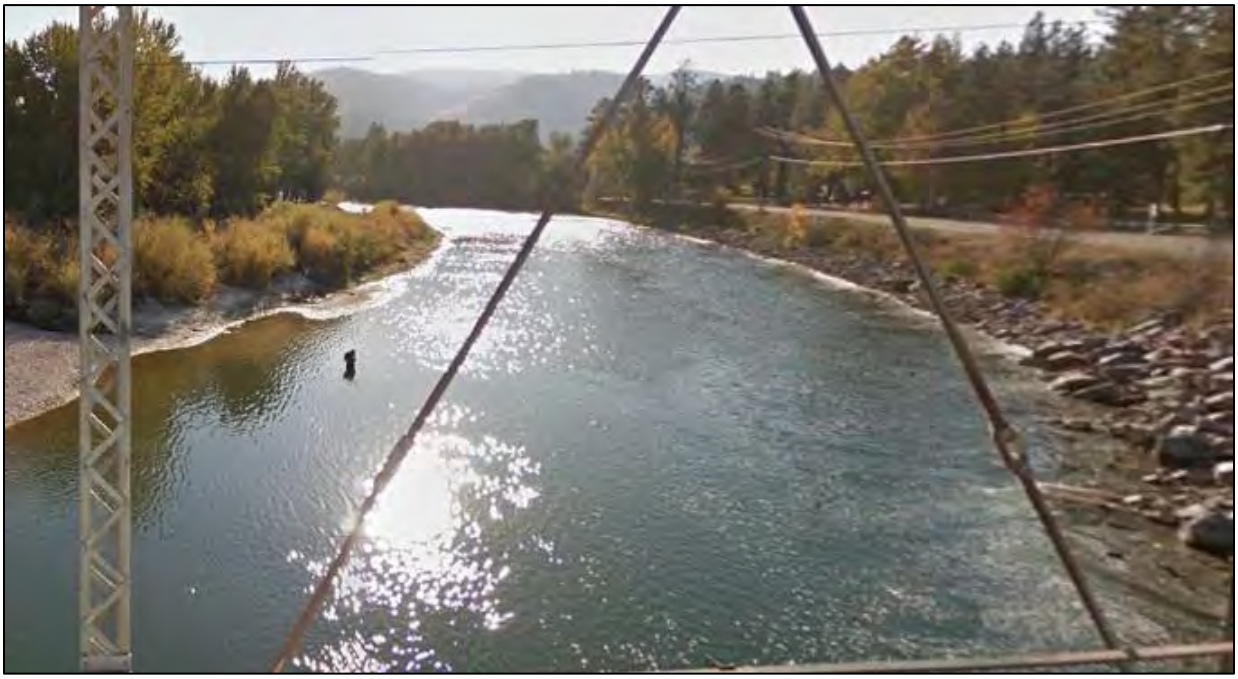


Photo 4: Looking upstream (south) at mid span

Photo 5: East Portal

Photo 6: Weight Limit Sign on East End of bridge

Photo 7: West Portal with Weight Limit Sign

Photo 8: East Approach

Photo 9: West Approach

Photo 10: Main Span Underside Framing Plan

Photo 11: Pony Truss Span Underside Framing Plan

Photo 12: Approach Span Underside Framing Plan

Photo 13: Abutment 1 East Elevation looking west

Photo 14: Bent 2 East Elevation looking west

Photo 15: Bent 3 East Elevation looking west

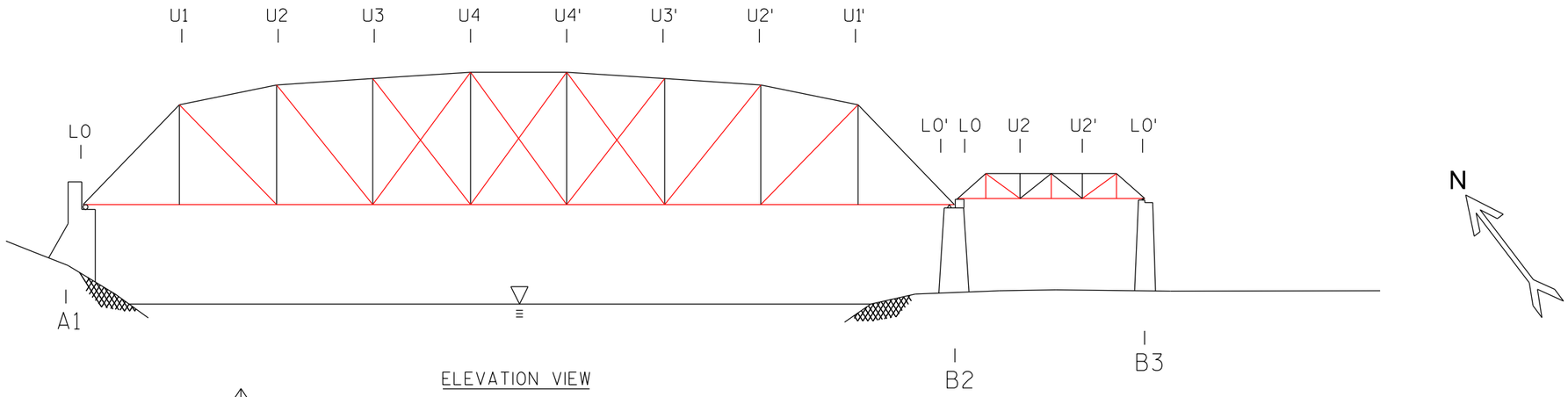
Photo 16: Bent 4 East Elevation looking west

Photo 17: Abutment 5 West Elevation looking east

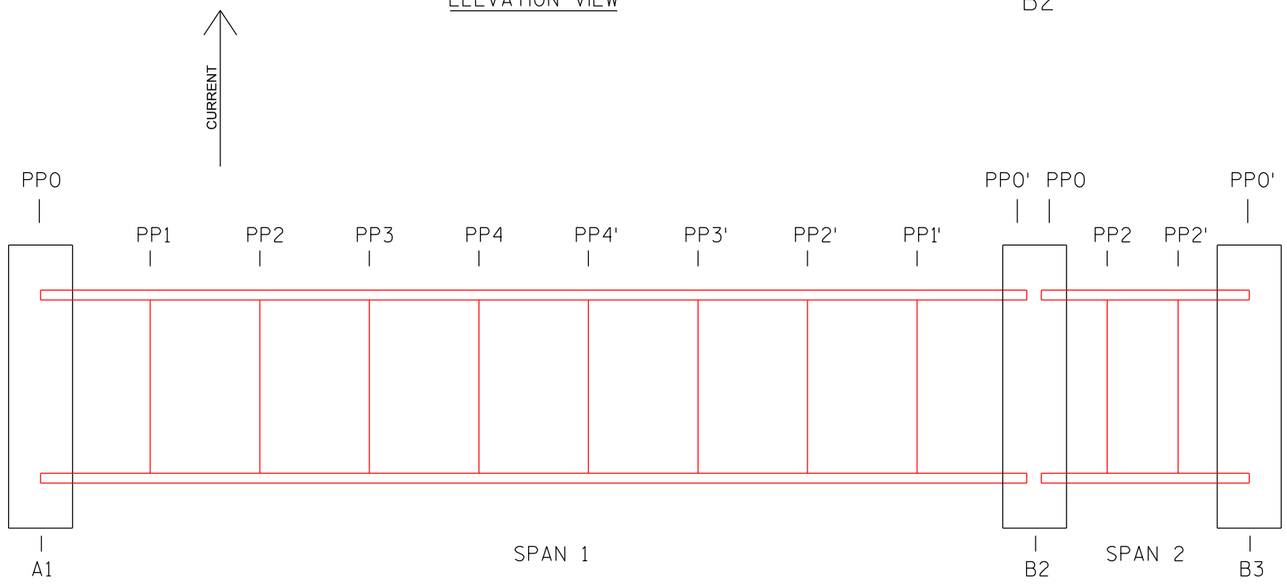
APPENDIX B: FRACTURE CRITICAL INSPECTION PLAN

The following drawing shows the members in red that were considered fracture critical during inspection. Fracture critical inspection requires visual inspection from no further away than arm's length, which was achieved via rope access methods.

STATE	BRIDGE NUMBER	SHEET NO.
MONTANA	L32101000+01001	1 OF 1



ELEVATION VIEW



PLAN VIEW

MEMBERS HIGHLIGHTED IN RED ARE CONSIDERED FRACTURE CRITICAL

BRIDGE NUMBER L32101000+01001

FICKETT Structural Solutions
250 EAST WISCONSIN AVENUE
SUITE 1800
MILWAUKEE, WISCONSIN 53202
(414) 223.5775

FISH PROJECT NUMBER 16057

MONTANA
DEPARTMENT OF TRANSPORTATION

MDT Montana Department of Transportation

BY _____
BY _____ _____
CONSULTANT DESIGN ENGINEER DATE

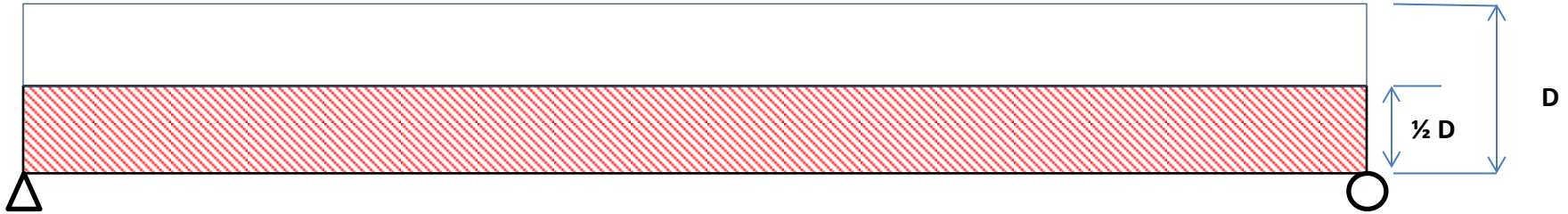
DATE OF INSPECTION August 2017

SHEET DESCRIPTION
MACLAY FRACTURE CRITICAL PLAN

DRAWN BY	RYAN A SIEVERS	
REVIEWED BY	TODD DEMSKI	

Fracture Critical Bridge Inspection Plan and Reporting Form

Solid Floor Beam: TEMPLATE



Consider the fracture critical portion of the floor beam as the lower half of the beam depth, the portion below the neutral axis that is in tension. Use separate forms for each member. Note any defects and label the defect accordingly. Make sure and note that a defect is Near Face (NF), Far Face (FF) or Both Faces (BF). All notations will be recorded looking ahead on line. Use this drawing for trusses or two girders system bridges with solid rolled or built up section floor beams.

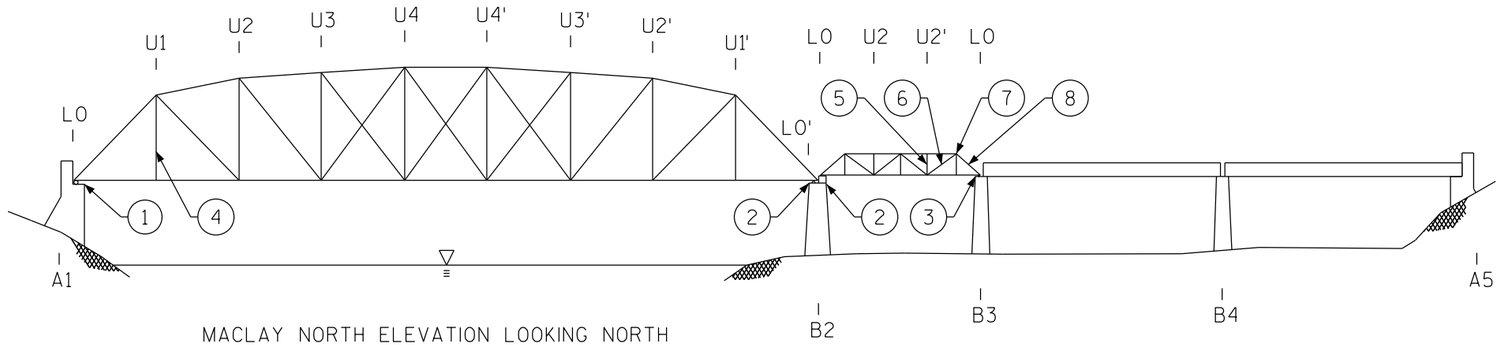
Inspection Comments: Template of floor beam form. Individual floor beam forms can be found in Appendix C.

Previous Inspection Comments:

APPENDIX C: INSPECTION NOTES

The following drawings show where specific defects were noted during the inspection.

STATE	BRIDGE NUMBER	SHEET NO.
MONTANA	L32101000+01001	1 OF 1



MACLAY NORTH ELEVATION LOOKING NORTH

GENERAL NOTES:

a. APPROXIMATELY 5 PERCENT OF THE PAINTED COATING HAD FAILED ON THE VERTICALS, UPPER CHORD, AND DIAGONAL MEMBERS WITH MINOR SURFACE CORROSION AND NEGLIGIBLE SECTION LOSS, 5 PERCENT HAD FAILED WITH EXPOSED PRIMER UNDERNEATH, 5 PERCENT WAS CHALKING, AND THE REMAINING PAINTED COATING WAS IN GOOD CONDITION.

b. APPROXIMATELY 15 OF THE PAINTED COATING HAD FAILED ON THE LOWER CHORD WITH MODERATE CORROSION WITH NEGLIGIBLE SECTION LOSS, 25 PERCENT HAD FAILED WITH EXPOSED PRIMER UNDERNEATH, AND THE REMAINING PAINTED COATING WAS BUBBLING AND PEELING.

c. APPROXIMATELY 40 PERCENT OF THE PAINTED COATING ON THE BRACING HAD FAILED WITH MINOR SURFACE CORROSION AND NEGLIGIBLE SECTION LOSS, 40 PERCENT HAD FAILED WITH EXPOSED PRIMER UNDERNEATH, AND THE REMAINING PAINTED COATING WAS BUBBLING AND PEELING.

INSPECTION NOTES:

1. ABUTMENT 1, NORTH TRUSS ROLLER BEARING HAD A FAILED PAINTED COATING ON APPROXIMATELY 25 PERCENT OF THE SURFACE AREA WITH MODERATE CORROSION AND PITTING UP TO 1/16 IN. TO THE STEEL UNDERNEATH, 10 PERCENT HAD FAILED WITH EXPOSED PRIMER UNDERNEATH, AND THE REMAINING PAINT WAS CHALKING. THE HEAVY CORROSION WAS UNDER THE ROLLERS AND ROLLER KEEPER. THE ROLLER KEEPER HAD SPLIT DUE TO HEAVY CORROSION AND THE NESTED ROLLER ASSEMBLY HAD FAILED. TWO OF THE ROLLERS ALONG WITH A PORTION OF THE KEEPER WERE OUT FROM UNDERNEATH THE TRUSS TO THE WEST OF THE BEARING AND ONE ROLLER WAS STICKING OUT FROM UNDERNEATH THE BEARING TO THE EAST OF THE BEARING. THE ANCHOR RODS HAD UP TO 25 PERCENT SECTION LOSS AT THE CONCRETE INTERFACE DUE TO HEAVY CORROSION. THE TOP PLATE WAS DISPLACED 1-7/8 IN. TO THE WEST (IN EXPANSION) IN RELATION TO THE BOTTOM PLATE.
2. THE NORTH SPAN FIXED BEARINGS HAD A FAILED PAINTED COATING ON APPROXIMATELY 5 PERCENT OF THE SURFACE AREA WITH MINOR SURFACE CORROSION AND NEGLIGIBLE SECTION LOSS, 10 PERCENT HAD FAILED WITH EXPOSED PRIMER UNDERNEATH, AND THE REMAINING PAINTED COATING WAS CHALKING.
3. BENT 3, NORTH TRUSS SLIDING BEARING WAS UNPAINTED AND HAD MODERATE CORROSION WITH PITTING UP TO 1/16 IN. DEEP. THE TOP PLATE WAS DISPLACED 1-3/8 IN. TO THE EAST (IN EXPANSION) IN RELATION UPPER FLANGE OF THE BEARING.
4. THE EXTERIOR FLANGE OF THE VERTICAL WAS BENT 1 IN. TO THE NORTH DUE TO IMPACT DAMAGE APPROXIMATELY 5 FT. ABOVE THE BRIDGE DECK.
5. THE INTERIOR FLANGE OF THE VERTICAL WAS BENT 1 IN. OVER A 6 IN. LENGTH DUE TO IMPACT DAMAGE.
6. THE INTERIOR FLANGE WAS BENT 1-3/8 IN. OVER A 24 IN. LENGTH DUE TO IMPACT DAMAGE.
7. THE EXTERIOR GUSSET PLATE HAD TWO MISDRILLED 3/4 IN. DIAMETER HOLES.
8. THE DIAGONAL HAD SEVEN AREAS OF IMPACT DAMAGE UP TO 3/4 IN. LONG AND 1/4 IN. OF DEFECTION SPACED OVER A 15 IN. LENGTH.

BRIDGE NUMBER L32101000+01001

FICKETT Structural Solutions
250 EAST WISCONSIN AVENUE
SUITE 1800
MILWAUKEE, WISCONSIN 53202
(414) 223.5775

FISH PROJECT NUMBER 16057

MONTANA
DEPARTMENT OF TRANSPORTATION

MDT Montana Department of Transportation

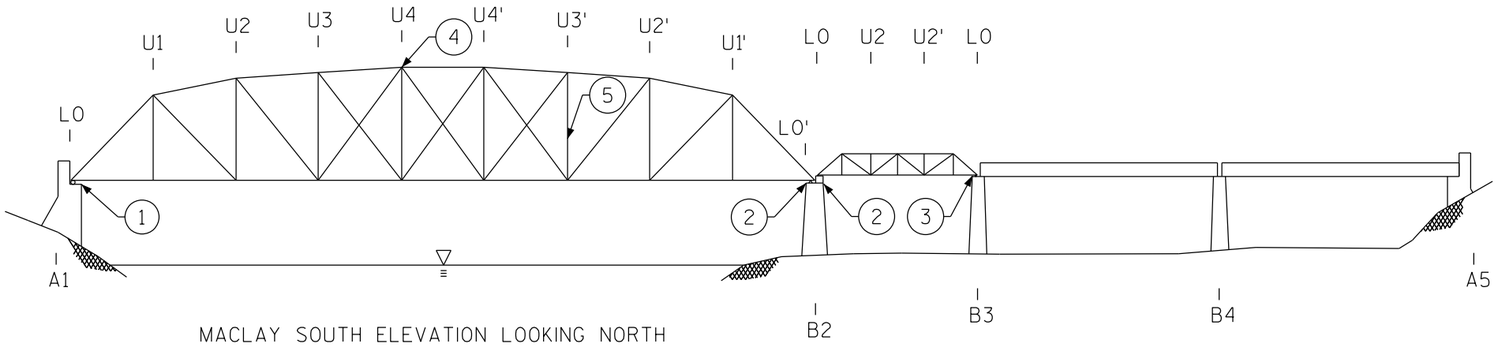
BY _____
BY _____ _____
CONSULTANT DESIGN ENGINEER DATE

DATE OF INSPECTION August 2017

SHEET DESCRIPTION
MACLAY NORTH ELEVATION VIEW

DRAWN BY	RYAN A SIEVERS		
REVIEWED BY	TODD DEMSKI		

STATE	BRIDGE NUMBER	SHEET NO.
MONTANA	L32101000+01001	1 OF 1



MACLAY SOUTH ELEVATION LOOKING NORTH

GENERAL NOTES:

a. APPROXIMATELY 5 PERCENT OF THE PAINTED COATING HAD FAILED ON THE VERTICALS, UPPER CHORD, AND DIAGONAL MEMBERS WITH MINOR SURFACE CORROSION AND NEGLIGIBLE SECTION LOSS, 5 PERCENT HAD FAILED WITH EXPOSED PRIMER UNDERNEATH, 5 PERCENT WAS CHALKING, AND THE REMAINING PAINTED COATING WAS IN GOOD CONDITION.

b. APPROXIMATELY 15 OF THE PAINTED COATING HAD FAILED ON THE LOWER CHORD WITH MODERATE CORROSION WITH NEGLIGIBLE SECTION LOSS, 25 PERCENT HAD FAILED WITH EXPOSED PRIMER UNDERNEATH, AND THE REMAINING PAINTED COATING WAS BUBBLING AND PEELING.

c. APPROXIMATELY 40 PERCENT OF THE PAINTED COATING ON THE BRACING HAD FAILED WITH MINOR SURFACE CORROSION AND NEGLIGIBLE SECTION LOSS. 40 PERCENT HAD FAILED WITH EXPOSED PRIMER UNDERNEATH, AND THE REMAINING PAINTED COATING WAS BUBBLING AND PEELING.

INSPECTION NOTES:

1. ABUTMENT 1, SOUTH TRUSS ROLLER BEARING HAD A FAILED PAINTED COATING ON APPROXIMATELY 25 PERCENT OF THE SURFACE AREA WITH MODERATE CORROSION AND PITTING UP TO 1/16 IN. TO THE STEEL UNDERNEATH, 10 PERCENT HAD FAILED WITH EXPOSED PRIMER UNDERNEATH, AND THE REMAINING PAINT WAS CHALKING. THE HEAVY CORROSION WAS UNDER THE ROLLERS AND ROLLER KEEPER. THE ROLLER KEEPER HAD SEVERED DUE TO HEAVY CORROSION AND THE NESTED ROLLER ASSEMBLY HAD FAILED. THE ROLLER KEEPER HAD BROKEN AWAY FROM THE BEARING DUE TO HEAVY CORROSION AND WAS PUSHED AGAINST THE ABUTMENT BACKWALL. ONLY HALF OF THE ROLLERS WERE STILL WITHIN THE BEARING BUT THEY WERE NOT FULLY IN CONTACT WITH THE BEARING PLATES. THE TOP PLATE WAS DISPLACED 1-1/2 IN. TO THE WEST (IN EXPANSION) IN RELATION TO THE BOTTOM PLATE.
2. THE SOUTH SPAN FIXED BEARINGS HAD A FAILED PAINTED COATING ON APPROXIMATELY 5 PERCENT OF THE SURFACE AREA WITH MINOR SURFACE CORROSION AND NEGLIGIBLE SECTION LOSS, 10 PERCENT HAD FAILED WITH EXPOSED PRIMER UNDERNEATH, AND THE REMAINING PAINTED COATING WAS CHALKING.
3. BENT 3, SOUTH TRUSS SLIDING BEARING WAS UNPAINTED AND HAD MODERATE CORROSION WITH PITTING UP TO 1/16 IN. DEEP. THE TOP PLATE WAS DISPLACED 1-3/4 IN. TO THE EAST (IN EXPANSION) IN RELATION UPPER FLANGE OF THE BEARING.
4. ONE BOLT WAS SHEARED OFF OF THE HORIZONTAL BRACE TO TOP CHORD CONNECTION PLATE.
5. THE LOWER, HORIZONTAL BRACING MEMBER WAS BENT 2 IN. TO THE EAST, AND UPWARD AND DOWNWARD 1 IN. DUE TO IMPACT DAMAGE.

BRIDGE NUMBER L32101000+01001

FICKETT Structural Solutions
250 EAST WISCONSIN AVENUE
SUITE 1800
MILWAUKEE, WISCONSIN 53202
(414) 223.5775

FISH PROJECT NUMBER 16057

MONTANA
DEPARTMENT OF TRANSPORTATION

MDT Montana Department of Transportation

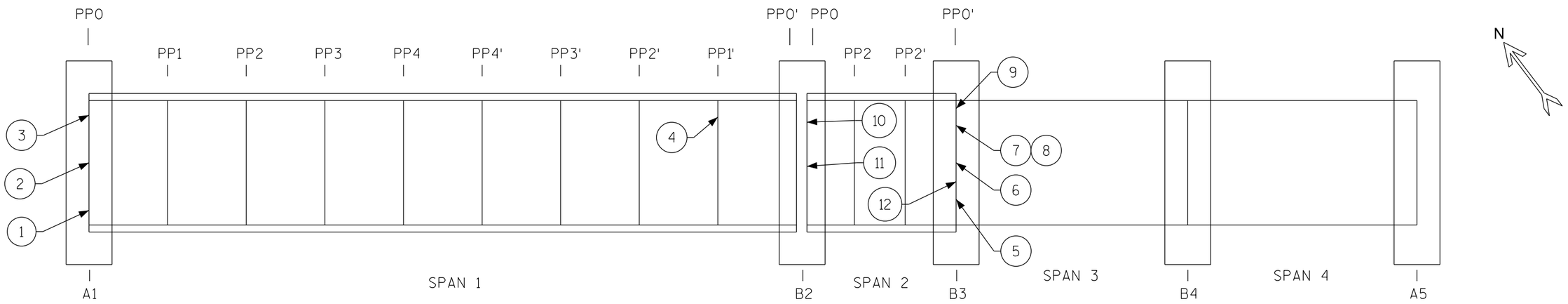
BY _____
BY _____ _____
CONSULTANT DESIGN ENGINEER DATE

DATE OF INSPECTION August 2017

SHEET DESCRIPTION
MACLAY SOUTH ELEVATION VIEW

DRAWN BY	RYAN A SIEVERS		
REVIEWED BY	TODD DEMSKI		

STATE	BRIDGE NUMBER	SHEET NO.
MONTANA	L32101000+01001	1 OF 1



CURRENT

FLOOR PLAN VIEW

GENERAL NOTES:

a. FLOOR BEAMS: APPROXIMATELY 40 PERCENT OF THE PAINTED COATING HAD FAILED WITH MINOR SURFACE CORROSION AND NEGLIGIBLE SECTION LOSS, 40 PERCENT HAD FAILED WITH EXPOSED PRIMER UNDERNEATH, AND THE REMAINING PAINTED COATING WAS BUBBLING AND PEELING.

b. STRINGERS: APPROXIMATELY 30 PERCENT OF THE PAINTED COATING ON THE STRINGERS THAT WERE PAINTED HAD FAILED WITH MODERATE CORROSION WITH UP TO 1/16 IN. THICK RUST SCALE, 15 PERCENT HAD FAILED WITH EXPOSED PRIMER UNDERNEATH, AND THE REMAINING PAINTED COATING WAS BUBBLING AND PEELING. THE 20 PERCENT OF THE STRINGERS THAT WERE LEFT UNPAINTED AND HAD MINOR TO MODERATE CORROSION WITH NEGLIGIBLE SECTION LOSS

INSPECTION NOTES:

1. STRINGER 7 ON ABUTMENT 1: THE STRINGER WEB HAD HEAVY CORROSION AND SECTION LOSS; 17 IN. LONG BY 2 IN. HIGH WITH A 1 IN. DIAMETER HOLE CENTERED 10 IN. FROM THE STRINGER END.
2. STRINGER 4 ON ABUTMENT 1: THE STRINGER WEB HAD HEAVY CORROSION AND UP TO 50 PERCENT SECTION LOSS; 10 IN. LONG BY 1 IN. HIGH HOLE ADJACENT TO THE STRINGER END.
3. STRINGER 2 ON ABUTMENT 1: THE STRINGER WEB HAD HEAVY CORROSION AND SECTION LOSS; 14 IN. LONG BY 2 IN. HIGH WITH A 2 IN. LONG BY 1/2 IN. HIGH HOLE CENTERED 2 IN. FROM THE STRINGER END.

INSPECTION NOTES:

4. THE BOTTOM WEST FLANGE OF FLOOR BEAM 1' ON SPAN 1 HAD BENT UPWARDS 1/2 IN. OVER A 6 IN. LENGTH APPROXIMATELY 16 IN. FROM THE NORTH END.
5. STRINGER 8 ON BENT 3: THE STRINGER WEB HAD HEAVY CORROSION AND SECTION LOSS WITH THREE HOLES RANGING IN SIZE FROM 1/4 IN. TO 1/2 IN. IN DIAMETER LOCATED AT THE WEB TO LOWER FLANGE INTERFACE AT THE STRINGER END.
6. STRINGER 7 ON BENT 3: THE STRINGER WEB HAD HEAVY CORROSION AND UP TO 50 PERCENT SECTION LOSS; 6 IN. LONG BY 2 IN. HIGH ADJACENT TO THE STRINGER END AND HAD A 1/2 IN. DIAMETER HOLE LOCATED 6 IN. FROM THE STRINGER END.
7. STRINGER 4 ON BENT 3: THE STRINGER WEB HAD HEAVY CORROSION AND SECTION LOSS WITH A 5 IN. LONG BY 1 IN. HIGH HOLE NEAR THE STRINGER END. THE BOTTOM FLANGE WAS KNIFE-EDGED IN THIS AREA.
8. STRINGER 4 ON BENT 3: A GAP WAS NOTED BETWEEN THE BOTTOM FLANGE AND THE SUPPORTING BEARING SEAT OF THE BENT. SIGNIFICANT MOVEMENT WAS OBSERVED WHEN TRAFFIC PASSED OVER THIS AREA (GAP CLOSES WITH PASSING TRAFFIC).
9. STRINGER 2 ON BENT 3: THE STRINGER WEB HAD HEAVY CORROSION AND UP TO 1/8 IN. THICK RUST SCALE ON BOTH SIDES OF THE STRINGER WEB AT THE WEB TO BOTTOM FLANGE INTERFACE ADJACENT TO THE STRINGER END.
10. STRINGER 2 ON EAST SIDE OF BENT 2 (PONY TRUSS): THE STRINGER WEB HAD HEAVY CORROSION AND SECTION LOSS WITH TWO HOLES; 7 IN. LONG BY 1 IN. HIGH HOLE AND A 6 IN. LONG BY 2 IN. HIGH HOLE CENTERED 16 IN. FROM THE STRINGER END.
11. STRINGER 5 ON EAST SIDE OF BENT 2 (PONY TRUSS): THE SOUTH FACE HAD A 16 IN. LONG BY 2 IN. TALL AREA OF PACK RUST UP TO 1/4 IN. THICK ON THE BOTTOM OF THE WEB LOCATED 12 IN. FROM THE END OF THE STRINGER.
12. BENT 3, SPAN 2: THE HOLLOW PIPE THAT THE STRINGERS WERE BEARING ON HAD MOVEMENT UP TO 1/4 IN. WHEN VEHICLES PASSED. THE SOUTH ANCHOR ROD FOR THE SOUTH PIPE HAD FAILED AND THIS EDGE OF THE PIPE HAD MOVEMENT UP TO 1/2 IN. WHEN VEHICLES PASSED.

BRIDGE NUMBER L32101000+01001

FICKETT Structural Solutions
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(414) 223.5775

FISH PROJECT NUMBER 16057

MONTANA
DEPARTMENT OF TRANSPORTATION

MDT Montana Department of Transportation

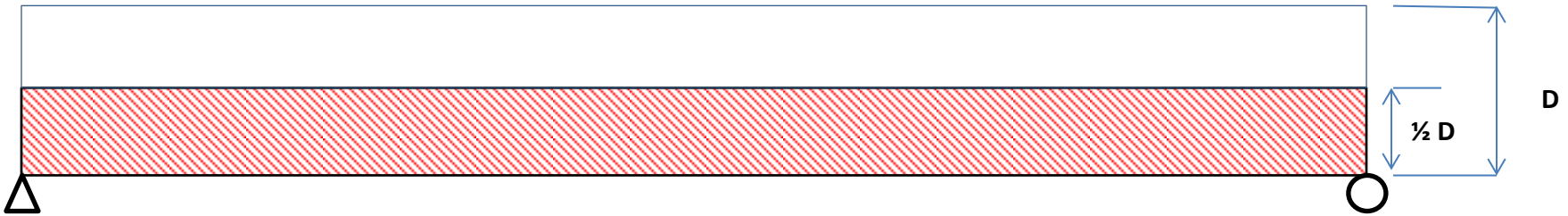
BY _____
BY _____ _____
CONSULTANT DESIGN ENGINEER DATE

DATE OF INSPECTION August 2017

SHEET DESCRIPTION
MACLAY FLOOR SYSTEM

DRAWN BY	RYAN A SIEVERS		
REVIEWED BY	TODD DEMSKI		

Solid Floor Beam: Span 1- 1



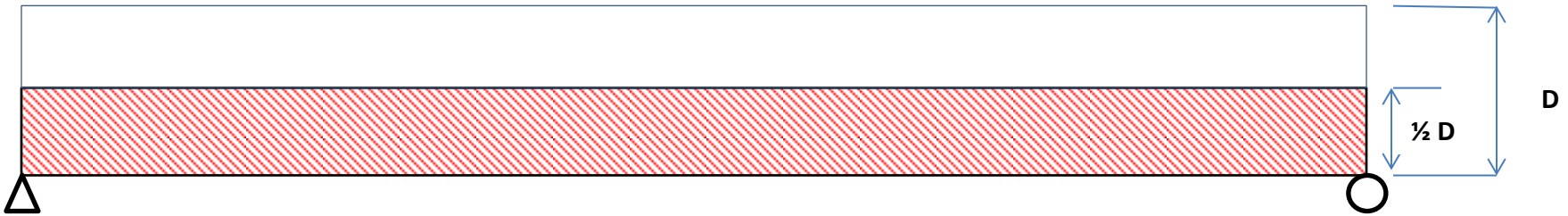
Consider the fracture critical portion of the floor beam as the lower half of the beam depth, the portion below the neutral axis that is in tension. Use separate forms for each member. Note any defects and label the defect accordingly. Make sure and note that a defect is Near Face (NF), Far Face (FF) or Both Faces (BF). All notations will be recorded looking ahead on line. Use this drawing for trusses or two girders system bridges with solid rolled or built up section floor beams.

Inspection Comments:
Approximately 40 percent of the painted coating on the floor beams had failed with minor surface corrosion and negligible section loss, 40 percent had failed with exposed primer underneath, and the remaining painted coating was bubbling and peeling.

Previous Inspection Comments:

Unknown

Solid Floor Beam: Span 1- 2



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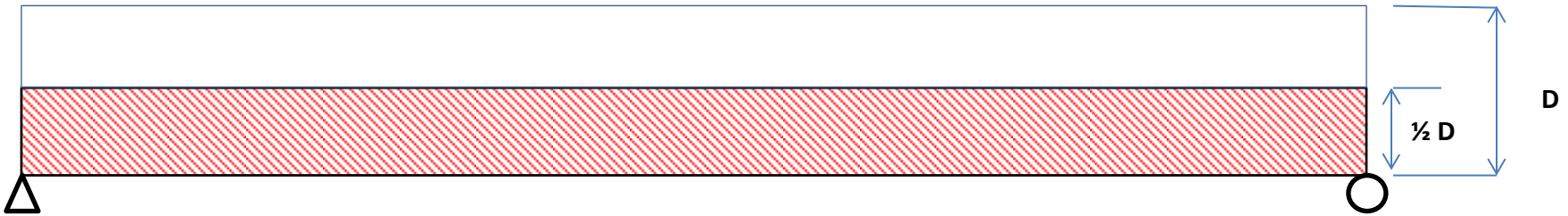
Previous Inspection Comments:

Unknown

Solid Floor Beam: Span 1- 3



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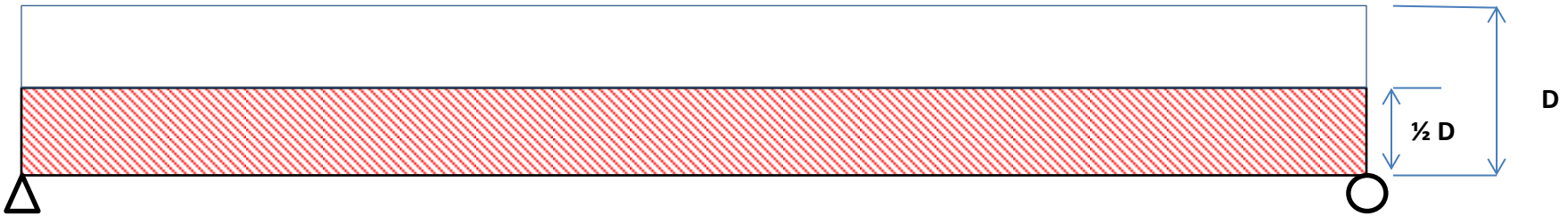
Inspection Comments:
Approximately 40 percent of the painted coating on the floor beams had failed with minor surface corrosion and negligible section loss, 40 percent had failed with exposed primer underneath, and the remaining painted coating was bubbling and peeling.

Previous Inspection Comments:

Unknown

Solid Floor Beam: Span 1- 4



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Inspection Comments:
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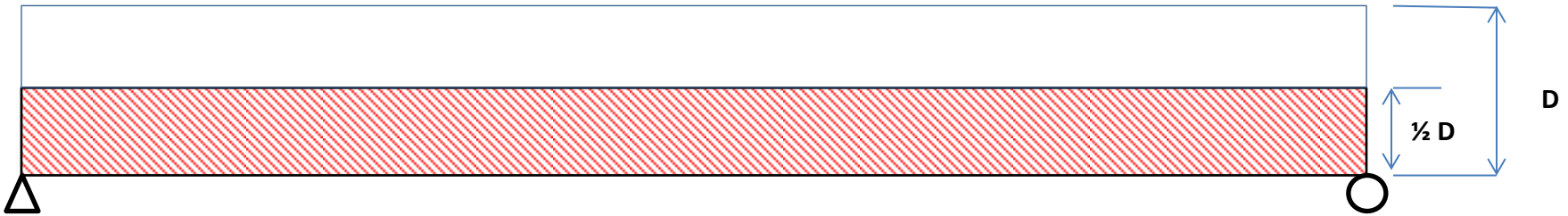
Previous Inspection Comments:

Unknown

Solid Floor Beam: Span 1- 4’



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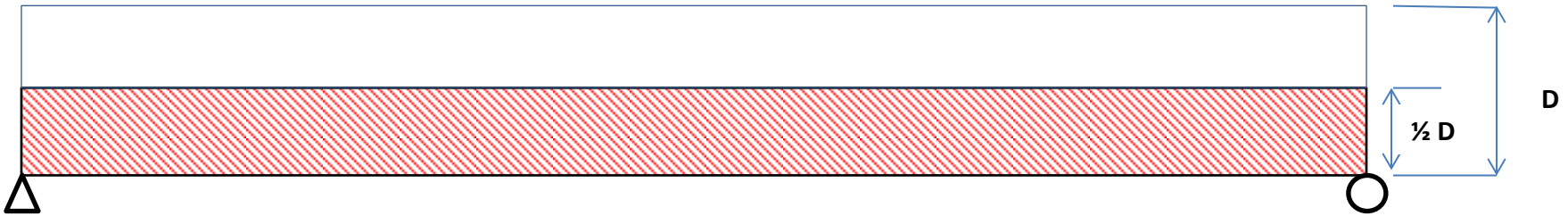
Inspection Comments:
Approximately 40 percent of the painted coating on the floor beams had failed with minor surface corrosion and negligible section loss, 40 percent had failed with exposed primer underneath, and the remaining painted coating was bubbling and peeling.

Previous Inspection Comments:

Unknown

Solid Floor Beam: Span 1- 3’



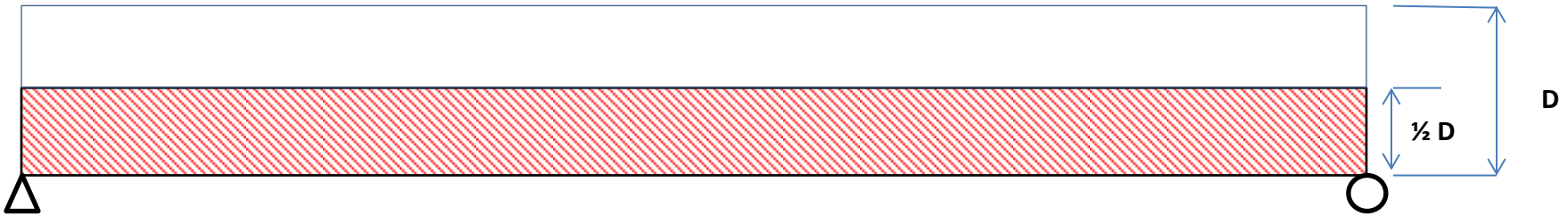
Consider the fracture critical portion of the floor beam as the lower half of the beam depth, the portion below the neutral axis that is in tension. Use separate forms for each member. Note any defects and label the defect accordingly. Make sure and note that a defect is Near Face (NF), Far Face (FF) or Both Faces (BF). All notations will be recorded looking ahead on line. Use this drawing for trusses or two girders system bridges with solid rolled or built up section floor beams.

Inspection Comments:
Approximately 40 percent of the painted coating on the floor beams had failed with minor surface corrosion and negligible section loss, 40 percent had failed with exposed primer underneath, and the remaining painted coating was bubbling and peeling.

Previous Inspection Comments:

Unknown

Solid Floor Beam: Span 1- 2’



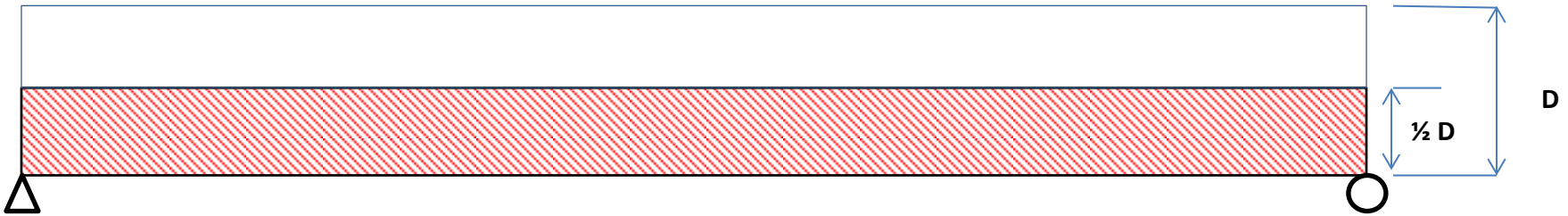
Consider the fracture critical portion of the floor beam as the lower half of the beam depth, the portion below the neutral axis that is in tension. Use separate forms for each member. Note any defects and label the defect accordingly. Make sure and note that a defect is Near Face (NF), Far Face (FF) or Both Faces (BF). All notations will be recorded looking ahead on line. Use this drawing for trusses or two girders system bridges with solid rolled or built up section floor beams.

Inspection Comments:
Approximately 40 percent of the painted coating on the floor beams had failed with minor surface corrosion and negligible section loss, 40 percent had failed with exposed primer underneath, and the remaining painted coating was bubbling and peeling.

Previous Inspection Comments:

Unknown

Solid Floor Beam: Span 1- 1’



Consider the fracture critical portion of the floor beam as the lower half of the beam depth, the portion below the neutral axis that is in tension. Use separate forms for each member. Note any defects and label the defect accordingly. Make sure and note that a defect is Near Face (NF), Far Face (FF) or Both Faces (BF). All notations will be recorded looking ahead on line. Use this drawing for trusses or two girders system bridges with solid rolled or built up section floor beams.

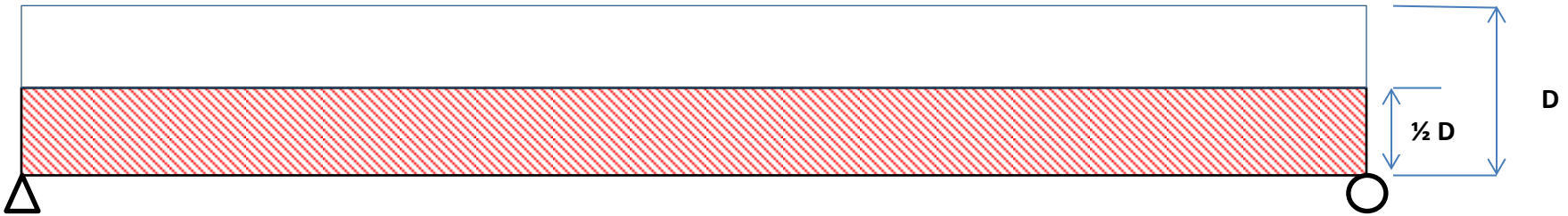
Inspection Comments:
Approximately 40 percent of the painted coating on the floor beams had failed with minor surface corrosion and negligible section loss, 40 percent had failed with exposed primer underneath, and the remaining painted coating was bubbling and peeling.

The bottom west flange of Floor Beam 1’ on Span 1 had bent upwards 1/2 in. over a 6 in. length approximately 16 in. from the north end.

Previous Inspection Comments:

Unknown

Solid Floor Beam: Span 2 - 2



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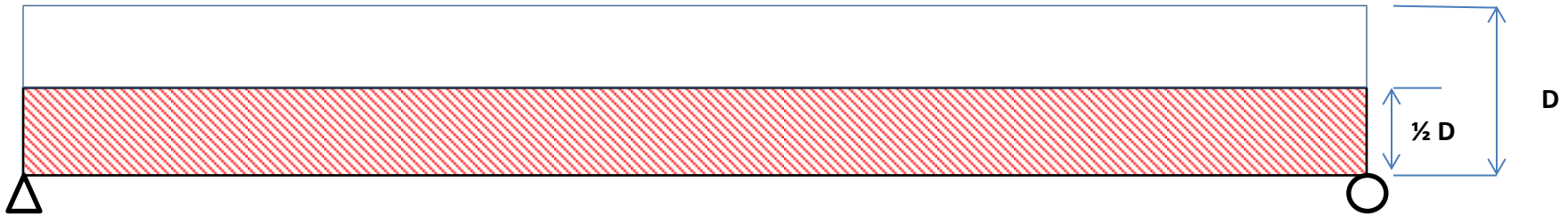
Inspection Comments:
Approximately 40 percent of the painted coating on the floor beams had failed with minor surface corrosion and negligible section loss, 40 percent had failed with exposed primer underneath, and the remaining painted coating was bubbling and peeling.

Previous Inspection Comments:

Unknown

Solid Floor Beam: Span 2 – 2'



Consider the fracture critical portion of the floor beam as the lower half of the beam depth, the portion below the neutral axis that is in tension. Use separate forms for each member. Note any defects and label the defect accordingly. Make sure and note that a defect is Near Face (NF), Far Face (FF) or Both Faces (BF). All notations will be recorded looking ahead on line. Use this drawing for trusses or two girders system bridges with solid rolled or built up section floor beams.

Inspection Comments:
Approximately 40 percent of the painted coating on the floor beams had failed with minor surface corrosion and negligible section loss, 40 percent had failed with exposed primer underneath, and the remaining painted coating was bubbling and peeling.

Previous Inspection Comments:

Unknown

APPENDIX D: DEFECT PHOTOS

Photo 18: Minor wear to West Approach. Similar condition on East Approach

Photo 19: West Approach within 5 ft. of bridge deck had section of cold patch in good condition

Photo 20: 1/4 in. wide transverse crack located 18 ft. from the West Transition

Photo 21: 1/2 in. wide transverse crack located 4 ft. from the East Transition

Photo 22: Typical minor wear on Span 1 bituminous overlay

Photo 23: Typical minor wear on Span 1 bituminous overlay

Photo 24: End 6 ft. at the West Transition had cold patch with minor wear and hairline map cracking

Photo 25: Typical 1/8 in. wide transverse crack located above each floor beam

Photo 26: Transverse crack up to 1/2 in. wide over Bent 4

Photo 27: Transverse crack up to 1/2 in. wide over Abutment 5

Photo 28: Typical underside of Span 1 deck; Note burn through holes in corrugated steel

Photo 29: Typical underside of Span 3 deck

Photo 30: The North Curb on Span 4 had section loss up to 1-1/2 in. on the top and interior faces with no exposed reinforcing steel

Photo 31: The North Curb had section loss up to 5 in. with exposed longitudinal and stirrup reinforcing steel for 4 ft. over Bent 4

Photo 32: Bridge rail for Spans 1 and 2

Photo 33: The vertical angle on the South Rail between Panel Point 4’ and 3’ was bent 1-1/2 in. over a 2 ft. length due to impact damage

Photo 34: North Rail, Panel Point 1': The bottom angle was bent 3/4 in. upwards

Photo 35: Bridge rail for Spans 3 and 4

Photo 36: Three vertical members had impact damage that bent the interior flange 3/4 in. over a 6 in. length on the North Rail near the East Approach

Photo 37: Typical minor wear on Span 2 bituminous overlay

Photo 38: Joint 1 over Abutment 1 looking north at joint

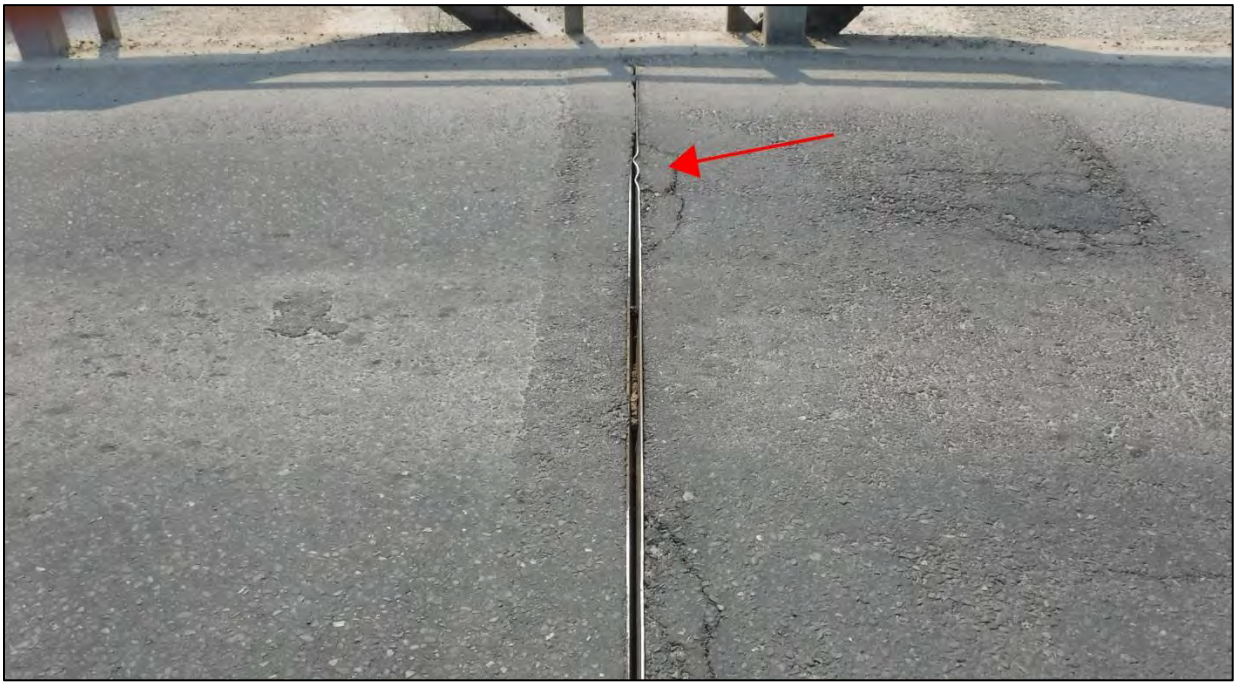


Photo 39: Joint 2 over Bent 2 with area of 3/4 in. bends in the steel plates

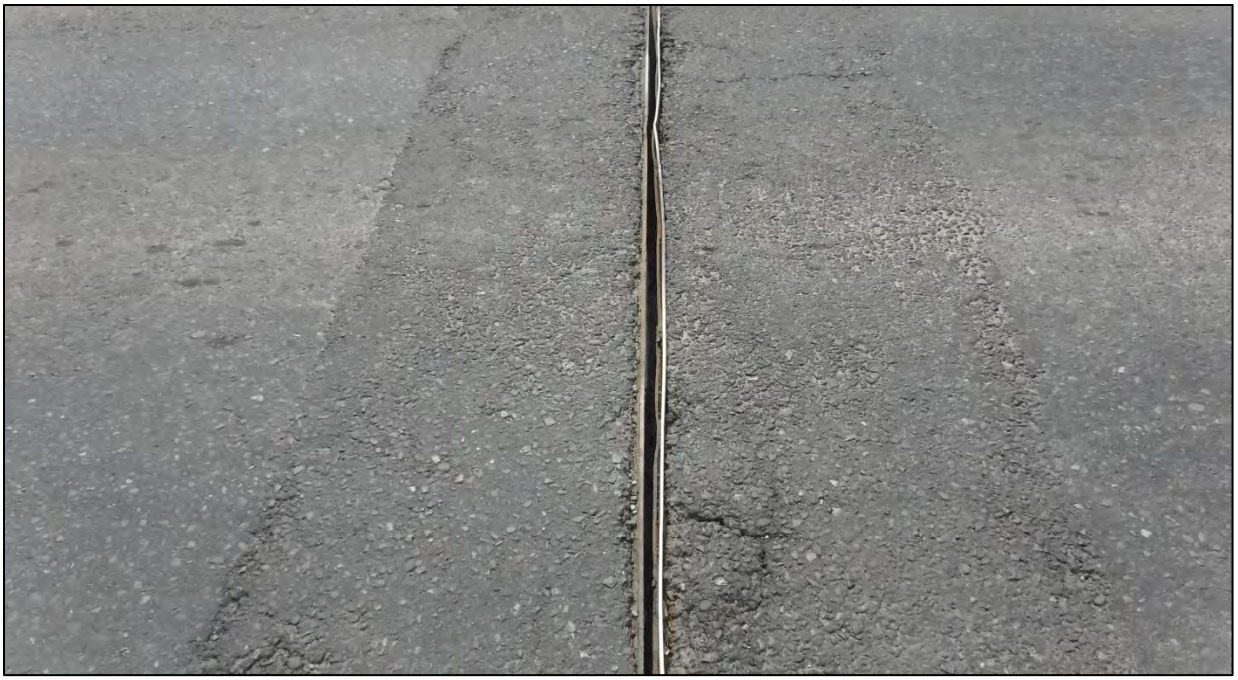


Photo 40: Joint 3 over Bent 3

Photo 41: Joint 3 over Bent 3 with seal deterioration which was typical over 90 percent of the length

Photo 42: Joint 3 over Bent 3 with separation from the Span 2 deck over a 4 ft. length

Photo 43: The bottom west flange of Floor Beam 1' on Span 1 had bent upwards 1/2 in. over a 6 in. length approximately 16 in. from the north end

Photo 44: Typical unpainted stringers with minor to moderate corrosion and negligible section loss

Photo 45: Span 1, Abutment 1, Stringer 2: the stringer web had heavy corrosion and section loss over a 17 in. long by 2 in. high area with a 1 in. diameter hole center 10 in. from the stringer end

Photo 46: Span 1, Abutment 1, Stringer 5: the stringer web had heavy corrosion and up to 50 percent section loss over a 10 in. long by 1 in. high hole adjacent to the stringer end

Photo 47: Span 1, Abutment 1, Stringer 7: the stringer web had heavy corrosion and section loss over a 14 in. long by 2 in. high area with a 2 in. long by 1/2 in. high hole center 2 in. from the stringer end

Photo 48: Span 2, Bent 2, Stringer 2: the stringer web had heavy corrosion and section loss with two holes; 7 in. long by 1 in. high and 6 in. long by 2 in. high centered 16 in. from the stringer end

Photo 49: Span 2, Bent 2, Stringer 5: the south face had a 16 in. long by 2 in. tall area of pack rust up to 1/4 in. thick on the bottom of the web located 12 in. from the end of the stringer

Photo 50: Span 2, Bent 3, All Stringers: the hollow pipe that the stringers were bearing on had vertical movement up to 1/4 in. when vehicles passed. The south anchor rod for the south pipe had failed and this edge of the pipe had movement up to 1/2 in. when vehicles passed

Photo 51: Span 2, Bent 3, Stringer 2: the stringer web had heavy corrosion with up to 1/8 in. thick rust scale on both sides of the stringer web at the web to lower flange interface adjacent to the stringer end

Photo 52: Span 2, Bent 3, Stringer 4: the stringer web had heavy corrosion and section loss with a 5 in. long by 1 in. high through hole near the stringer end. The bottom flange was knife edges in this area

Photo 53: Span 2, Bent 3, Stringer 7: the stringer web had heavy corrosion with up to 50 percent section loss over a 6 in. long by 2 in. high adjacent to the stringer end that had a 1/2 in. diameter hole 6 in. from the stringer end at the web to lower flange interface

Photo 54: Span 2, Bent 3, Stringer 8: the stringer web had heavy corrosion and section loss with three through holes ranging in size from 1/4 in. to 1/2 in. in diameter located at the web to lower flange interface at the stringer end

Photo 55: Abutment 1 had one full height, vertical up to 1/8 in. wide in the middle of the abutment

Photo 56: Bent 2 with areas of spalling on the edge of a delamination with 1 in. of penetration and no exposed reinforcing steel

Photo 57: Bent 3 had a 12 in. wide by 10 in. high area of delamination on the top, southeast corner of the bent

Photo 58: Bent 3 had a 5 ft. long horizontal crack up to 1/16 in. wide was located near the bottom, northeast corner

Photo 59: Bent 4 had a 3 ft. wide by 2 ft. high spall with exposed reinforcing steel on the west face of the bent cap. The exposed reinforcing steel had moderate corrosion with negligible section loss

Photo 60: Abutment 1, North Truss roller bearing

Photo 61: Abutment 1, North Truss roller bearing with heavy corrosion and section loss to the anchor rods

Photo 62: Abutment 1, North Truss roller bearing with two of the rollers severed and displaced from underneath the roller keepers

Photo 63: Abutment 1, South Truss roller bearing

Photo 64: Abutment 1, South Truss roller bearing with the rollers and roller keeper protruding out from underneath the bearing and resting against the abutment backwall

Photo 65: Bent 2, North Truss, Span 1 fixed bearing

Photo 66: Bent 2, South Truss, Span 1 fixed bearing

Photo 67: Bent 2, North Truss, Span 2 fixed bearing

Photo 68: Bent 2, South Truss, Span 2 fixed bearing

Photo 69: Bent 3, North Truss, Span 2 slider bearing

Photo 70: Bent 3, South Truss, Span 2 slider bearing

Photo 71: Span 1, North Truss, Vertical U1-L1: the exterior flange of the vertical was bent 1 in. to the north due to impact damage approximately 5 ft. above the bridge deck

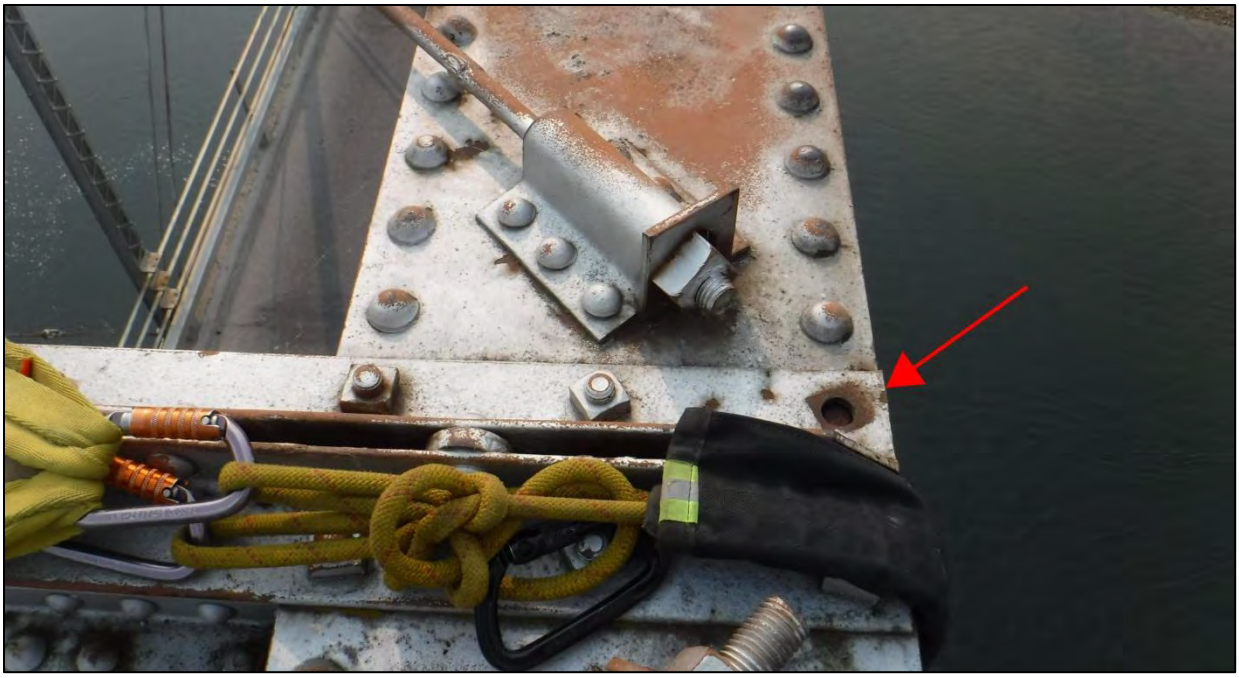


Photo 72: Span 1, South Truss, Top Chord at U4: one bolt was sheared off on the horizontal brace to top chord connection plate

Photo 73: Span 2, North Truss, Vertical L2'-U2': the interior flange of the vertical was bent 1 in. over a 6 in. length due to impact damage

Photo 74: Span 2, North Truss, Diagonal L2'-U1': the interior flange was bent 1-3/8 in. over a 24 in. length due to impact damage

Photo 75: Span 2, North Truss, Gusset Plate U1': the exterior gusset plate had two misdrilled 3/4 in. diameter holes

Photo 76: Span 2, North Truss, Diagonal L0'-U1': the diagonal had seven areas of impact damage up to 3/4 in. long and 1/4 in. of defection spaced over a 15 in. length

Photo 77: Panel Point 3': the lower, horizontal bracing member was bent 2 in. to the east, and bent upward and downward 1 in. due to impact damage