PHYSICAL CONDITION REPORT

FOR THE 2022 ROUTINE ELEMENT LEVEL AND FRACTURE CRITICAL INSPECTION

SR 7 OVER SYMMES CREEK

BR#: LAW-7-02.40
SFN: 4400038
Lawrence County, OH

PREPARED FOR:

OHIO DEPARTMENT OF TRANSPORTATION
District 9
PID#: 115920

Inspected: September 27 through September 29, 2022
Report: December 19, 2022

OHIO DEPARTMENT OF TRANSPORTATION

STRINTEG

(THIS PAGE INTENTIONALLY LEFT BLANK)

2022 ROUTINE LEVEL & FRACTURE CRITICAL INSPECTION PHYISCAL CONDITION REPORT

of the

SR 7 OVER SYMMES CREEK
BRIDGE NO. LAW-7-02.40
SFN: 4400038

LAWRENCE COUNTY, OHIO

Prepared by:

Nicholas Fisco, PE _____
Ohio PE#: 77409

Reviewed by:

Donald Cartwright, PE _____
Ohio PE#: 78426

Inspected on:

September 27-29, 2022

Inspected by:

Donald Cartwright, PE
Nicholas Fisco, PE
Anthony Koloze, PE
Molly Capistrant, EI

Prepared for:

OHIO DEPARTMENT OF TRANSPORTATION
DISTRICT 9

PID No. 115920

Report Submitted December 19, 2022

Strinteg Corporation
7700 Hub Parkway
Suite 1
Valley View, OH 44125

TABLE OF CONTENTS

TABLE OF CONTENTS

BRIDGE DESCRIPTION

The LAW-7-02.40 Bridge is a two-lane, four-span, 348'-8" long structure that carries one lane of State Route 7 in each direction over Symmes Creek in Chesapeake, Ohio. The bridge was originally constructed in 1933 and is comprised of a 162'-0" long Parker through truss main span in Span 2, 63'-0" long simply supported rolled steel multi-beam spans in Spans 1 and 3, and a simply supported rolled steel multi-beam span in Span 4 that varies in length from 15'-0" to 47'-8 1/2". The reinforced concrete bridge deck measures 34'-0" curb-to-curb and is flanked by 7'-3" wide sidewalks on either side. Spans 1 through 3 are original to the structure, while Span 4 was added at an unknown date prior to 1990. When Span 4 was added, a new forward abutment and forward approach slab were constructed and the original forward abutment was modified and repurposed as Pier 3. In 1990, the bridge underwent a rehabilitation which included the removal and replacement of the existing non-composite reinforced concrete deck with a composite reinforced concrete deck, traffic railing replacement, heat straightening of select truss members, raising of the truss portals to increase vertical clearance, replacement of the concrete beams in Span 4 with steel beams, partial removal and reconstruction of the abutments, approach slab replacement, and other miscellaneous repairs. The bridge was last painted in 1993 and an epoxy overlay was added to the deck and sidewalks at an unknown date.

LOCATION MAP

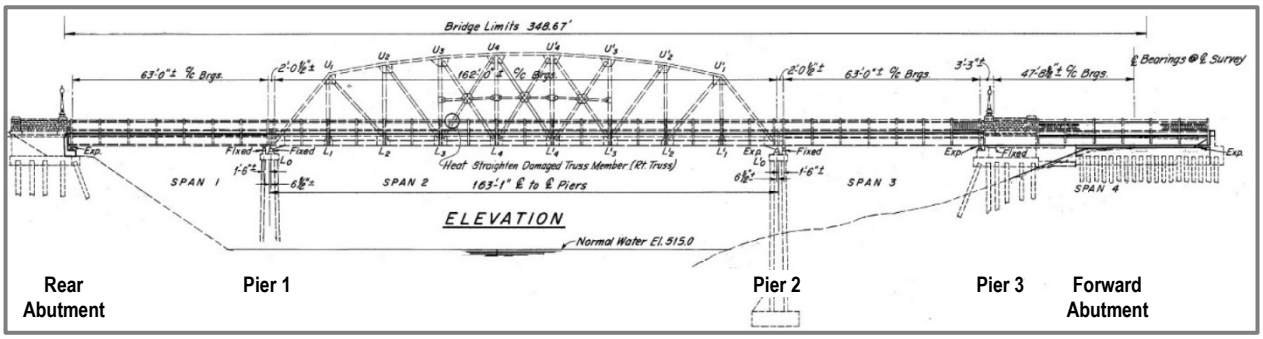

Figure 1 – LAW-7-02.40 South Elevation

The truss upper chords and end posts are comprised of riveted, built-up box sections composed of rolled channels with top cover plates and bottom lacing bars, and the truss lower chords are comprised of riveted web plates with intermittent internal angle and plate diaphragms. The truss verticals, diagonals, and mid-height horizontal struts are comprised of rolled 12" wide flange members of various size. Riveted gusset plates connect the truss members at each panel point. At the truss lower chord panel points, rolled steel 36" wide flange floorbeams frame into the inboard faces with riveted connection angles and riveted, built-up tapered steel cantilevers frame in the outboard faces with riveted connection angles and two 1" diameter bolt top flange tie rods. Eight rolled steel W18x47 stringers support the roadway deck and frame into the floorbeams with riveted connection angles on the webs and a riveted seat angle on the bottom flange, while the sidewalks on either side are supported by rolled steel W12x32 stringers that are riveted to the top flange of the floorbeam cantilevers. The upper and lower lateral bracing on the truss is comprised of angle sections and 1" diameter rods, respectively, and upper struts are comprised of rolled steel 10" wide flange sections.

All structure nomenclature is per the previous reports and in accordance with current ODOT standards. The substructure units are numbered from west to east, starting with the Rear Abutment, continuing with Piers 1, 2, and 3, and ending with the Forward Abutment. Similarly, the spans (1 to 4) and truss panel points and floorbeams (0 to 9) are numbered from west to east. The trusses are numbered from north (Left Truss) to south (Right Truss). Similarly, the beams and stringers are numbered from north to south. In Spans 1 through 3, the roadway stringers are numbered Stringer/Beam 1 to Stringer/Beam 8 and Sidewalk Stringer/Beam 1 to Stringer/Beam 4, with Sidewalk Stringers/Beams 1 and 2 being on the north side of the bridge centerline and Sidewalk Stringers/Beams 3 and 4 being on the south side. In Span 4, the stringers are numbered 1 through 9. While State Route 7 is globally a south to north route, for the purposes of this report the travel lanes will be referenced as westbound (global southbound) and eastbound (global northbound) due to the orientation of the roadway and bridge at this location.

INSPECTION PROCEDURE

Personnel from Strinteg Corporation performed a routine element level and fracture critical member inspection of the structure on September 27 through 29, 2022. Access to the structure was gained using industrial rope access techniques, protected climbing techniques, and from the ground **(See Photo 1)**. Traffic control was not required; however, advance warning signs were placed on both approaches and cones were placed on the sidewalks.

Photo 1 – Rope access inspection of Span 2 truss framing.

A hands-on inspection was performed on the fracture critical members in the truss span (Span 2). These members include the lower chords, diagonals, select verticals, gusset plates, and floorbeams. **See Appendix A** for the Fracture Critical Plan and Fatigue Detail Table.

Inspection findings were recorded on bridge specific field inspection forms and field sketches were created to document specific conditions. Inspection equipment utilized during the inspection included: chipping hammers, calipers, scrapers, wire brushes, measuring tapes, flashlights, markers, and pit gauges. Non-destructive testing was performed on the end floorbeams utilizing grinders to remove paint and rust and magnetic particle kits to determine crack limits. Color digital photographs were taken of the fatigue prone details, areas of deterioration, condition changes, and any immediate maintenance needs, as necessary. To make tracking conditions easier, significant changes from the previous inspection have been made red in this report.

INSPECTION TEAM

The inspection was led by a qualified bridge inspection team leader as set forth by the Federal Highway Administration (FHWA) and the National Bridge Inspection Standards (NBIS). In addition, this team leader has completed the Occupational Safety and Health Administration (OSHA) 10-hour Construction Safety and Health course and all training required by the FHWA through the National Highway Institute (NHI) which includes Safety Inspection of In-Service Bridges (Course No. 130055) and Fracture Critical Inspection Techniques for Steel Bridges (Course No. 130078).

The inspection team members were as follows:

- Donald Cartwright, PE, SPRAT III (Team Leader)
- Anthony Koloze, PE, SPRAT II
- Nicholas Fisco, PE, SPRAT II
- Molly Capistrant, EI

CONDITION RATING

National Bridge Inspection Standards (NBIS) are federal regulations that set the national standard for the proper safety inspection and evaluation of all highway bridges. The NBIS applies to all structures defined as highway bridges located on all public roads. State and federal guidelines for evaluating the condition of bridges were developed to promote uniformity in the inspections performed by different teams and at different times. Condition ratings are used to describe the existing, in-place bridge as compared to the as-built condition. The following table was used as a guide in evaluating the condition of the various members of the bridge.

SUMMARY ITEMS (NBIS)	CONDITION	DEFECTS
9	Excellent	Excellent condition.
8	Very Good	No problems noted.
7	Good	Some minor problems.
6	Satisfactory	Structural elements show some minor deterioration.
5	Fair	All primary structural elements are sound but may have minor section loss, cracking, spalling or scour.
4	Poor	Advanced section loss, deterioration, spalling or scour.
3	Serious	Loss of section, deterioration, spalling or scour have seriously affected primary structural components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present.
2	Critical	Advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.
1	"Imminent" Failure	Major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic but corrective action may put it back in light service.
0	Failed	Out of service - beyond corrective action.

The inspection of this bridge was performed in accordance with the following documents:

1. *Manual of Bridge Inspection*, Ohio Department of Transportation (ODOT), 2014 (rev 2021).
2. *The Manual for Bridge Evaluation*, AASHTO, 3rd Edition, 2018 (rev 2020).
3. *Manual for Bridge Element Inspection*, AASHTO, 2nd Edition, 2019.
4. *Bridge Inspector's Reference Manual*, U.S. Department of Transportation, 2002 (rev 2012).
5. *Inspection of Fracture Critical Bridge Members*, U.S. Department of Transportation, 1986.
6. *National Bridge Inspection Standards*, U.S. Department of Transportation, 2004.
7. *Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges*, Federal Highway Administration, 1995 with Latest Revisions.

INSPECTION SUMMARY

EXECUTIVE SUMMARY

The LAW-7-02.40 Bridge is in FAIR CONDITION [5-NBIS] overall. This overall condition is driven by cracks in the end floorbeams of the truss in Span 2 that have propagated up to 1/4" from the previous measurements, pack rust and section loss to primary truss members that is beginning to reactivate, and spalling with exposed reinforcement in the substructure units. A noteworthy change from the previous inspection is the fire damage in Span 4 where fires below the bridge have resulted in extensive soot staining throughout the span, fully covering Beams 1 through 5 and the adjacent underside of deck. The beams do not exhibit any signs of associated distress, and the deck is sound. This is a new condition that occurred sometime after the 2020 inspection.

ITEM 58 – DECK SUMMARY

The reinforced concrete deck is in FAIR CONDITION [5-NBIS] overall. Hairline to 1/32" wide map cracking and transverse cracks with moderate efflorescence are typical on the deck underside. The epoxy wearing surface has moderate to heavy wear in the wheel lines with isolated locations where the overlay is completely worn away exposing the concrete deck. The exposed areas of the deck surface in these locations have hairline to 1/32" wide map cracking.

ELEMENT 12 – REINFORCED CONCRETE DECK

The reinforced concrete deck top surface is covered with an epoxy overlay; however, in some locations, the wearing surface has completely worn away exposing the deck top surface. In these locations, the deck top surface has hairline to 1/32" wide map cracking spaced at 2' to 3' **(See Photo 2)**. The deck underside in Span 2 exhibits hairline to 1/32" wide map cracking spaced as close as 12", transverse hairline cracks with minor to moderate efflorescence and isolated leakage spaced at 2', and isolated longitudinal hairline cracks with minor to moderate efflorescence **(See Photo 3)**. In Spans 1, 3, and 4, the deck underside has transverse hairline cracks with minor to moderate efflorescence spaced at 2' and isolated longitudinal hairline cracks with minor to moderate efflorescence.

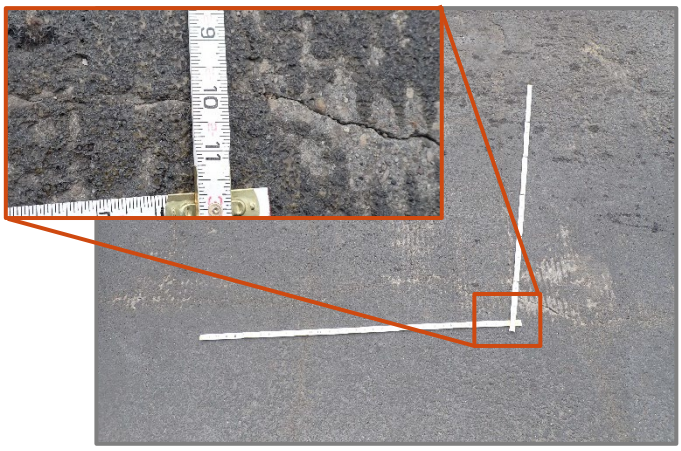

Photo 2 – Map cracking up to 1/32" wide spaced at 2' in top surface of the deck in the westbound lane in Span 1, looking south.

Photo 3 – Hairline to 1/32" wide map cracking spaced at 12" and transverse crack with minor efflorescence in the underside of deck between Stringers 3 and 4 in Bay 3 of Span 2, looking northeast.

In Span 2, there is a 14" long by 4" wide by 2 1/2" high corner spall in the south edge of deck between Floorbeams 2 and 3.

ELEMENT 510 – WEARING SURFACE

The 1/4" thick epoxy overlay on the concrete deck has moderate to heavy wear in the wheel lines. There are isolated locations throughout the bridge where the overlay is completely worn away exposing the concrete deck top surface. This condition is worst in the eastbound lane of Span 4 where there are large areas of completely worn wearing surface up to 6' long by 2' wide **(See Photo 4)**.

Photo 4 – Up to 6' long by 2' wide area of completely worn wearing surface in the eastbound lane of Span 4, looking northeast.

ELEMENT 300 – STRIP SEAL EXPANSION JOINT

Strip seal type expansion joints are present above each substructure unit on the bridge. The joints have moderate to heavy accumulation of loose debris, typically worst in the shoulders, minor plow damage, and moderate laminate corrosion with up to 1/16" deep section loss to top surface of the joint armor **(See Photo 5)**. Vertical misalignments between joint armor sections on either side of the joint up to 1 1/4" were noted at all joint locations **(See Photo 6)**. See **Table 1** below for measurements at each joint location.

Photo 5 – Expansion joint over Pier 2 with heavy debris accumulation, laminate corrosion, plow damage, and approximately 1' long section of missing joint seal at roadway centerline, looking north.

Location	Vertical Misalignment	Rear/Forward Side Higher
Rear Abutment	1/4"	Rear
Pier 1	3/8"	Rear
Pier 2	1 1/4"	Forward
Pier 3	3/4"	Forward
Forward Abutment	3/4"	Forward

Table 1 – Roadway expansion joint vertical misalignment measurements

There is an approximately 1' long section of missing joint seal at the roadway centerline of the joint over Pier 2 and two areas up to 4" long of bulging/debonded joint seal in the eastbound lane over the Forward Abutment **(See Photo 5)**.

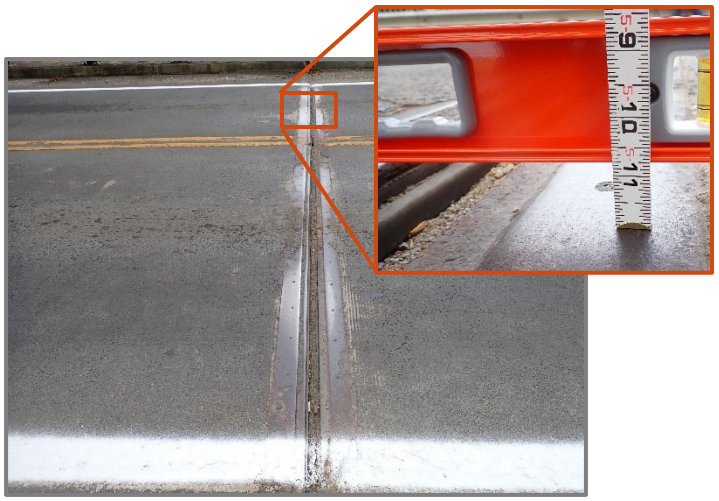

Photo 6 – Up to 1 1/4" vertical misalignment between joint sections on either side of the Pier 2 joint in the westbound lane, looking south. Note forward side of joint is higher.

Joint opening measurements were taken at each roadway joint and are presented in **Table 2** below. The measurements were taken along the right edge line of both lanes and the ambient temperature was 57° F at the time of inspection. The openings in the westbound lane matched those of the eastbound lane, except at the joints over Pier 2 and the Forward Abutment.

Location	2022 Measurement (57° F) Westbound Lane	2022 Measurement (57° F) Eastbound Lane
Rear Abutment	1 1/2"	1 1/2"
Pier 1	2 3/8"	2 3/8"
Pier 2	2 1/4"	1 3/4"
Pier 3	1 3/4"	1 3/4"
Forward Abutment	1/2"	1"

Table 2 – Roadway expansion joint opening measurements

ELEMENT 302 – COMPRESSION SEAL

There is one compression joint above Pier 3 at the rear end of Span 4 that is obscured/sealed over with tar. While the previous inspection noted signs of leakage from this joint and water seepage on the Pier 3 backwall, no signs of leakage were noted during the current inspection.

ELEMENT 330 – METAL BRIDGE RAILING

The roadway railing on the bridge consists of a post- and truss-mounted W-beam with steel tubular backup. At the rear end of the right bridge rail in Span 1, the first two posts have significant collision damage **(See Photo 7)**. The first post has a 3" long tear in the weld between the southwest flange and base plate and is rotated to the east approximately 45°. The second post has a 3" long tear in the weld between the southwest flange and base plate and is slightly twisted. Additionally, at the forward end on the left rail, the first post is rotated to the west approximately 45° due to collision and the northwest flange is partially torn and the top blockout on the second post is partially torn. Minor dents and impact scrapes are present throughout both bridge rails.

Photo 7 – Collision damage to first two posts of the right bridge rail at the rear end in Span 1, looking northeast. Note posts with tears at bases and rotated/twisted.

ELEMENT 815 – DRAINAGE

There are thirteen total scuppers in Spans 2 through 4 that allow for water to freely drain onto the embankment or creek below the bridge. At the time of inspection, the scuppers were typically full of loose leaves; however, the downspouts themselves were clear and allowed unrestricted drainage.

Photo 8 – Typical failing epoxy overlay on the left sidewalk in Span 2, looking east. Note areas of paint loss and minor corrosion on steel pedestrian railing.

SIDEWALK/CURB/RAILING
(no associated elements)

Reinforced concrete sidewalks with a pedestrian railing are located on each side of the bridge. There is an epoxy overlay on the sidewalks; however, it is generally failing and exposing the top surface of the concrete which has hairline transverse cracks spaced at 2' to 3' that extend into the concrete sidewalk curb below the pedestrian railing **(See Photo 8)**. Reflective hairline transverse cracks with minor to moderate efflorescence are present on the undersides of the sidewalk. The inboard sidewalk edges have isolated corner spalls adjacent to the joints up to 11" long by full height by 3 1/2" deep. The sidewalk stringers and floorbeam brackets that support the concrete sidewalk typically have advanced section loss. See **ELEMENT 113 – STEEL STRINGER** and **ELEMENT 152 – STEEL FLOORBEAM** for additional information.

The pedestrian railing on the bridge consists of an ornate steel railing with a masonry termination at each end. The steel pedestrian railing typically exhibits areas of paint failure with minor surface corrosion throughout its length **(See Photo 8)**. Heavy loss with isolated corrosion holes to the bases of the railing posts is typical at the interface with the sidewalk cantilever top flanges **(See Photo 9)**. The right pedestrian railing top connection plate is disconnected from the east side of the third post from the rear end of Span 1 **(See Photo 10)**. Isolated bolt heads and nuts on the railing connections are missing or have minor section loss.

The sliding plate sidewalk joints have moderate to heavy debris accumulation and minor vertical misalignments between the plate and sliding surface. The worst case was noted at Pier 3 where the right sidewalk sliding plate is up to 7/8" higher than the sliding surface on the forward side. In Span 4, the left sidewalk, which is partially supported by the retaining wall, has settled up to 4".

Photo 9 – Corrosion holes at the bases of the right pedestrian railing posts in Span 1, looking northwest.

Photo 10 – Top connection plate on the east side of third post from rear end of Span 1 disconnected, looking south.

ITEM 59 – SUPERSTRUCTURE SUMMARY

The superstructure is in FAIR CONDITION [5-NBIS] overall due to cracks in the end floorbeams of the Span 2 truss that have propagated since the previous inspection and areas of moderate to advanced section loss to components at the truss lower chord panel points in Span 2 and at isolated locations in Spans 1, 3, and 4.

Photo 11 – End 12" of Beam 7 in Span 3 at Pier 2 with 1/8" deep cleaned and painted pitting to both faces of the web and 1/16" deep cleaned and painted pitting to top flange, looking north. Note advanced section loss and corrosion hole in adjacent diaphragm.

ELEMENT 107 – STEEL OPEN GIRDER/BEAM

The beams in Spans 1, 3, and 4 have areas of minor to moderate painted over pitting at the beam ends that is typically over or beyond the bearings. The worst case noted was in Span 3 where the end 12" of Beam 7 at Pier 2 has 1/8" deep cleaned and painted pitting for the full height of the web on both faces and 1/16" deep cleaned and painted pitting to both flanges **(See Photo 11)**. Beam 7 at Pier 2 also has a 24" length just east of the bearing where the web has 1/4" deep cleaned and painted pitting on the bottom 5" of the south web and the bottom flange has 1/2" thickness remaining (11/16" original thickness) for a 2" width on both bottom flange edges **(See Photos 12 and 13)**.

Photo 12 – Cleaned and painting pitting up to 1/4" deep on the bottom 5" of the south web of Beam 7 in Span 3 adjacent to Pier 2, looking northeast.

Photo 13 – Bottom flange of Beam 7 in Span 3 adjacent to Pier 2 with 1/2" remaining for 2" width on both edges, looking northeast.

Beams 1 through 5 in Span 4 have extensive soot staining due to a fire event under the bridge since the previous inspection **(See Photos 14 and 15)**. The remaining beams in Span 4 have light to moderate soot staining. No obvious signs of distress were noted in the beams and the paint system appeared to still be fully intact. The beam ends in Span 4 at Pier 3 have widespread active laminate corrosion with negligible section loss. There is a previously noted broken weld between the north face of the Beam 4 web in Span 4 and the crossframe bottom strut at the Forward Abutment **(See Photo 15)**.

Photo 14 – Heavy soot staining on Beams 1 through 5 in Span 4 due to fire event, looking east.

Photo 15 – Broken weld between the north face of the Beam 4 web in Span 4 and the crossframe bottom strut at the Forward Abutment, looking east. Note heavy soot staining on members.

ELEMENT 113 – STEEL STRINGER

Roadway Stringers

The roadway stringers on this bridge are in Span 2 and consist of Stringers 1 through 8. The roadway stringers have isolated cleaned and painted areas of pitting up to 1/8" deep at the end floorbeam connections and isolated locations on Stringers 1 and 8 with 3/8" remaining (9/16" original thickness) for the full width of the outboard bottom flange **(See Photo 16)**. There is up to 1" thick active pack rust accumulation between select stringer bottom flanges and seat angles with up to 1/16" deep associated pitting to the stringer bottom flange underside **(See Photo 16)**. The roadway stringers throughout Span 2 typically have failing paint with minor surface corrosion on the top flanges at the ends and isolated cleaned and painted surface corrosion (< 1/32" deep) throughout.

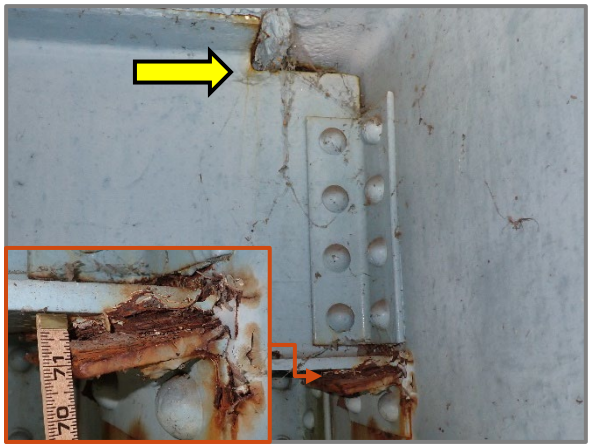

Photo 16 – Up to 1" thick pack rust between Stringer 1 bottom flange and seat angle at the connection to Floorbeam 9 in Span 2, looking north. Note cleaned and painted pitting up to 1/8" at stringer web cope and failing paint with minor surface corrosion on the stringer top flange.

Sidewalk Stringers

There are four sidewalk stringers each in Spans 1 through 3 consisting of Sidewalk Stringers 1 through 4. Sidewalk Stringers 1 and 4 in Span 2 typically have active advanced section loss at the ends at the connections to the floorbeam brackets with corrosion holes in the webs up to 9" long by 2" high in the web and up to 8" long by 2" wide in the outboard bottom flange **(See Photos 17 and 18)**. The rivets connecting the sidewalk stringer bottom flanges to the sidewalk bracket top flanges regularly have over 80% loss to the rivet heads. Sidewalk Stringers 2 and 3 have corrosion holes in the webs up to 24" long by 4 1/2" high and knife edging of the bottom flange isolated to the beam ends at the connections to the end floorbeams **(See Photo 19)**.

Photo 17 – Advanced section loss to Sidewalk Stringer 1 at Floorbeam 9 in Span 2 with 6" long by 2" wide corrosion hole in bottom flange and 10" long by 1" high corrosion hole in web, looking southeast.

Photo 18 – Advanced section loss to Sidewalk Stringer 4 at Floorbeam 3 in Span 2 with 5" long by 1" high corrosion hole in the web and 80% loss to rivet head on bottom flange, looking north.

Photo 19 – Advanced section loss to Sidewalk Stringer 3 at Floorbeam 0 in Span 2 with 24" long by 4 1/2" high corrosion hole in web and knife edging to bottom flange, looking west.

In Spans 1 and 3, Sidewalk Stringers 1 and 4 have similar advanced section loss at the beam ends over Piers 1 and 2 with up to 10" long by 1" high corrosion holes in the webs and up to 2" wide by 1" long corrosion holes in the bottom flanges. The Sidewalk Stringer 2 and 3 stub beam cantilevers at Piers 1 and 2 have advanced section loss and corrosion holes throughout **(See Photo 20)**.

Photo 20 – Advanced section loss and corrosion holes throughout Sidewalk Stringer 3 stub cantilever in Span 3 at Pier 2, looking northeast.

ELEMENT 120 – STEEL TRUSS

The truss in Span 2 typically has moderate to advanced section loss at the lower chord panel points and the chord members at deck level and moderate active pack rust between elements on the lower chord.

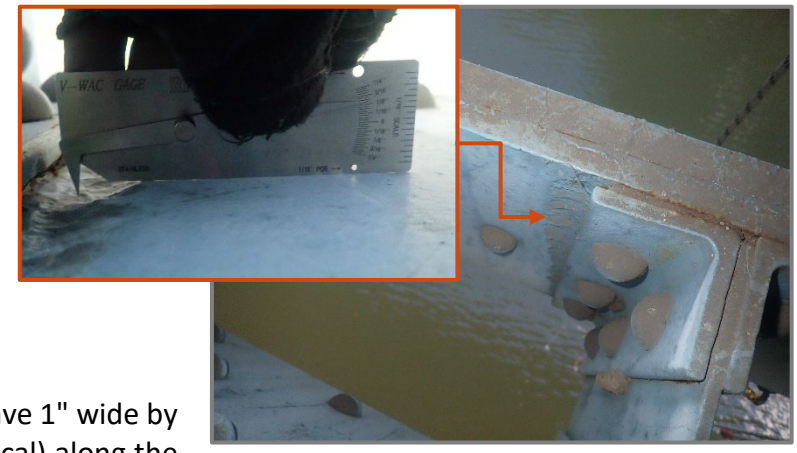

Photo 21 – Full height by 1" wide by 1/8" deep pitting to the interior of L4-L5 outboard web along mid-length internal diaphragm angles on Right Truss, looking southeast.

Lower Chord

The truss lower chord members have 1" wide by up to 1/8" deep pitting (1/16" typical) along the full height of the exterior faces at the interfaces with the gusset plates and on the interior faces at the interfaces with the internal diaphragm angles **(See Photo 21)**. On L6-L7 of the Right Truss, there is up to 1 1/8" thick pack rust between the interior and exterior web plates near L7 that has caused the top and bottom 4" of the interior plate to be bowed **(See Photo 22)**. There is pack rust up to 5/8" thick between lower chord interior faces and the internal diaphragm angles and up to 1/4" thick between lower chord members and isolated splice plates and gusset plates.

Photo 22 – Up to 1 1/8" thick pack rust between interior and exterior flange plates along top edge on L6-L7 of the Right Truss near L7, looking east.

Upper Chord

The truss upper chord members have isolated areas of paint failure with minor surface corrosion. On the U8-L9 end post on the Left Truss, there is up to 1/2" thick pack rust between the bridge plaque and the top flange plate with up to 1/16" deep associated pitting to the top flange plate. Additionally, the horizontal plate of the U8-L9 end post at L9 has up to 2" diameter corrosion holes that are beginning to reactivate and a broken rivet head **(See Photo 23)**. The end posts have up to 3/4" thick pack rust between the bottom flange and lacing bars.

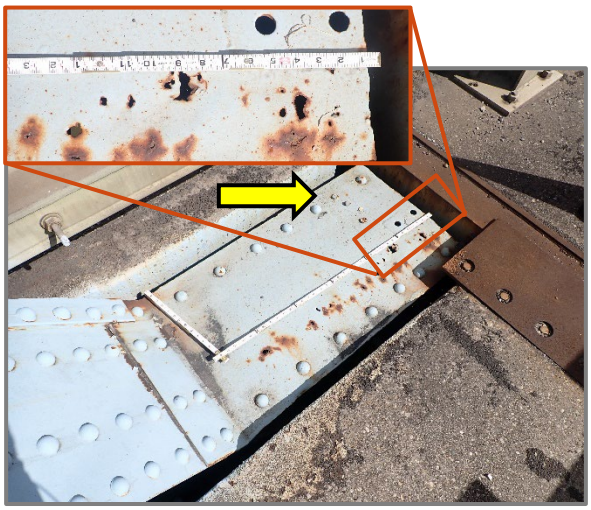

Photo 23 – U8-L9 end post horizontal plate at L9 of Right Truss with up to 2" diameter corrosion holes that are beginning to reactivate and a broken rivet head, looking northeast.

Verticals

The truss verticals typically have moderate to advanced section loss within the bounds of the lower chord gusset plates. The worst case was noted at L2 on the Right Truss, where the L2-U2 vertical has 1/4" deep typical pitting with 5/8" deep pockets in the web that extends onto the flanges and isolated corrosion holes **(See Photo 24)**. There is up to 1/4" deep cleaned and painted pitting to the vertical webs and flanges at the sidewalk interfaces and to the exterior of the inboard flange at previous guardrail connections **(See Photo 25)**. Pack rust up to 1/2" thick was noted between the verticals and the thin fill plates at the lower chord gusset plates with up to 100% section loss to fill plates.

Photo 24 – Advanced section loss to L2-U2 web and flanges on the interior of L2 on Right Truss with isolated corrosion holes in web, looking west.

Photo 25 – Up to 1/4" deep pitting to the exterior of the inboard flange of L4-U4 on the Left Truss at previous guardrail connection, looking northeast.

Photo 26 – Up to 3/16" deep pitting to the exterior of the inboard flange of U2-L3 on the Right Truss at the interface with the L3 gusset plate and 100% section loss to the thin fill plate, looking northeast.

Diagonals

At deck level, the truss diagonals have up to 7/32" deep cleaned and painted pitting at the interface where the members go through the deck. There is up to 3" high by full width by 3/16" deep pitting to the exterior of the flanges of the truss diagonals along the lower chord gusset plate interfaces **(See Photo 26)**. Pack rust up to 1/4" thick was noted between the diagonals and lower chord gusset plates and up to 1/2" thick between the thin fill plates and diagonals at the lower chord gusset plates with up to 100% section loss to fill plates **(See Photo 26)**.

For detailed truss findings, see **Appendix C**.

LATERAL BRACING (no associated elements)

The upper and lower lateral bracing in the Span 2 truss have no significant deficiencies beyond minor sagging of the upper lateral bracing.

SWAY BRACING (no associated elements)

The sway bracing members have isolated locations of minor pack rust between the connection plates and bracing members. The east top flange of the bottom diagonal sway brace at Panel Point 3 is bent 1/2" over a 3" length approximately 4' from the bridge centerline.

ELEMENT 152 – STEEL FLOORBEAM

Roadway Floorbeams

There are cracks emanating from the copes in the webs at both end floorbeams. The locations of cracks were ground with a handheld grinder to remove paint and then magnetic particle testing was performed to determine the crack lengths. At the Floorbeam 0 connection to the Left Truss, there is a 1 3/8" long horizontal crack on the top of the web and a 1 3/4" long vertical crack below with a 1/4" long overcut between them **(See Photo 27)**. These cracks were previously noted to be "1 1/2" long maximum" in the prior inspection report; therefore, the lower diagonal crack has propagated 1/4" since the previous inspection. At Floorbeam 9, there are cracks at both truss connections. At the Floorbeam 9 connection to the Left Truss, there is a 1" long horizontal crack on the top of the web and a 1 3/8" long diagonal crack below with a 1/4" long overcut between them **(See Photo 28)**. These cracks were previously noted to be "1 1/4" long maximum" in the prior inspection report; therefore, the lower diagonal crack has propagated 1/8" since the previous inspection. At the Floorbeam 9 connection to the Right Truss, there are three diagonal cracks in the web. The top and middle diagonal cracks are 1" and 1/4" long, respectively, and the bottom crack, which emanates from a 1/2" overcut in the web, is 5/8" long **(See Photo 29)**. These cracks were previously noted to be "1 1/2" maximum" in the prior inspection report; the change in lengths can be attributed to the inclusion of the overcut in the crack length. Previously noted crack locations at other floorbeams were determined to be overcuts (Floorbeam 3 at the Right Truss) or paint cracks (Floorbeams 3 and 5). See **Appendix D** for additional photos of the crack locations. The copes on Floorbeams 1 through 8 are of poor quality due to insufficient cope radius and overcuts in the web up to 9/16" long.

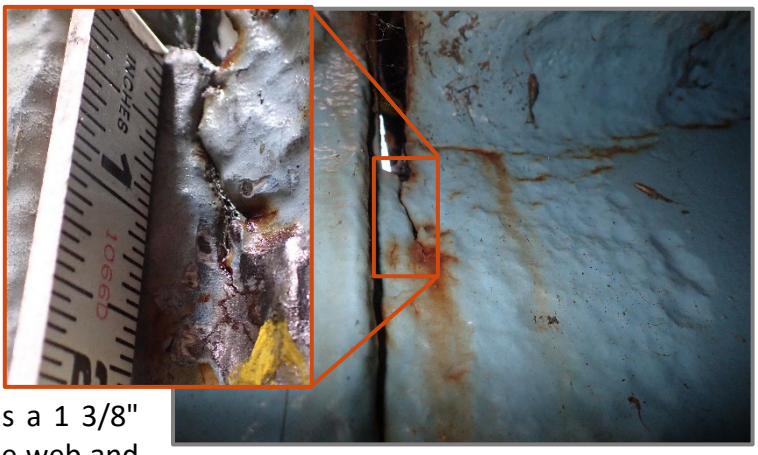

Photo 27 – 1 3/4" long vertical crack in the web cope of Floorbeam 0 in Span 2 at Left Truss with 1/4" propagation since previous inspection, looking east.

Photo 28 – 1 3/8" long diagonal crack in the web cope of Floorbeam 9 in Span 2 at Left Truss with 1/8" propagation since previous inspection, looking west.

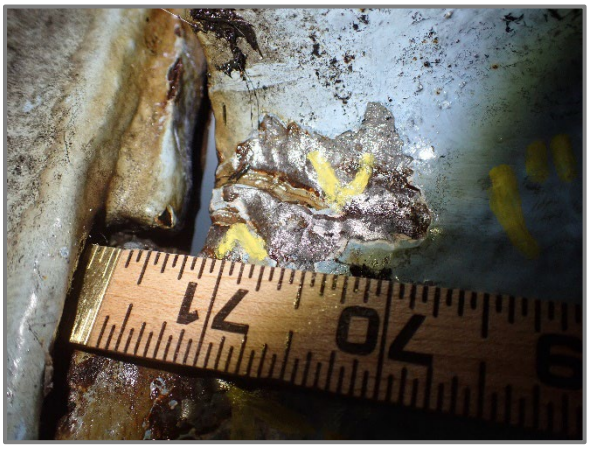

Photo 29 – 1" long and 1/4" long cracks in the web cope of Floorbeam 9 in Span 2 at Right Truss, looking west.

The floorbeams between the truss lines in Span 2 have up to 1/4" deep pitting (1/16" to 1/8" deep typical) adjacent to the connection angles to the truss **(See Photo 30)**. Floorbeam 0 has a 12' long by 6" high area of pitting up to 1/4" deep (3/16" typical) on the rear web that starts about 5' from the Right Truss with up to 1/4" deep pitting for a 2" width on the bottom flange underside **(See Photo 31)**. The bottom flange of Floorbeam 9 has isolated 3/8" deep pitting to the forward bottom flange edge adjacent to the Left Truss and isolated 1/4" deep pitting to the forward bottom flange edge and bottom flange underside at the Right Truss. The pitting on the floorbeams is typically cleaned and painted but is beginning to reactivate at isolated locations. See **Appendix C** for detailed floorbeam findings.

Photo 30 – Up to 3/16" deep pitting over 5" high by 3" wide area of the Floorbeam 4 in Span 2 forward web along bottom flange at the Left Truss that is beginning to reactivate, looking west.

Photo 31 – Up to 1/4" deep pitting over 12' long by 6" high area on Floorbeam 0 in Span 2 rear web near Right Truss with up to 1/4" deep pitting over 2" width on the flange underside, looking northeast.

Floorbeam Cantilevers

The floorbeam cantilevers that are outboard of the truss lines in Span 2 supporting the sidewalk stringers have advanced section loss to the top flanges at the sidewalk stringer connections with typical 1/8" deep pitting for the full flange width and isolated knife edging and corrosion holes up to 1" wide by 4" long **(See Photo 32)**. The top flange tie rods have advanced section loss at isolated locations of heavy debris accumulation, with the worst location noted on the Floorbeam 8 cantilever at the Left Truss where the west tension bolt has up to 95% section loss to the diameter (the east bolt has minimal loss) **(See Photo 33)**.

Photo 32 – Advanced section loss to Floorbeam 9 north sidewalk cantilever in Span 2 with 4" long by 1" wide corrosion hole in forward bottom flange, looking south.

Photo 33 – Up to 95% section loss to the west tie bolt on the Floorbeam 8 cantilever connection to the Left Truss, looking west. Note heavy debris accumulation on top flange of cantilever.

ELEMENT 162 – STEEL GUSSET PLATE

The lower gusset plates in Span 2 have pitting up to 3/16" deep (1/16" to 1/8" deep typical) on the interior faces along the interfaces with the lower chord and web members **(See Photo 34)**, with isolated locations on the exterior of the plates. The pitting is typically cleaned and painted; however, it is reactivating on the exteriors of the outboard plates at the sidewalk cantilevers. Additionally, there is paint failure with minor active corrosion along the edges of the gusset plates and along the interfaces with the truss members. Pack rust up to 1/4" thick was noted between the lower gusset plates and truss members at isolated locations causing minor bows to the plate free edges.

Photo 34 – Cleaned and painted pitting up to 3/16" deep over 10" long by 4" high area on interior of L5 outboard gusset plate along L5-L6 on the Right Truss, looking southwest.

The upper gusset plates had no significant deficiencies noted. The gusset plates at the mid-height connections have isolated locations where the rivets have been replaced with high-strength bolts and scattered areas of peeling paint with minor surface corrosion. For detailed gusset plate findings, see **Appendix C**.

ELEMENT 310 – ELASTOMERIC BEARING

There are eight elastomeric bearings at the Forward Abutment for the steel beams in Span 4. There is moderate debris accumulation at the bearings leading to minor active corrosion on the sole plates. The bearing pad for Beam 3 was noted to be expanded more than the other beams in the span. At Beams 5 and 6, there are minor gaps between the elastomeric pads and the beam seat along the rear face of the pad that extend up to 2 1/4" under the pad and the sole plates are misaligned and overhang the forward side of the bearing up to 3".

ELEMENT 311- MOVABLE BEARING

The Rear Abutment rocker bearings for the beams in Span 1 have minor to advanced cleaned and painted section loss on the bearing components, with up to 7/16" deep pitting noted on the bearing at Beam 3. The Beam 1 rocker bearing has excessive expansion tilt toward the rear backwall and the lead plate between the masonry plate and the top of the abutment is displaced **(See Photo 35)**. This condition has not changed since the previous inspection. The remaining rocker bearings at the Rear Abutment were slightly expanded or plumb.

Photo 35 – Excessive expansion tilt of rocker bearing of Beam 1 in Span 1 at Rear Abutment, looking northwest. Note displaced lead sheet between masonry plate and cap.

At Pier 2, the Span 2 truss rocker bearings have isolated minor to moderate cleaned and painted pitting on the bearing components, with some areas reactivating. The Right Truss rocker bearing northwest and northeast anchor bolt nuts have 80% and 50% section loss, respectively, and the southwest and southeast anchor bolt nuts have up to 20% section loss. The Left Truss rocker bearing southwest anchor bolt nut has 50% section loss and there is moderate debris on the masonry plate. At L9 of the Right Truss, the right pin plate has a localized distortion at the top of the pin.

The Pier 3 rocker bearings for the beams in Span 3 have up to 1/4" deep cleaning and painted pitting on the bearing components. The south anchor bolt for Beam 8 is bent to the south approximately 10°.

ELEMENT 313 – FIXED BEARING

The fixed bearings at Pier 1 for the beams in Span 1 have cleaned and painted freckled pitting up to 1/16" deep with isolated minor active corrosion at the bases of the castings. Additionally, there is typically loose pack rust between the bearing casting components and pins. The anchor bolts are typically tilted toward the east and isolated anchor bolt nuts are backed off up to 1 5/8". The Beam 7 bearing at Pier 1 is undermined up to 1" due to a spall in the forward face of the beam seat.

At Pier 1, the Span 2 truss fixed bearings have cleaned and painted freckled pitting up to 1/8" deep with isolated active corrosion around the pin nuts. The anchor bolt nuts have up to 70% section loss.

The fixed bearings at Pier 2 for the beams in Span 3 have cleaned and painted freckled pitting up to 1/8" deep with isolated minor active corrosion at the bases of the castings **(See Photo 36)**. The Beam 6 bearing at Pier 2 is undermined up to 3/4" due to a spall in the rear face of the beam seat.

Photo 36 – Freckled pitting up to 1/8" deep throughout the fixed bearing of Beam 7 in Span 3 at Pier 2, looking northeast. Note active corrosion at the base of the casting.

At Pier 4, the Span 4 fixed bearings have heavy active corrosion with negligible section loss. Additionally, the Beam 4 bearing is undermined up to 5 1/2" due to a spall in the forward face of the beam seat.

ELEMENT 515 – STEEL PROTECTIVE COATING

The protective coating system throughout the structure has widespread minor surface dulling and chalking with isolated areas of paint failure and active corrosion, typically at the beam, floorbeam, and stringer ends and on the truss lower chord, lower chord gusset plates, and upper chord members.

DIAPHRAGMS/CROSSFRAMES (no associated elements)

The diaphragms have cleaned and painted advanced section loss with isolated corrosion holes noted in the webs and bottom flanges. Corrosion holes were noted in the diaphragms between Beams 1 and 2 and Beams 7 and 8 in Span 3 at Pier 2, between Beams 1 and 2 and Beams 2 and 3 in Span 3 at Pier 3, and between Beams 7 and 8 in Span 4 near midspan **(See Photo 37)**.

Photo 37 – Advanced section loss and corrosion holes in the diaphragm between Beams 7 and 8 in Span 4 near midspan, looking west.

ITEM 60 – SUBSTRUCTURE SUMMARY

The substructure is in FAIR CONDITION [5-NBIS] overall due to minor to moderate spalls with exposed reinforcement in the pier beam seats that undermine isolated beam/stringer bearings and shallow spalls with exposed reinforcement throughout the pier caps and abutments.

Photo 38 – Hairline cracks with heavy efflorescence on the south face of the south column of Pier 2, looking north.

ELEMENT 205 – REINFORCED CONCRETE COLUMN

The reinforced concrete columns of Pier 2 have shallow cover spalls up to 12" wide by 6" high with exposed reinforcement at the top of both columns on the east face. Additionally, the top of the south column on Pier 2 has widespread hairline vertical and horizontal cracks with heavy efflorescence on the south face **(See Photo 38)**. The north column on Pier 1 has heavy vegetation growth throughout the full height of the column.

ELEMENT 215 – REINFORCED CONCRETE ABUTMENT

There are multiple shallow edge spalls/delaminations up to 24" long by 6" high by 3" deep along the top edge of the Rear Abutment beam seat. Additionally, there is a 14" high by 6" wide by 3/4" deep spall with exposed and corroded reinforcement (no measurable section loss) on the vertical face of the Rear Abutment beam seat at the center. The visible portion of the Forward Abutment at the north end has minor hairline cracks; the remainder of the abutment is buried and not visible for inspection.

ELEMENT 220 – REINFORCED CONCRETE PILE CAP/FOOTING

The bottom rear edge of the Pier 3 pile cap has exposed reinforcement due to shallow spalls and lack of cover over its full length with one broken reinforcing bar noted near the north end of the cap **(See Photo 39)**.

Photo 39 – Pier 3 pile cap with exposed reinforcement on the bottom rear edge due to shallow spalls and lack of cover, looking east. Note broken bar near north end of pile cap.

Photo 40 – Spall 15" high by 24" wide by 6 1/2" deep in the forward beam seat below Beam 4 in Span 4 that has undermined the bearing up to 5 1/2", looking northwest.

There is a 15" high by 24" wide by 6 1/2" deep spall with exposed reinforcement in the forward beam seat of the Pier 3 pile cap below Beam 4 in Span 4 that has undermined the bearing up to 5 1/2" **(See Photo 40)**. Additionally, there are isolated full height by up to 3' wide by 1" deep spalls with exposed reinforcing in the vertical faces of the beam seats on the rear face of the Pier 3 pile cap.

ELEMENT 227 – REINFORCED CONCRETE PILE

There are 34 exposed reinforced concrete piles at Pier 3 that are split into two rows. In the rear row, between Beams 4 and 6, one pile has a full height by full width by 2" deep spall with exposed reinforcing on the west face and two piles have full height by 12" wide by 2" deep spalls with exposed reinforcing on the west faces. Additionally, the pile under Beam 7 on the rear face does not support the cap, as it was constructed incorrectly and sits in front of the cap **(See Photo 41)**.

Photo 41 – Pier 3 with one pile with a full height by full width by 2" deep spall with exposed reinforcing on the west face, two piles have full height by 12" wide by 2" deep spalls with exposed reinforcing on the west faces, and one incorrectly constructed pile, looking east.

Photo 42 – Spall 68" long by 12" high by 3 3/4" deep with exposed reinforcement and one broken vertical bar between Beams 5 and 6 in Span 2 in Pier 2 beam seat, looking southeast. Note spall undermines Beam 6 bearing up to 3/4".

ELEMENT 234 – REINFORCED CONCRETE PIER CAP

The rear face of the Pier 2 cap has moderate spalls with exposed and corroded reinforcement in the beam seat, with the largest noted below Beams 5 and 6 where there is a 68" long by 12" high by 3 3/4" deep spall with exposed reinforcement and one broken vertical reinforcing bar; this spall undermines the Beam 6 bearing up to 3/4" **(See Photo 42)**. There are various other moderate spalls throughout the rear face of the Pier 2 cap up to 10' long by 12" high by 3" deep with exposed reinforcement. The forward face of the Pier 2 cap has less volume and severity of spalls and delaminations than the rear face. There are three delaminations/spalls with exposed reinforcement up to 48" high by 10" wide by 3/4" below Beam 7 on the rear face and various other minor to moderate spalls and delaminations.

The Pier 1 cap has minor to moderate spalls with exposed reinforcement on both beam seat faces. There is a 24" wide by 3" high by 7" deep corner spall between Beams 7 and 8 on the forward face of the beam seat that undermines the Beam 7 bearing up to 1" **(See Photo 43)**. The remaining spalls on the beam seats do not extend under the beam bearings. The Pier 1 cap below the beam seats has various spalls/delaminations up to 7' high by 12" wide by 1" deep with exposed reinforcement.

Photo 43 – Corner spall 24" wide by 3" high by 7" deep between Beams 7 and 8 on the forward face of the beam seat of the Pier 1 cap that undermines the Beam 7 bearing up to 1", looking northwest.

ELEMENT 830 – ABUTMENT BACKWALL

Both of the abutment backwalls have isolated minor vertical cracks, some with light efflorescence.

SLOPE PROTECTION (no associated element)

Large diameter rip rap has been placed on the slope in front of both abutments with no significant deficiencies noted.

ITEM 61 – CHANNNEL SUMMARY

The channel, which flows between the piers in Span 2 at a skew, is in GOOD CONDITION [7-NBIS] overall with no scour noted around the substructure units **(See Photo 44)**.

Photo 44 – General view of channel below Span 2, looking southeast.

Photo 45 – Erosion gully up to 4' deep by 5' wide by 35' long in the west channel bank approximately 5' from the right column of Pier 1, looking west.

There is an up to 4' deep by 5' wide by 35' long erosion gully in the west channel bank **(See Photo 45)**. The erosion gully, which has sparse rubble and asphalt debris in it, runs approximately 5' from the Pier 1 right column and extends diagonally to the shoreline. Minor sloughing is present on the rear channel bank in front of Pier 1.

SIGN/UTILITY ITEMS SUMMARY

SIGNS

A “No wake zone entire creek” sign is present on the right side of the truss between L4 and L5.

UTILITY ITEMS

The water main that runs along the right side of the truss has a broken wire hanger between Panel Points 7 and 8 and minor pack rust accumulation between the water main and floorbeam cantilever brackets **(See Photo 46)**. The small flexible conduit that runs along the left side of the truss has a disconnected section in Span 1 adjacent to the Rear Abutment and several of the support brackets are bent downwards or have broken/missing rollers. There is a single sidewalk luminaire that is mounted near the middle of the Right Truss upper chord that is powered by an electrical line that runs from a utility pole at the southwest corner of the bridge.

Photo 46 – Broken wire hanger for water main between Panel Points 7 and 8 on the right side of the truss, looking east.

APPROACH SUMMARY

The approaches are in fair condition overall due to heavy scaling and map cracking up to 1/4" wide in the west approach asphalt roadway surface, settlement of the west approach sidewalks, and potholes and spalls in the approach slabs.

ELEMENT 321 – REINFORCED CONCRETE APPROACH SLAB

The rear approach slab has a 17" long by 4" wide by 1" deep spall in the eastbound lane adjacent to the roadway centerline **(See Photo 47)**. The epoxy overlay on the rear approach slab exhibits moderate to heavy wear throughout with isolated locations that have completely worn away **(See Photo 47)**. The asphalt roadway surface covering the forward approach slab has minor potholes and sealed cracks that are beginning to reopen. Additionally, there are up to 3" wide by 3" deep potholes in the asphalt along the joint with the Forward Abutment direct traffic backwall.

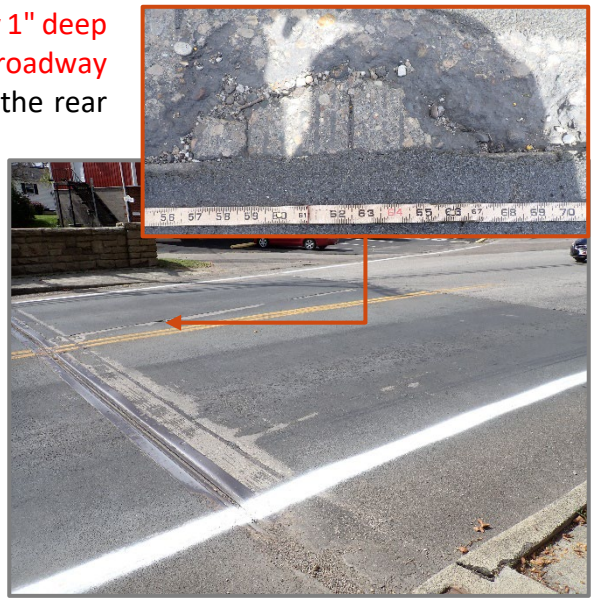

Photo 47 – Spall 17" long by 4" wide by 1" deep in the eastbound lane of the rear approach slab, looking southwest. Note moderate to heavy wear of epoxy overlay and areas where overlay is completely worn away.

APPROACH ROADWAY SURFACE (no associated element)

The asphalt roadway surface on the west approach has up to 1/4" wide map cracking spaced at 3' to 5' while the east approach asphalt roadway surface has random sealed cracks that are beginning to reopen.

Photo 48 – Makeshift retaining wall consisting of roadway signs and ratchet straps at the southwest corner of bridge, looking east.

EMBANKMENT (no associated element)

The slope at the southwest corner of the bridge is being retained by a makeshift retaining wall consisting of roadway signs and ratchet straps which was in place during the previous inspection **(See Photo 48)**. The embankment in this location is steep and there is a sizeable erosion gully in the southwest channel bank. See **ITEM 61 – CHANNEL SUMMARY** for additional information.

SIDEWALK (no associated elements)

The southwest and northwest sidewalks on the rear approach have settled up to 2 1/2" and 2 1/4", respectively, relative to the sidewalk in Span 1.

ITEM 41 – OPERATIONAL STATUS

The bridge remains OPEN WITH NO RESTRICTIONS [A-NBIS].

CONCLUSIONS AND RECOMMNEDATIONS

Based upon the results of our 2022 routine element level fracture critical inspection, the LAW-7-02.40 Bridge is in FAIR CONDITION [5-NBIS] overall. This overall condition is driven by cracks in the end floorbeams of the truss in Span 2 that have propagated up to 1/4" from the previous measurements, pack rust and section loss to primary truss members that is beginning to reactivate, and spalling with exposed reinforcement in the substructure units. Fire damage in Span 4 below the bridge has resulted in extensive soot staining throughout the span, fully covering Beams 1 through 5 and the adjacent underside of deck. The beams do not exhibit any signs of associated distress, and the deck is sound. This is a new condition that occurred sometime after the 2020 inspection.

Strinteg has provided rehabilitation and maintenance recommendations as well as conceptual costs below in order to extend the usable life of the structure. We present our recommendations in the following three priority categories:

- High Priority Repairs: (Within 6 Month Period) — Work which should be performed as soon as possible to address deficiencies which affect the load carrying capacity of the structure or public safety.
- Medium Priority Repairs: (Within 1 to 2 Year Period) — Recommendations for deficiencies which currently do not significantly affect the load carrying capacity of the structure or public safety but will require corrective action if deterioration continues.
- Low Priority Repairs: (As Scheduled) — Recommendations for deficiencies that are minor in nature and won't affect the capacity of the structure or public safety or rehabilitation level repairs that are not immediately time sensitive. Recommendations for minor preventative repairs or routine maintenance may also be listed.

High Priority Repairs: None

Medium Priority Repairs: Repair impact damage to the rear end of the right guardrail and the forward end of the left guardrail.

Replace the temporary retaining wall at the southwest corner of the bridge with engineered solution.

Repair erosion channel on the south side of the west channel bank.

Replace/repair areas of epoxy overlay throughout bridge with heavy wear.

Drill crack arrest holes in the webs of Floorbeams 0 and 9 in Span 2.

Repair the cracked connection weld between the left face of Beam 4 and the crossframe at the Forward Abutment.

Install vandal protection fence to restrict access to the underside of Span 4.

Level off sidewalks at the Rear Abutment to remove tripping hazard.

Low Priority Repairs: Repair/retrofit sidewalk stringers with advanced section loss.

Replace deteriorated anchor bolts and anchor bolt nuts at the bearings.

Repair/replace deteriorated tension bolts above the sidewalk support cantilever brackets.

Replace/repair diaphragms with holed through sections.

Clean and paint the superstructure.

Perform pack rust mitigation procedures for areas with heavy pack accumulation on the truss lower chord and gusset plates in Span 2.

Repair/patch spalls with exposed reinforcement, delaminations, and cracks in the substructure units.

Seal any unsealed cracks in the approaches.

Low Priority Repairs: (continued)

Repair the disconnected top rail on the right sidewalk railing of Span 1.

Remove debris on and around the bearings.

Remove heavy vegetation growth on the north column of Pier 1.

Remove debris from joint seals and replace failed sections of joints at Pier 2 and Forward Abutment joints.

(THIS PAGE INTENTIONALLY LEFT BLANK)

APPENDIX A

Fracture Critical Plan and Fatigue Detail Table

(THIS PAGE INTENTIONALLY LEFT BLANK)

OHIO DEPARTMENT OF TRANSPORTATION
DISTRICT 9 • 650 EASTERN AVENUE, P.O. BOX 467 • CHILLICOTHE, OHIO 45601-0467

Fracture Critical Member (FCM) Inspection Procedure

Reference: ODOT Manual of Bridge Inspection, Chapter 4

Inspection Responsibility:	ODOT District 9
County-Route-SLM:	LAW-007-0240
Structural File Number:	4400038
Inspection Frequency:	24 Months
Fatigue Life Study:	Year of Study: Not Calculated Remaining Fatigue Life: Not Calculated
Load Path Redundant:	Main Span: No, Parker truss span is a two-truss system and floorbeam spacing exceeds 14'. Approach Spans: Yes, multi-beam system.
Structurally Redundant:	No, truss span and approach spans are simple span.
Internally Redundant:	No, tension members are rolled members (only select lower chord members consist of multiple riveted plates).
System Redundant:	No rigorous analysis performed (i.e. finite element, 3-D modeling)

Figure 1 – LAW-7-02.40 south elevation looking northeast.

Location: The LAW-7-2.40 Bridge **(see Figure 1)** carries one lane of State Route 7 northbound and one lane of State Route 7 southbound over Symmes Creek in Chesapeake, Ohio **(see Figure 2)**. It is located 0.11 miles north of SR 527.

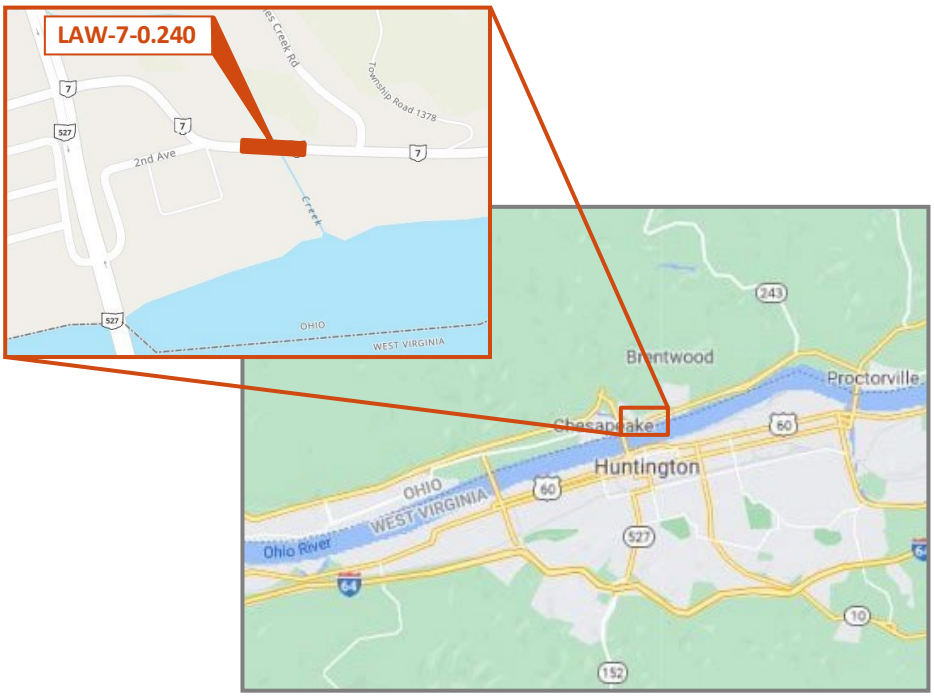

Figure 2 – LAW-7-02.40 location map.

Structure Description: This structure is composed of 4 spans for a total length of 348'-8" with a maximum span length of 162'. It carries two lanes of traffic with a 34'-0" roadway width, and it also carries two sidewalks outside the truss lines. Spans 1, 2, and 3 are original to the structure, and Span 4 was added at an unknown date prior to 1990. During this rehabilitation, the original forward abutment was retained and renamed to Pier 3, and a new forward abutment and forward approach slab were added. Span 2, the main span, is a 162'-0" long Parker through truss while Spans 1, 3, and 4 are simple span rolled steel multi-beam spans **(see Figure 1).**

The truss is comprised of riveted built-up box sections (channels with cover plates and lacing bars) for the upper chord and end posts, rolled beams for the diagonals and verticals, two plates or two sets of riveted plates with internal diaphragms for the lower chord, riveted gusset plates, rolled floorbeams, and rolled stringers. Floorbeams are spaced at 18'-0". The fracture critical members are the primary truss members that experience tension (lower chord, diagonals, select verticals) and the floorbeams **(see Figure 3).**

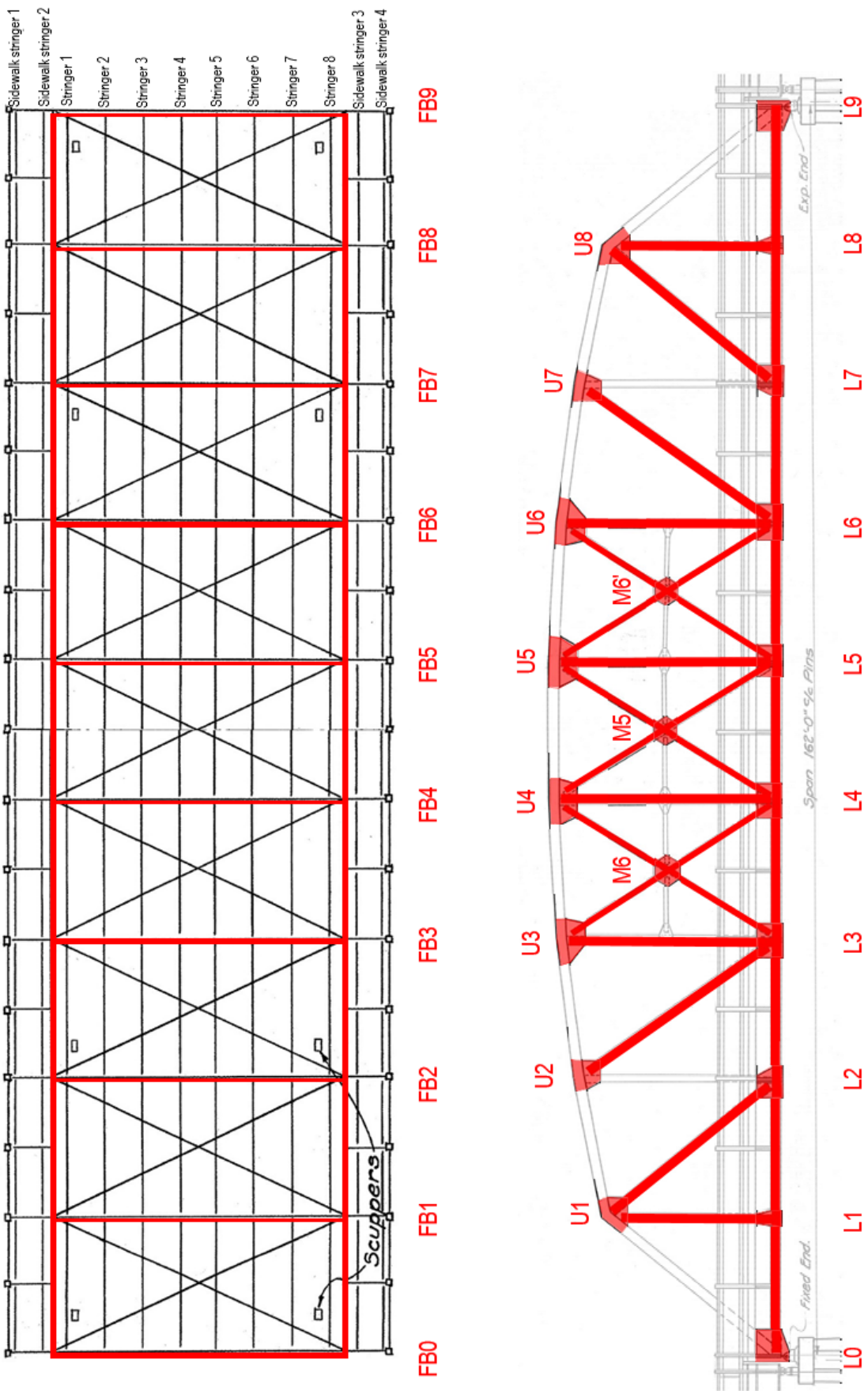

Figure 3 – Span 2 framing plan and truss south elevation (Images taken from the 1932 design drawings).
Lower chord members, diagonals, verticals (except U2-L2 & U7-L7), gusset plates, and floorbeams are fracture critical members.

Inspection Risk Factors

Inspection Procedure and Inspector Access Risk Factors: A combination of rope access techniques, protected climbing techniques, ladders, and/or rigging are required to gain hands-on access to all the fracture critical members and their tension regions. In the 2022 inspection, all fracture critical members were access with rope access techniques and protected climbing techniques.

- Inspection Methods
    - Primary truss members (including gusset plates): Inspect the entire member for the full length, especially for distress at fatigue prone details.
    - Floorbeams: Inspect the bottom flange and bottom half of the web of the beam over its length and the web for the full height in the primary shear regions, especially at the copes for cracks and for distress at fatigue prone details.
- Access
    - Protected climbing and rope access: Used to gain hands-on access to all primary truss members, including gusset plates and floorbeam tension/primary shear areas.
- Maintenance of Traffic
    - Traffic control is not required; however, cones at the bridge corners for pedestrian and bike traffic along with advanced warning signs on the approaches are recommended.
- Inspector Risks
    - Work at heights
    - Cold/Hot extreme temperatures
    - Biological/Wildlife hazards
    - Traffic on the bridge
    - Working over water

Inspection Risk Factors			
Risk Factor	**Location**	**Description**	**Photo**
Fracture Critical Structure	Superstructure	Primary truss member (including gusset plates) or floorbeam failure would cause collapse of structure.	-
Fatigue Prone Detail - E	Vertical members U3-L3, U4-L4, U5-L5 & U6-L6	Base metal of the vertical member interior flange at the sway bracing connection angle attached by fillet welds with no transition radius (Category E)	1
Previous Cracking and Repairs	Floorbeam upper web at cope adjacent to inboard truss connection	Cracks in the web of the copes at Floorbeams 0 and 9 and overcuts in the webs of various floorbeams. No crack arrest holes have been drilled.	2 & 3
High ADTT	All primary truss members and floorbeams	Average daily truck traffic is 567.	-

Fatigue prone detail categories are in accordance with AASHTO LRFD specifications Table 6.6.1.2.3-1

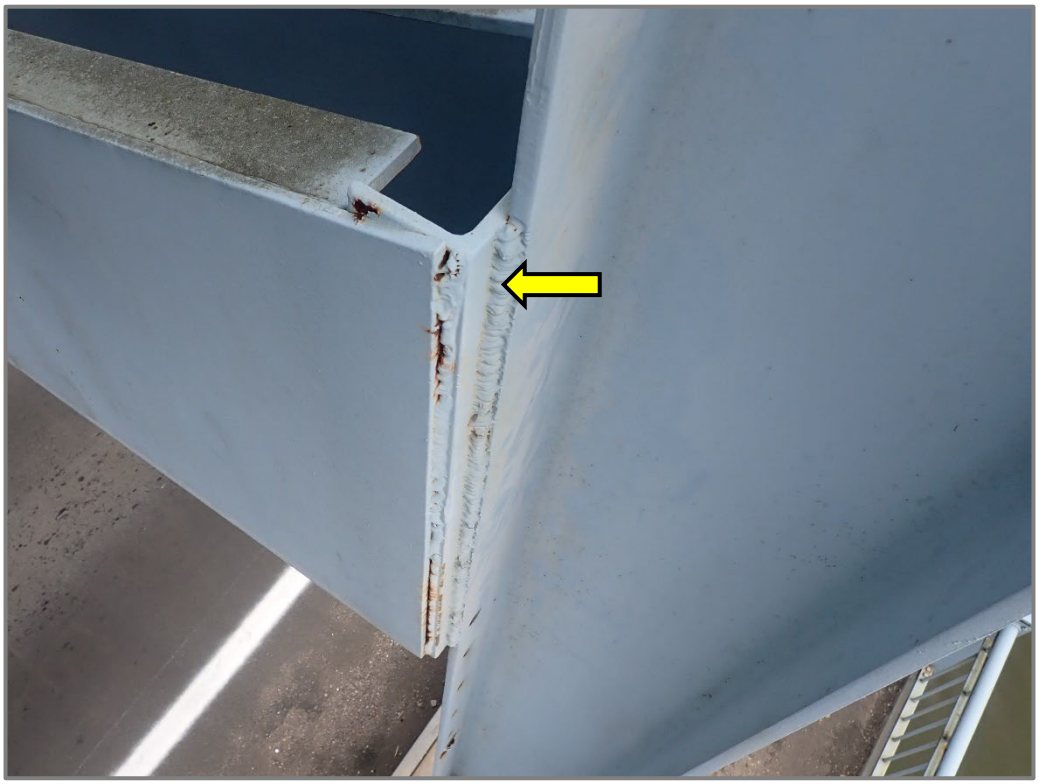

Photo 1 – Sway bracing connection angle attached by fillet welds with no transition radius (Category E). U6-L6 of the Right Truss is shown (looking northeast).

Photo 2 – Cracking in the web of a floorbeam at the upper cope (looking east at Floorbeam 0 in Span 2 adjacent to the Left Truss).

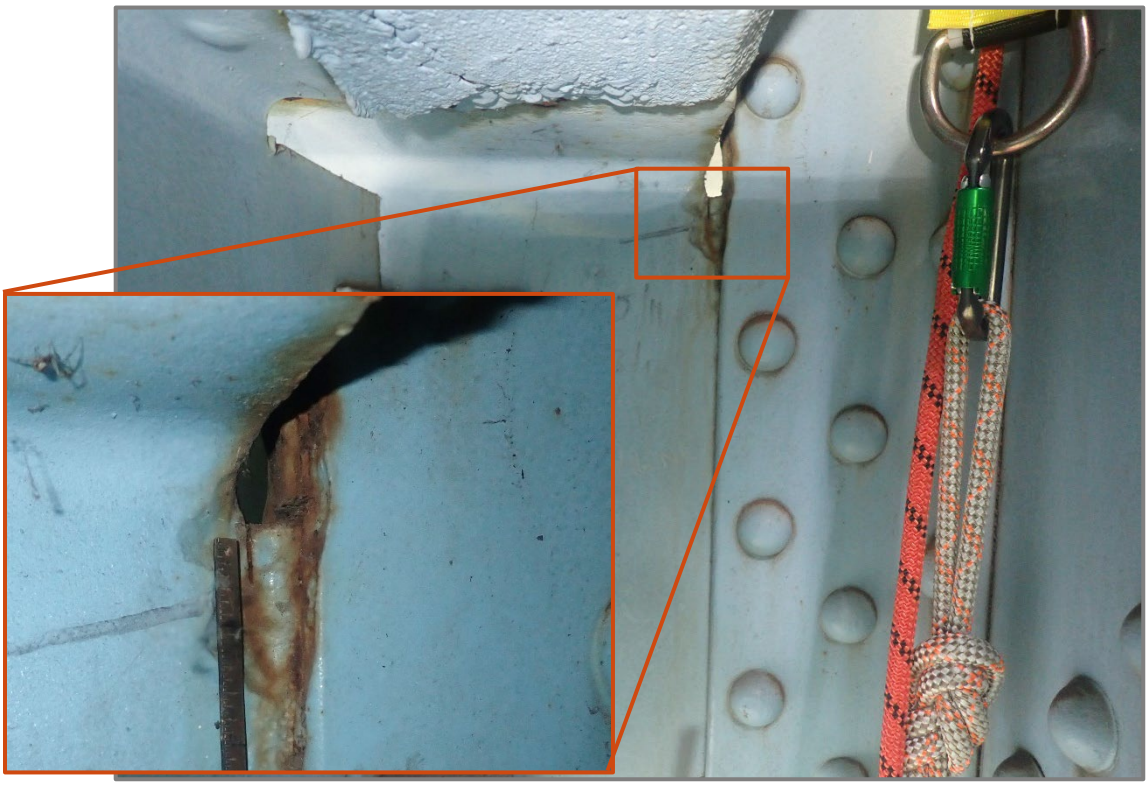

Photo 3 – Overcut in a floorbeam web at the upper cope at the connection to the truss (looking east at Floorbeam 3 adjacent to the Right Truss).

APPENDIX B

Assetwise Report

(THIS PAGE INTENTIONALLY LEFT BLANK)

Inspector:	Fisco,Nicholas	**Structure Number:**	4400038
Inspection Date:	12/01/2022	**Facility Carried:**	SR 7

Bridge Inspection Report

Ohio Bridge Inspection Summary Report — LAW-00007-0240 (4400038)

2: District	District 09 — 13904 - CHESAPEAKE (LAW county)	5A: Inventory Route	1 00007
21: Major Maint A/B	01 - State Highway Agency /	7: Facility On	SR 7
225 Routine Main A/B	02 - County Highway Agency /	6: Feature Ints	SYMMES CREEK
221 Inspection A/B	01 - State Highway Agency /	9: Location	.11 MI N OF SR 527
220: Inv. Location	DISTRICT 09	Lat, Lon	38.428303 ,-82.450325

Condition

58: Deck	**6 - Satisfactory Condition**
58.01 Wearing Surface	6 - Satisfactory (1-10% distress)
58.02 Joint	4- Poor (heavy leaking, offset)
59: Superstructure	**5 - Fair Condition**
59.01 Paint & PCS	4 - Poor PCS (15-20% corr.)
60: Substructure	**5 - Fair Condition**
61: Channel	**7**
61.01 Scour	**6 - Satisfactory**
62: Culverts	**N - Not Applicable**
67.01 GA	**5**

Appraisal

Sufficiency Rating	77.0 SD/FO 0 - ND
36: Rail, Tr, Gd, Term Std	1 1 N N
72: Approach Alignment	6 - Equal to present minimum criteria
113: Scour Critical	8 - Stable for scour conditions
71: Waterway Adequacy	8 - Bridge Above Approaches

Geometric

48: Max Span Length (ft)	162.0
49: Structure Length (ft)	348.0
52: Deck Width, Out-To-Out (ft)	36.0
424: Deck Area (sf)	12528
32: Appr Roadway Width (ft)	35.0
51: Road Width, Curb-Curb (ft)	34.0
50A: Curb/SW Width: Left (ft)	7.4
50A: Curb/SW Width: Right (ft)	7.4
34: Skew (deg)	0
33: Bridge Median	0 - No median
54B: Min Vert Underclearance (ft)	0
336A: Min Vert Clrnce IR Cardinal (ft)	15.417
336B: Min V Clr IR Non-Cardinal (ft)	0
578: Culvert Length (ft)	0

Load Posting

41: Op/Post/Closed	A - Open
70: Posting	5 - Equal to or above legal loads
70.01: Date	
70.02: Sign Type	
734: Percent Legal (%)	115
704: Analysis Date	02/07/2019
63: Analysis Method	6 - Load Factor (LF) rating reported by

Structure Type

43: Bridge Type	3 - Steel 10 - Truss - Thru N- Not Applicable
45: Spans Main / Approach	1 / 3
107: Deck Type	1 - Concrete Cast-in-Place
408: Composite Deck	Y - Composite Construction
414A Joint Type 1	8 - Elastomeric Strip Seal
414B: Joint Type 2	N - None
108A: Wearing Surface	5 - Epoxy Overlay N- Not Applicable
422: WS Date	
423: WS Thick (in)	1.2
482: Protective Coating	5 - Paint System OZEU
483: PCS Date	10/01/1993
453: Bearing Type 1	2 - Rockers & Bolsters
455: Bearing Type 2	3 - Sliding (Bronze)
528: Foundn: Abut Fwd	A - Cast-in-Place Reinforced Concrete Piles (12" diameter)
533: Foundn: Abut Rear	A - Cast-in-Place Reinforced Concrete Piles (12" diameter)
536: Foundn: Pier 1	N - None (Such as most Culverts)
539: Foundn: Pier 2	N - None (Such as most Culverts)

Age and Service

27: Year Built/ 106 Rehab	1933 / 1990
42A: Service On	1 - Highway
42B: Service Under	5 - Waterway
28A: Lanes on	02
28B: Lanes Under	00
19: Bypass Length	5
29: ADT	11346
109: % Trucks (%)	5

Inspections

		Months	
90: Routine Insp.		12	09/29/2022
92A: FCM Insp.	Y	12	09/09/2022
92B: Dive Insp.	N	0	
92C: Special Insp.	N	0	
92D: UBIT Insp.	Y	24	09/14/2021
92E: Drone Insp.	N	0	

Inspector Fisco,Nicholas

rating factor (RF) method using MS18 loading.

Inspector: Fisco,Nicholas **Structure Number:** 4400038

Inspection Date: 12/01/2022 **Facility Carried:** SR 7

Bridge Inspection Report

	Environment	Total Quantity	Units	Condition State 1	Condition State 2	Condition State 3	Condition State 4
12-Reinforced Concrete Deck	3 - Mod.	12437	sq. ft.	0	12434	3	0
	2022 Inspection (see attached physical condition report for additional information and photos) CS2 -12434 SF for unsealed transverse cracking t/o bridge typically spaced at 2' to 3', some with efflorescence, as well as isolated longitudinal & map cracking with efflorescence CS3 - 3 SF in Span 2 at spall on right edge of deck between FB2 & FB3						
1080-Delamination/Spall/Patched Area		3		0	0	3	0
1120-Efflorescence/Rust Staining		8289		0	8289	0	0
1130-Cracking (RC and Other)		4145		0	4145	0	0
510-Wearing Surfaces		11905	sq. ft.	6548	2976	1786	595
	2022 Inspection (see attached physical condition report for additional information and photos) CS2 - 2976 SF t/o bridge length around wheel lines where WS is deteriorating but is still substantially effective CS3 - 1786 SF t/o bridge length around center of wheel lines where WS is mostly worn away and has limited effectiveness CS4 - 595 SF heavily worn or missing						
3230-Effectiveness (Wearing Surface)		5357		0	2976	1786	595
107-Steel Open Girder/Beam	3 - Mod.	1458	ft.	1352	71	35	0
	2022 Inspection (see attached physical condition report for additional information and photos) CS2 - Span 1 - 23 LF for minor corrosion & minor losses to beams; Span 3 - 16 LF; Span 4 - 32 LF for minor corrosion typically at ends CS3 - Span 1 - 6 LF for section loss at Beams 1, 2 & 3; Span 3 - 12 LF for section loss at Beams 2, 6 & 7; Span 4 - 17 LF for active laminate corrosion and isolated minor section loss at Beams 1 - 8 and broken weld at Beam 4						
1000-Corrosion		106		0	71	35	0
515-Steel Protective Coating		13025	sq. ft.	0	12765	130	130
	2022 Inspection (see attached physical condition report for additional information and photos) CS2 - 12765 SF due to minor surface dulling and chalking t/o. CS3 - 130 SF for corrosion and failing paint at beam ends CS4 - 130 SF for corrosion and complete paint failure at ends						
3410-Chalking (Steel Protective Coatings)		12765		0	12765	0	0
3440-Effectiveness (Steel Protective Coatings)		260		0	0	130	130
113-Steel Stringer	3 - Mod.	2464	ft.	2334	72	58	0
	2022 Inspection (see attached physical condition report for additional information and photos) [Note that the overall quantity includes Sidewalk Stringers in Spans 1 and 3] CS2 - 56 LF in Span 2 with typical minor corrosion at ends of SW Stringers 1 & 4 and Roadway S1 & S8 with isolated areas throughout; 8 LF each in Span 1 and Span 3 sidewalk stringers for isolated areas of minor corrosion CS3 - 16 LF in Span 2 for areas of section loss on S1 & S8; 20 LF in Span 2 for SW Stringers 1 and 4; 22 LF in Span 3 for section loss on Sidewalk Stringer 2						
1000-Corrosion		130		0	72	58	0

Inspector: Fisco,Nicholas **Structure Number:** 4400038

Inspection Date: 12/01/2022 **Facility Carried:** SR 7

Bridge Inspection Report

	Environment	Total Quantity	Units	Condition State 1	Condition State 2	Condition State 3	Condition State 4
515-Steel Protective Coating		7157	sq. ft.	0	6412	716	29
	2022 Inspection (see attached physical condition report for additional information and photos) CS2 - 6412 SF for surface dulling and chalkiness throughout CS3 - 716 SF for corrosion/paint failing mostly at ends CS4 - 29 SF in Span 2 for complete failure of paint on top flange of S8 between FBs 3 & 4, isolated complete failure at ends of S1 & S8 and paint failures at the ends of the sidewalk stringers with active corrosion.						
3410-Chalking (Steel Protective Coatings)		6412		0	6412	0	0
3440-Effectiveness (Steel Protective Coatings)		745		0	0	716	29
120-Steel Truss	3 - Mod.	324	ft.	153	91	80	0
	2022 Inspection (see attached physical condition report for additional information and photos) CS2 - areas of surface rust typically around panel points CS3 - areas of section loss and corrosion typically on the verticals, diagonals, and lower chord around lower panel points, areas of section loss on the verticals around guardrail connections and active pack rust between connecting elements typically at the lower chord panel points						
1000-Corrosion		171		0	91	80	0
515-Steel Protective Coating		11021	sq. ft.	0	9368	1102	551
	2022 Inspection (see attached physical condition report for additional information and photos) Note includes paint for entire truss including gusset plates CS2 - all paint on truss is typically chalky CS3 - areas of corrosion where the paint has limited effectiveness, typically at the lower panel points and along the lower chord CS4 - areas where the paint has failed and exposed bare metal, typically around the lower chord and lower panel points, but also some isolated areas on the upper chord, mid panel points, and web members						
3410-Chalking (Steel Protective Coatings)		9368		0	9368	0	0
3440-Effectiveness (Steel Protective Coatings)		1653		0	0	1102	551
152-Steel Floor Beam	3 - Mod.	365	ft.	279	37	49	0
	2022 Inspection (see attached physical condition report for additional information and photos) [note that the overall quantity includes the diaphragms between Beams 1 & 2 and Beams 7 & 8 in Spans 1 & 3 since they are a main load carrying path] CS2 - 32 LF in Span 2 and 5 LF in Span 3 for isolated areas of minor corrosion CS3 - 41 LF in Span 2 for corrosion at ends of FBs, section loss on end FBs & cracks in FB webs at upper copes; 8 LF in Span 3 for corrosion and section loss typically around stringer connections						
1000-Corrosion		83		0	37	46	0
1010-Cracking		3		0	0	3	0
515-Steel Protective Coating		4552	sq. ft.	0	4228	288	36
	2022 Inspection (see attached physical condition report for additional information and photos) CS2 - for surface dullness and chalky paint with isolated areas of minor surface rust CS3 - 288 SF in Span 2 for corrosion at ends of FBs CS4 - 36 SF in Span 2 for paint failure and corrosion typically at ends of FBs						

Inspector: Fisco,Nicholas **Structure Number:** 4400038

Inspection Date: 12/01/2022 **Facility Carried:** SR 7

Bridge Inspection Report

	Environment	Total Quantity	Units	Condition State 1	Condition State 2	Condition State 3	Condition State 4
3440-Effectiveness (Steel Protective Coatings)		4552		0	4228	288	36
162-Steel Gusset Plate	3 - Mod.	42	each	20	2	20	0
	2022 Inspection (see attached physical condition report for additional information and photos) CS2 - 1 middle plate on Left Truss & 2 upper plates on Right Truss with minor corrosion and minor section loss CS3 - 10 lower plates on Left Truss & 10 lower plates on Right Truss with moderate corrosion and moderate section loss or larger areas of minor section loss						
1000-Corrosion		22		0	2	20	0
205-Reinforced Concrete Column	3 - Mod.	4	each	2	2	0	0
	2022 Inspection (see attached physical condition report for additional information and photos) CS2 - right column of Pier 2 has cracking and efflorescence, both columns of Pier 2 have shallow spalls with exposed reinforcement						
1090-Exposed Rebar		1		0	1	0	0
1120-Efflorescence/Rust Staining		1		0	1	0	0
215-Reinforced Concrete Abutment	3 - Mod.	96	ft.	77	17	2	0
	2022 Inspection (see attached physical condition report for additional information and photos) Note that the total quantity does not include wingwalls. CS2 - Rear Abut.17 LF for minor abrasion and spalling CS3 - Rear Abut. 2 LF for moderate spall under Beam 4 with exposed and corroded reinforcement						
1080-Delamination/Spall/Patched Area		12		0	12	0	0
1090-Exposed Rebar		2		0	0	2	0
1190-Abrasion/Wear (PSC/RC)		5		0	5	0	0
220-Reinforced Concrete Pile Cap/Footing	3 - Mod.	91	ft.	16	45	30	0
	2022 Inspection (see attached physical condition report for additional information and photos) CS2 - 45 LF with minor spalling with exposed reinforcement and cracking, some with efflorescence CS3 - 30 LF with moderate spalling with exposed reinforcement and moderate delaminations with heavy efflorescence. One broken reinforcement bar at north end of cap.						
1080-Delamination/Spall/Patched Area		30		0	20	10	0
1090-Exposed Rebar		10		0	0	10	0
1120-Efflorescence/Rust Staining		10		0	5	5	0
1130-Cracking (RC and Other)		25		0	20	5	0
227-Reinforced Concrete Pile	3 - Mod.	34	each	30	1	3	0
	2022 Inspection (see attached physical condition report for additional information and photos) CS2 - 1 pile with delamination and minor spalling CS3 - 3 (2 piles with moderate spalling with exposed reinforcement, 1 pile that was constructed incorrectly and is in front of cap - put under settlement)						
1080-Delamination/Spall/Patched Area		1		0	1	0	0
1090-Exposed Rebar		2		0	0	2	0
4000-Settlement		1		0	0	1	0

Inspector: Fisco,Nicholas **Structure Number:** 4400038

Inspection Date: 12/01/2022 **Facility Carried:** SR 7

Bridge Inspection Report

	Environment	Total Quantity	Units	Condition State 1	Condition State 2	Condition State 3	Condition State 4
234-Reinforced Concrete Pier Cap	3 - Mod.	89	ft.	37	10	42	0
	2022 Inspection (see attached physical condition report for additional information and photos) CS2 - 7 LF at Pier 1 & 3 LF at Pier 2 for delaminations and minor spalling some with exposed reinforcement CS3 - 16 LF at Pier 1 & 26 LF at Pier 2 for moderate spalling with exposed reinforcement						
1080-Delamination/Spall/Patched Area		42		0	0	42	0
1090-Exposed Rebar		10		0	10	0	0
300-Strip Seal Expansion Joint	3 - Mod.	188	ft.	0	168	19	1
	2022 Inspection (see attached physical condition report for additional information and photos) CS2 - joint partially filled with debris 38 LF at Rear Abut., 26 LF at Pier 1, 29 LF at Pier 2, 45 LF at Pier 3; joint partially filled with debris & minimal leakage noted 45 LF at Fwd. Abut. CS3 - joint completely filled with hard packed debris in shoulders that can affect movement and section loss on joint armor: 8 LF at Pier 1, 4 LF at Pier 2, 4 LF at Pier 3; joint seal partially pulled out 3 LF at Fwd. Abut. CS 4 - 1 LF joint missing at Pier along roadway centerline						
2310-Leakage		45		0	45	0	0
2320-Seal Adhesion		4		0	0	3	1
2350-Debris Impaction		135		0	123	12	0
2370-Metal Deterioration or Damage		4		0	0	4	0
302-Compression Joint Seal	3 - Mod.	34	ft.	14	20	0	0
	2022 Inspection (see attached physical condition report for additional information and photos) CS2 - 20 LF with minimal leakage						
2310-Leakage		20		0	20	0	0
310-Elastomeric Bearing	3 - Mod.	8	each	0	6	2	0
	2022 Inspection (see attached physical condition report for additional information and photos) CS2 - 6 (all have corrosion of sole plates and there is a minor gap along the west side of Beam 3 elastomeric pad) CS3 - Beams 5 & 6 sole plates are misaligned to the east and so are not fully bearing on elastomeric, also both have gaps between the elastomeric pad and beam seat along the west side of the bearing						
1000-Corrosion		6		0	6	0	0
2220-Alignment		2		0	0	2	0
311-Movable Bearing	3 - Mod.	18	each	0	5	13	0
	2022 Inspection (see attached physical condition report for additional information and photos) CS2 - 5 at Span 1 Rear Abut. with minor corrosion CS3 - 3 at Span 1 Rear Abut. (Beam 1 with excessive expansion & section loss at Beams 3 & 7); 2 at Span 2 Pier 2 (Beam 1 with pack rust, and Beam 8 excessive expansion and section loss to bearings and anchor bolt nuts); 8 at Span 3 Pier 3 (section loss)						
1000-Corrosion		17		0	5	12	0
2210-Movement		1		0	0	1	0

Inspector:	Fisco,Nicholas	**Structure Number:**	4400038
Inspection Date:	12/01/2022	**Facility Carried:**	SR 7

Bridge Inspection Report

	Environment	Total Quantity	Units	Condition State 1	Condition State 2	Condition State 3	Condition State 4
313-Fixed Bearing	3 - Mod.	26	each	0	16	10	0
	2022 Inspection (see attached physical condition report for additional information and photos) CS2 - 2 at Span 2 Pier 1, 7 at Span 3 Pier 2 & 7 at Span 4 Pier 3 for minor corrosion CS3 - 8 at Span 1 Pier 1 (Beam 8 with pack rust at pin and Beams 1-7 with section loss); 1 at Span 3 Pier 2 (Beam 7 with section loss); 1 at Span 4, Pier 3, Beam with ~20% loss of bearing area due to spall.						
1000-Corrosion		25		0	16	9	0
2240-Loss Bearing Area		1		0	0	1	0
321-Reinforced Concrete Approach Slab	3 - Mod.	1864	sq. ft.	1757	105	2	0
	2022 Inspection (see attached physical condition report for additional information and photos) CS2 - 60 SF at Rear with missing wearing surface along joint and in NB lane as well as moderate wear in wheel paths and 45 SF at Forward with moderate width unsealed crack along forward termination and minor chipping with seal failure along beginning of approach slab CS 3 - 2 SF spall in Rear Approach slab						
1080-Delamination/Spall/Patched Area		2		0	0	2	0
1190-Abrasion/Wear (PSC/RC)		105		0	105	0	0
330-Metal Bridge Railing	3 - Mod.	625	ft.	611	10	4	0
	2022 Inspection (see attached physical condition report for additional information and photos) CS2 - 10 LF t/o bridge for minor impact damage and scrapes CS3 - 4 LF of right rail in Span 1 & 4 LF of left rail in Span 4 with impact damage that has bent and torn posts						
1900-Distortion		14		0	10	4	0
7000-Damage		0		0	0	0	0
815-Drainage	3 - Mod.	13	each	0	13	0	0
	2022 Inspection (see attached physical condition report for additional information and photos) CS1 - 8 scuppers in Span 2, 4 scuppers in Span 3, and 1 scupper in Span 4. Only leaf debirs, no clogs.						
830-Abutment Backwall	3 - Mod.	103	ft.	83	20	0	0
	2022 Inspection (see attached physical condition report for additional information and photos) CS2 - 10 LF at each backwall with hairline vertical cracks, isolated cracks with efflorescence						

Inspector:	Fisco,Nicholas	**Structure Number:**	4400038
Inspection Date:	12/01/2022	**Facility Carried:**	SR 7

Bridge Inspection Report

LAW-00007-0240 _(4400038)

ODOT District:	District 09					Date Built:	07/01/1933
Major Maint:	01 - State Highway Agency	Facility Carried:	SR 7	Traffic On:	1 - Highway	Rehab Date:	01/01/1990
Routine Maint:	02 - County Highway Agency	Feature Inters:	SYMMES CREEK	Traffic Under:	5 - Waterway	Insp. Resp A:	01 - State Highway Agency
FIPS Code:	13904 - CHESAPEAKE (LAW county)	Location:	DISTRICT 09	.11 MI N OF SR 527		Insp Resp B:	
Inspector	Fisco,Nicholas	Inspection Date	12/01/2022	Reviewer	Not Approved		

Inspector Comments - Deck and Approach

Deck

Reference the 2022 Inspection Physical Condition Report for additional information and photos

Spans, panel points, and substructure units labeled looking upstation (west to east); Trusses are labeled left to right (north to south); Beams in Spans 1, 3 & 4 labeled left to right from B1 to B8; Stringers in Spans 1 & 3 labeled left to right from S1 to S4; Primary truss stringers in Span 2 labeled left to right from S1 to S8 and sidewalk stringers in Span 2 labeled left to right from SW1 to SW4.

Floor/Slab

Transverse cracking is typical with many locations having efflorescence. Longitudinal and map cracking, some with efflorescence, is more isolated. Cracks are spaced at 2' to 3'. There is a moderate spall in the right edge of deck in Span 2.

Bridge Wearing Surface

Epoxy shows wear in wheel paths; a few areas are exposing the concrete deck. There are some minor sized longitudinal/transverse cracks throughout the length of the wearing surface of the structure.

Expansion Joint

Joint strip seals are partially to mostly filled with debris and the joint armor has areas of loss up to 1/16" deep. The gland at the Forward Abutment is extruded in small sections and beginning to tear. and there is a 1' long missing section of joint seal over Pier 2 at roadway centerline. Minor vertical misalignments were noted at all joint locations, with worst noted at Pier 2 with the east side being 1 1/4" higher. The compression seal joint at Pier 3 is sealed over with tar. Evidence of leakage was noted at the Forward Abutment strip seal joint and the Pier 3 compression seal joint.

Joints were measured along the both edge lines at 57º F.
Left Lane: Rear Abut (1) - 1 1/2"; Pier 1 (2) 2 3/8"; Pier 2 (3) 2 1/4"; Pier 3 (4) 1 3/4"; Fwd Abut (5) 1/2".
Right Lane: Rear Abut (1) - 1 1/2"; Pier 1 (2) 2 3/8"; Pier 2 (3) 1 3/4"; Pier 3 (4) 1 3/4"; Fwd Abut (5) 1".

Bridge Railing

[includes post/truss mounted deep beam roadway guardrail]

The end of the right rail in Span 1 has impact damage with the first post bent and torn and the second post rotated and torn. The end of the left rail in Span 4 has impact damage with the first post bent and torn and a torn blockout at the second post. There are also some isolated minor scrapes/dents and areas of rust in various locations. Heavy debris is typical along the back face of the rails that is trapped between the W-beam and the longitudinal tube.

Deck Drainage

Scuppers have minimal leaf debris bloackage.

Curbs/Sidewalk/Railing

[includes sidewalk concrete, sidewalk joints, sidewalk and railing]

The wearing surface on the sidewalk is failing throughout. There are typical transverse cracks in the top of the sidewalk and on the underside with efflorescence. Spalls are present in the right sidewalk at the abutment joints and in both sidewalks at the joint over Pier 3. The sliding plate sidewalk joints typically have moderate debris accumulation and minor loss to the plates. The west side of the right sidewalk at the joint at Pier 3 is about 7/8" higher than the east side. The left sidewalk at Pier 3 has up to a 1 1/2" gap (aligns with the compression seal in the roadway). The left sidewalk panels in Span 4 that are partially supported by the retaining wall have up to 4" of settlement. The pedestrian railing has areas of active corrosion throughout. A section of the left rail in Span 1 that had severe impact damage has been replaced.

Approach

Approach Wearing Surface

Both were resurfaced during 2010. Minor to moderate unsealed transverse and longitudinal cracks are present in both approach roadways. Some cracks in the forward approach are sealed.

Approach Slab

There is an overlay on the rear approach slab that has wear in the wheel paths and some areas missing along the joint and in the right lane. The forward approach slab is covered by asphalt and there is a moderate width unsealed crack along the forward termination and chipping along the beginning of approach slab. Both sidewalks adjacent to the rear approach slab have settled with the left settling a maximum of 2 1/4" and the right 2 1/2". Rear approach slab has moderate spall along roadway centerline.

Embankment

There is erosion on the rear right embankment adjacent to the wingwall and a catch basin with roadway signs and ratchet straps in place as a temporary fix. The embankment is very steep with an erosion channel that extends down the embankment to the 4' deep by 5' wide by 35' erosion bully adjacent to the channel bank. There is 6' diameter area of sloughing on the west bank in front of Pier 1.

Signs

"No wake zone entire creek" sign hung on right lower chord over the creek.

Inspector Comments - General Appraisal

Superstructure

Beams/Girders

02-01-21- Special inspection performed due to recently reported vagrant fires.

Appeared to be a small fire in span 1 between beams 6/7, beams and deck underside have smoke discoloration (discoloration previously noted as well).

Span 3 had 2 more moderate sized fires, located between beams 2/3 and 3/4; fire appeared to be partially fueled with some type of paint?; heavy dark discoloration of the beams and deck underside was noted between beams 1/2, 2/3, and 3/4. Discoloration of lesser intensity was also noted between beams 4/5.

Span 1: Beams in Span 1 at the rear abutment have section loss to webs & bottom flanges with the worst case at Beams 1, 2 & 3 with up to 7/16" deep section loss of the flanges and minor loss in the webs. Beams 6 & 7 close to the abutment have smoke stains from a fire being built under the bridge (first noted in 2019).

Span 3 - Beams 2, 6, & 7 have areas of sections loss typically between 1/16" to 3/16" deep on the flanges and webs with the worst case being a minimum of 3/8" thickness remaining bottom flange at Pier 3. Beam 2 also has up to 3/16" deep loss in the underside of the bottom flange west of Pier 3. Beam 7 at Pier 2 has areas of 1/16" to 3/16" deep loss on the flanges and web. The beams have isolated areas of surface corrosion typically at the beam ends.

Span 4 - There are isolated areas of section loss with 1/8" deep loss on the Beam 8 bottom flange around the 2nd diaphragm and Beam 7 has 1/8" deep section loss on the bottom flange and the web (mostly beyond the bearing). The beam ends, especially at Pier 3, have active corrosion with laminate rust and negligible loss with some areas of complete paint failure. There is a broken weld between the Beam 4 web and crossframe at the Forward Abutment.

Stringers

[Includes sidewalk stringers in Spans 1, 2, and 3]

Roadway Stringers (Span 2):

Minor surface corrosion on the stringers, typically isolated to the ends. Stringers 1 and 8 in Span 2 have areas of section loss up to 1/8" deep typically at the ends by the floorbeam connection. For these stringers, there is also pack rust between the clip angle and the stringer bottom flange up to 3/4" thick that deforms the angle.

Sidewalk Stringers:

Sidewalk stringers in Spans 1, 2, and 3 exhibit advanced section loss in the bearing area over the cantilever floorbeam brackets, with corrosion holes common in the webs. Worst location noted on Stringer 3 in Span 2 at Floorbeam 0 (24" long by 4 1/2" high corrosion hole). Sidewalk stringer stub beams at Piers 1 and 2 have advanced cleaned and painted section loss throughout.

Steel Truss

[for detailed information see the truss member tables in the 2022 Physical Condition Report]

Verticals - Section loss is typical at the lower chord panel points ranging from minor to advanced areas of 100% loss with most of the section loss concentrated within the bounds of the gusset plates. There are areas of moderate loss on the inboard flanges at the old rail connections.

Diagonals - Minor to moderate section loss is present on the diagonals typically along the lower chord gusset plate interfaces. Some locations have minor pack rust between the diagonal member and the gusset plate.

Upper Chords & End Posts - The upper chords generally have no significant deficiencies. The end posts typically have minor to moderate section loss around the sidewalk level.

Lower Chords - Minor to moderate section loss is typical on the lower chords at the lower chord panel points along the gusset plate interface. Pack rust with some associated section loss was noted in the sections that have

two flange plates, at splice locations, and at several of the internal diaphragm locations.

Members at the lower panel points generally have areas of active corrosion with some areas having completely failed paint. Paint throughout truss is chalky.

Floorbeams

[for detailed information see the floorbeam table in the 2022 Physical Condition Report]

Roadway Floorbeams

Minor to moderate painted-over section loss to the flanges and webs at the coped areas adjacent to the inboard gusset plate connection is typical throughout. The worst case locations are the end floorbeams (FB0 & FB9) due to previous joint leakage. There are typical 1/8"-1/2" long overcuts into the floorbeam web at coped areas. Cracks in the floorbeam coped connections adjacent to the inboard gusset plate had propagation since 2020 inspection: FB0: 2 cracks at left end (top 1 3/8" long (no change) and bottom 1 3/4" long (1/4" prop.)) & FB9: 3 cracks at right end, all with no change (top 1"long, middle 1/4" long, bottom 5/8" long that emanates from 1/2" long overcut) and 2 cracks at left end (top 1" long (no change) and bottom 1 3/8" long (1/8" prop.)) with 1/4" cut located between the cracks. The previously noted 1" long crack at the right end of FB3 was determined to be an overcut. The previously noted 1/4" long possible crack indications at FBs 3 & 5 were determined to be just cracks in the paint.

Floorbeam Cantilevers

Advanced section loss to all of the negative moment cantilever tension bolts and heavy debris accumulation at the connection assembly on the top flange of the cantilever floorbeams adjacent to the sidewalk opening at each panel point is typical. One bolt has 95% section loss at L8 on Left Truss. One bolt is severed at L5 (first noted 10/18 - not found in 2022). Pack rust at the assemblies has deformed the top flange of the cantilevers at multiple locations.

Gusset Plate

[for detailed information see the gusset plate tables in the 2022 Physical Condition Report]

The lower truss gusset plates have areas of minor to moderate section loss typically along the connecting members with many locations having active surface corrosion. Most of the loss is on the interior faces, but there are some isolated locations on the exterior faces of the plates. Several plates have pack rust between the gusset plate and connecting member with an associated minor bow. Minor bows of 1/16"-1/8" due to fit-up were also observed.

Bearing Devices

Elastomeric bearings- All the bearing plates at the Forward Abutment have paint failure with active corrosion. The sole plates of Beams 5 & 6 are misaligned towards the east and are therefore not in full bearing on the elastomeric pads. Minor gaps between the bottom of the elastomeric pads and the abutment were noted along the west side of the Beam 3, Beam 5, & Beam 6 bearings for up to a 2 1/4" width under the pad.

Rocker bearings - All bearings at the rear abutment have minor section loss to the pins, nuts, masonry plates & rockers with the worst case at Beams 1, 2 & 3. The Beam 1 rocker has excessive expansion and is tilted toward the rear backwall and the remaining bearings are expanded within expected limits or are plumb. The truss rocker bearings at Pier 2 have minor to moderate section loss with loss on the pins and anchor bolt nuts. There are isolated areas of section loss on the rocker bearings for Span 3 at Pier 3.

Fixed bearings - The bearings have minor corrosion and very minor loss. The Span 4, Beam 4 bearing at Pier 3 has about 20% loss of bearing area due to a spall in the pier.

Protective Coating System

The PCS, especially in the truss span, is typically chalky and has surface dulling. There are areas of paint failure with active corrosion typically on the lower chord, lower chord gusset plates, and ends of floorbeams, beams, and stringers. However, there are also some random isolated areas on the truss upper chord and web members.

Diaphragm/X-Frames

The diaphragms have areas of painted over section loss with holes noted in Span 3 between Beams 7 & 8 at Pier 2, Span 3 between Beams 1 & 2 and 2 & 3 at Pier 3, and Span 4 between Beams 7 & 8.

Lateral Bracing

Overall the lateral bracing is in good condition with some minor sagging of the upper lateral bracing noted.

Sway Bracing

A few gusset plates scattered throughout the bracing have minor areas of pack rust between plates & beams. There is a slight bow at the top chord at Panel Point 1 that appears to be from construction.

Fatigue

Cracks in floorbeam webs at copes (see Floorbeam section above)

Utilities

Waterline along right side of bridge and small diameter conduit along left side. Some brackets along the left side for a utility that no longer exists are bent down and have broken rollers. Additionally, near the Rear Abutment, there is a disconnected portion of the small diameter conduit. There is typically pack rust between the floorbeam cantilever brackets and the water line support connections on the right side of the truss. A broken wire hanger for this pipe was found between PP7-8. An electrical line is connected to a light at the center of the Right Truss upper chord.

Substructure

Abutments

The Rear Abutment has several small to moderate areas of spalling (varies shallow to up to 2" deep) with exposed reinforcement. The Forward Abutment is mostly buried/not visible. Both abutments have some hairline vertical cracks.

Pile Caps

[includes Pier 3 cap]

Pier Cap 3 has spalling with exposed reinforcing steel on the underside for the entire length, and scattered areas of spalling on the faces throughout. One broken bottom reinforcement bar noted on rear face at north end. There is cracking with heavy efflorescence on the forward face.

Pier Caps

[includes Pier 1 & Pier 2 caps]

Pier Cap 1 has several areas of spalling with exposed rebar on both faces, areas of delamination, and several minor spalls with exposed steel on both faces of the beam seat. Pier Cap 2 has several areas of spalling with exposed rebar on the rear face, vertical cracking with delamination was present on the right end of the forward face, and cracking with efflorescence was present on the right end of the cap. Pier Cap 2 has moderate spalls on the pier cap that undermine Beam 6 bearing up to 3/4".

Concrete Piles

34 total piles are exposed at Pier 3 with the west row of piles having 1 pile with delamination and minor spalling, 2 piles with moderate spalling and exposed reinforcement, and 1 pile that was incorrectly constructed in front of the cap.

Concrete Columns

[includes columns of Piers 1 and 2]

The right column of Pier 2 has minor cracking with efflorescence on the south face near the top.

Backwalls

Both the Rear and Forward Abutment backwalls have isolated hairline cracks.

Wingwalls

The Rear Abutment left wingwall has minor cracking with efflorescence.

Slope Protection

Large riprap is present in front of both abutments with settlement exposing the top surface of the Rear Abutment footing at the left end. There is a minor erosion channel up to 10" deep on the forward embankment between Beam lines 1 & 2.

Culvert

Not applicable

Inspector Comments - Waterway

Waterway Adequacy

Channel Hydraulic Opening

Brush and trees along the embankments.

Channel

Channel Alignment

Flows left to right; sees back water from the Ohio river.

Inspector:	Fisco,Nicholas	**Structure Number:**	4400038
Inspection Date:	12/01/2022	**Facility Carried:**	SR 7

Bridge Inspection Report

There is an 4' deep by 5' wide by 35' long erosion gully in the west channel bank.

Scour Critical

APPENDIX C

Member Defect Tables

(THIS PAGE INTENTIONALLY LEFT BLANK)

Appendix C

Table C.1 Truss Member Defects				
Truss	**Member**	**Flange**	**Location**	**Defect Description**
Left	L0-L1	inboard	right face near L0	Section loss: 1/16" D x 2" H x 15" L along the top
		both	top face near L0	Active Pack rust: 1/2" thick x 2' L at diaphragm connection angles
		both	at L1 gusset plate	Section loss: < 1/16" D x FH x 1" L
	L0-U1	outboard	bottom flange	Pack rust: 3/8" thick at lacing bars connection
	L1-U1	outboard	web above guardrail	Section loss: 1/16" D x 4" Ø
		inboard	above old guardrail connection	Section loss: 1/8" D x 1" H x FW and 3" Ø above
		inboard	below U1 gusset plate	Section loss: 1/8" D x 1 1/2" Ø
		-	at L1 gusset plate	Section loss: 1/16" D x 2" Ø in web forward face within bounds of gusset plates
	L1-L2	both	at L1 gusset plate	Section loss: < 1/16" D x FW along diaphragm angles within bounds of gusset plates
		-	bottom of flange plates at splice	Pack rust: 1/8" thick x 3' L Section loss: 1/4" D x FW x 3' L
	U1-L2	outboard	at mid-height	3/8" bow over 12" L
	L2-U2	inboard	at old guardrail connection	Section loss: < 1/16" D x 1/2" H x FW
	L3-U2	inboard	at sidewalk	Section loss: 1/8" D x 4" H x 4" W
	L2-L3	-	bottom of flange plates at both L2 and L3	Active Pack rust: Up to 1/4" thick x 3' L Section loss: 1/8" D x 3' L
	L3-U3	-	L3 gusset plate	Section loss: 1/16" D x 4" H from bottom
		inboard	at old guardrail connection	Section loss: < 1/32" D x 18" H x FW
	L3-U4	inboard	at L3 gusset plate	Section loss: 1/16" D x 3" H x FW
	U3-L4	inboard	at M3'	Section loss: 1/16" D x 18" L x FW
	L3-L4	-	at splice near L4 at end	Active Pack Rust: 1/4" thick x 2' L
	L4-U4	inboard	at old guardrail connection	Section loss: 1/8" to 1/4" D x 3" H x FW extending over an 18" height
	L4-L5	inboard	18" from L4 at diaphragm angle	Section loss: 6" W x 3" H x 1/8" D
		inboard	at L4 gusset plate	Section loss: < 1/16" D x 1" W x FH
	U4-L5	inboard	at L5 gusset plate	Section loss: 1/8" D x 2"H x FW 0.27" 0.47" Pack Rust: 3/16" thick
	L5-U5	inboard	at old guardrail connection	Section loss: 1/16" D x 8" H x FW with 1/8" D x 1" H x FW area of active corrosion
	L5-L6	both	near L5 at splice plates	Active Pack Rust: 3/16" D x 2' L
		inboard	at L6 gusset plate	Pack rust: 1/8" thick x 8"H
	L5-U6	both	at L5 gusset plate	Section loss: 1/16" D x 1/2" H x FW
	U5-L6	inboard	at sidewalk	Section loss: 1/8" D x 6" W x 6" H area of active corrosion
		both	at L6 gusset plate	Active Pack Rust: 1/8" thick x 2' L Section loss: 1/16" D x FW
	L6-U6	-	L6 gusset plate	Section loss: 1/16" D x 4" Ø in web rear face within bounds of gusset plates
		inboard	at L6 gusset plate	Section loss: 1/16" D X FW
		inboard	at old guardrail connection	Section loss: 1/8" D x 2" H x FW (x 2)
	L6-U7	inboard	at sidewalk	Section loss: 1/8" D x 3" Ø
	L6-L7	both	near L6 end 2'	Active Pack rust: 1/4" thick between plates
		both	near L7 end 2'	Active Pack rust: up to 1/2" thick between plates on top and bottom edges
	L7-U7	inboard	at old guardrail connection	Section loss: 1/16" D x 2" H x FW
		inboard	at floorbeam	Section loss: 1/8" D x FW
		-	at floorbeam	Section loss: 1/8" D x 3" W in web forward face

New findings in red

Legend:

Left = North Forward = East FH = Full Height L = Long

Right = South Rear = West W = Wide D = Deep

STRINTEG

Appendix C

Table C.1 Truss Member Defects				
Truss	**Member**	**Flange**	**Location**	**Defect Description**
Left	L7-U8	outboard	at sidewalk	Section loss: 0.27" D x 4" W x 3" H in right face
		inboard	at L8 gusset plate	Section loss: 1/8" D x 1" H x FW
		-	at sidewalk	Section loss: 1/16" D x 8" H x 3" W
	L7-L8	both	bottom edge along splice	Active Pack Rust: Up to 1/4" thick x 2' L
		both	at L8 gusset plate	Section loss: 1/32" D x 1"W x FH
	L8-U8	inboard	under old guardrail connection	Section loss: up to 1/4" D x FW x 1" H Section loss: 1/16" D x FW x 6" H Section loss: 1/8" D x 4" W x 1" H
	L8-L9	outboard	diaphragm angle near L9	Section loss: 1/16" D x 6" H in right face
	U8-L9	top	under bridge plaque	Section loss: 12" W x 9" H x 0.04" D Pack rust: 1/2" thick
Right	L0-L1	inboard	near L0	Section loss: 1/8" D x 2 1/2" H x 1" L
		both	near L0 at diaphragm connection angles	Section loss: 1/16" D in top face Active Pack rust: up to 5/8" thick
		outboard	top left face near midspan	Pack rust: 1/4" thick Section loss: 1/16" D with isolated 1/8" D x 5" H
		inboard	near midspan	Section loss: < 1/16" D x 9" H x 20" L in right face with grinder marks
		outboard	interior connection angle near L1	Section loss: 3/16" D x 2" Ø in left face
		outboard	at L1 gusset plate	Section loss: 1/32" D (isolated 1/16" D) x 5" H x 2" L in left face
		outboard	at L1 gusset plate	Section loss: < 1/16" D x 5 1/2" H x 2" L in right face
		inboard	at L1 gusset plate	Section loss: < 1/16" D x 3" H x 3" L in right face
	L0-U1	inboard	at L0 gusset plate	Section loss: 3/16" D x 6" H x 9" L along web outside bounds of gusset plate
		-	L0 cover plate	Section loss: < 1/16" D with broken rivets
		inboard	below portal	Pack Rust: 3/4" thick caulked between web and abandoned angle
		-	under bridge plaque	Active corrosion
	L1-U1	outboard	above L1 gusset plate	Section loss: 1/8" D x FW at fill plate Active pack Rust: up to 1/2" thick at fill plate Section loss: 100% in top of fill plate
		inboard	at old guardrail connection	Section loss: 1/8" D x 6" W x 1 1/2" L
		inboard	at old guardrail connection	Section loss: 3/16" D x 6" W x 2" L with adjacent smaller areas
		-	at U1 gusset plate	3/4" Ø hole in web
	L1-L2	inboard	at L1 gusset plate	Section loss: 1/16" D x FH with isolated 1/8" D at the top edge
		outboard	near L1 gusset plate north face	Section loss: 1/8" D x 1 1/2" W x 7" H at top and 1/16" D x 1 1/2" W x remaining height at diaphragm connection angle within bounds of gusset plate
		inboard	near L1 gusset plate south face	Section loss: 1/16" D x 2" H x 1/2" L at diaphragm connection angle
		both	underside near L2	Pack rust: 1/8" thick at diaphragm connection angles
		both	top face and underside near L2	Pack rust: up to 1/4" thick at splice plates within bounds of gusset plate
		outboard	near L2 north face	Section loss: 1/16" D x 5" H x 4" L at diaphragm connection angle
	U1-L2	inboard	at L2 gusset plate	Section loss: 1/16" D x 3" L x 1" H
		inboard	at sidewalk	Section loss: 1/16" D x 2" Ø in exterior face
		outboard	at sidewalk	Section loss: 1/16" D x 3" L x 1 1/2" H in interior face

New findings in red

Legend:

Left = North Forward = East FH = Full Height L = Long
Right = South Rear = West W = Wide D = Deep

STRINTEG

Appendix C

Table C.1 Truss Member Defects				
Truss	**Member**	**Flange**	**Location**	**Defect Description**
Right	L2-U2	-	bottom web and flanges at L2 gusset plate	Section loss: Left half of the web x 3' H x 1/4" D average with isolated 5/8" D with pin corrosion holes and up to 1/4" deep by 9" wide on within bounds of the gusset plates. Section loss: 100% on bottom 1' of the web with up to 1/4" deep pitting on the east half of both flanges. Section loss: Up to 1/4" deep x 9" W on web outside bounds of gusset plate.
		outboard	at L2 gusset plate south face	Section loss: 1/16" D x FW at fill plate Active pack rust with 100% section loss in top of fill plate
		inboard	at sidewalk	Section loss: 1/16" D to 1/8" D in interior face and both web faces
		inboard	at old guardrail connection	Section loss: 1/16" D x 6" H x FW with isolated 1/8" D areas
	L2-L3	both	bottom of flange plates near L2	Pack rust and section loss: 7/16" thick at splice plates
	U2-L3	outboard	at L3 gusset plate	Section loss: 1/8" D with isolated 3/16" D x 3" H x FW with pack rust and 100% section loss in top of fill plate
		inboard	at L3 gusset plate	Section loss: 3/16" D x 2" H x 7" W
		inboard	at guardrail connection	Section loss: 1/16" D Active corrosion
	L3-U3	inboard	at old guardrail connection	Section loss: Up to 1/8" D x 2" H x FW Active corrosion
		-	rear web above sidewalk	Section loss: < 1/16" D x 3" W x 18" L Active corrosion
		inboard	at sidewalk	3/16" x 24" H bow to the right on rear side; 3/16" x 24" H bow to the left on forward side
		inboard	at L3 gusset plate	Section loss: up to 1/8" D x 6" H x 1" W from bottom of member extending into web
		ouboard	deck level	Gouges: Up to 1/16" D x 2" W on west edge
		outboard	at guardrail connection	Active section loss to 1/16" D x FW x 1" H
		outboard	at L3 gusset plate	Section loss: 1/16" D x FW at fill plate Pack Rust: 1/16" thick 100% section loss in top of fill plate
	L3-L4	both	near L4 gusset plate	Active pack rust: 3/8" thick
	U3-L4	both	below M6	Section loss: < 1/16" D on inside of top flanges
		inboard	above guardrail	Section loss: 1/32" D x up to 18" H x 3" W in top interior face
		inboard	at L4 gusset plate north face	Section loss: 1/8" D x 2" H x 3" L
	L4-U4	-	web at L4 gusset plate	Corrosion holes: 2" H x 4" L at left side and 1" H x 3" L at right side at bottom free edge
		inboard	at sidewalk	Section loss: 1/16" D x 6" H extending into web
		inboard	along L4 gusset plate north face	Section loss: 1/8" D x FW
		inboard	at old guardrail connection	Section loss: 5/32" D x 2" H x FW with remaining width 1/16" D
	U5-L4	inboard	at L4 gusset plate	Section loss: 1/8" D x FW with active pack rust 3/16" thick
		inboard	top face at L4 gusset plate	Section loss: 1/8" D x 2 1/2" H x 6" W in web with up to 1/8" D x 2" W in both flanges
		inboard	at sidewalk	Section loss: 1/8" D x 1 1/2" Ø
		inboard	below M5 gusset plate	Section loss: 1/32" D in top interior face

New findings in red

Legend:

Left = North Forward = East FH = Full Height L = Long
Right = South Rear = West W = Wide D = Deep

STRINTEG

Appendix C

Table C.1 Truss Member Defects				
Truss	**Member**	**Flange**	**Location**	**Defect Description**
Right	L4-L5	outboard	midspan diaphragm connection angle	Section loss: 3/16" D x 1" W x FH
		outboard	midspan diaphragm connection angle	Pack rust: 1/4" thick
	U4-L5	inboard	at sidewalk	Section loss: 1/8" D x 16" H x FW with a 1/4" D x 2" H x 1" W area and a 1/4" D x 1" Ø area. Active corrosion
		outboard	at L5 gusset plate	Section loss: 1/8" D x 1 1/2" H x FW with isolated 3/16" D areas Active Pack Rust: 1/4" thick
	L5-U5	both	at L5 gusset plate	Section loss: 1/16" D x FW
		-	bottom of web at L5 gusset plate	Section loss: 8" H x FW x 1/8" D w/ knife edging and pinholes at bottom within bounds of gusset plate Section loss: 6" W x 26" H x 1/8" D typical (3/16" D isolated) in the forward face and left flange above the FW section loss within bounds of gusset plate
		-	forward web near sidewalk	Section loss: 1/16" D x 6" W x 12" H
		-	rear web near sidewalk	Section loss: < 1/16" D x 1" W x 15" H
		both	below M4' plate	Section loss: < 1/32" D in rear face
		outboard	above gusset plate	Pack rust: up to 1/4" thick between truss and fill plate
		inboard	above old guardrail connection	Section loss: 1/8" D x FW x 1" H (x2)
	L5-U6	inboard	at L5 gusset plate	Section loss: 1/8" D x FW
	L5-L6	both	near L5 gusset plate	1/4" thick pack rust between flange and splice plates
			Lower chord diaphragm angle connections	Active pack rust: 1/4" thick x 2' L
	U5-L6	inboard	at sidewalk	Section loss: 0.020" D x 8" H x 4" W with isolated 7/16" D area
		inboard	at L6 north face	Section loss: 1/8" D x FW x 3" L
		-	at sidewalk	Section loss: 1/16" D x 4" W x 10" H
	L6-U6	inboard	from floorbeam connection to old guardrail connection	Section loss: Up to 1/16" D x 9" H x FW
		-	rear web face from L6 gusset plate to old gaurdrail connection	Section loss: Up to 3/16" D x 3" W x 4" H
	L6-L7	outboard	at L6 gusset plate	Active Pack rust: up to 3/16" between gusset plate and flange plate
		outboard	end 3.5' from L6	Active Pack rust: Up to 1 1/8" thick along end with bowing of the top 4" and bottom 4" of the thinner (~3/8" thick) interior flange plate.
		inboard	end 3.5' from L6	Active Pack rust: Up to 5/8" thick along end with bowing of the top 4" and bottom 4" of the thinner (~3/8" thick) interior flange plate.

New findings in red

Legend:

Left = North Forward = East FH = Full Height L = Long

Right = South Rear = West W = Wide D = Deep

Appendix C

Table C.1 Truss Member Defects				
Truss	**Member**	**Flange**	**Location**	**Defect Description**
Right	L7-U7	-	bottom edge of web at L7 gusset plate	Section loss: 0.20" D x 12" H x FW with small corrosion holes within the bounds of the gusset plate
		inboard	below old guardrail connection	Section loss: 1/16" D x FW x 2" H
		outboard	above gusset plate	Pack Rust: Up to 1" thick at fill plate
		inboard	at sidewalk	Active section loss: 1/32" D x FW x 6" H
		-	both web faces below old guardrail connection	Section loss: 1/32" D x up to FW
	L7-L8	both	at L8 gusset plate	Section loss: 1/16" D x 1" W x FH along diaphragm connection angle within bounds of gusset plate
		both	bottom edge at splice plate	Active pack rust: 1/4" thick
		both	near L7 gusset plate	Active pack rust: 1/8" thick at top edges of splice plate
	L7-U8	inboard	at L7 gusset plate	Section loss: < 1/16" D x FW
		inboard	at sidewalk	Section loss: 0.15" D x 3" W x 6" H
	L8-U8	inboard	at old guardrail connection	Section loss: 1/8" D x FW
	U8-L9	inboard	from L9 gusset plate to sidewalk	Section loss: 0.20" D x 4" W
		inboard	at guardrail connection	Active section loss: <1/32" D
		outboard	4' from L9 bearing	Section loss: 1/8" D x FW x 3' H in web
		both	above sidewalk	Pack rust: 3/4" thick at lacing bars with 1/8" remaining section to lacing bars and active corrosion
		outboard	above sidewalk	Pack rust: minor between web and flange
		-	L9 cover plate	Section loss: Up to 2" Ø holes
	L8-L9	ouboard	left face	Section loss: 1/32" D x 18" L x 6" H area with hammer marks
		both	near L8 gusset plate	Section loss: 1/16" D x FH at diaphragm connection angle

New findings in red

Legend:

Left = North Forward = East FH = Full Height L = Long

Right = South Rear = West W = Wide D = Deep

STRINTEG

Appendix C

Table C.2 Truss Floorbeam Defects				
Floorbeam	**End**	**Face**	**Location**	**Defect Description**
0	left	rear	web	Section loss: FH x 5" W x up to 3/16" D
	left	forward	web	Section loss: FH x 5" W x 1/16" D
	left	-	web at top cope	Two cracks: 1 3/8" and 1 3/4" long - previously noted as "1 1/2" long maximum"
	left	rear	end 3' L of web	Section loss: 1/8" D x 3" H
	left	rear	end 3' L of bottom flange	Section loss: 1/8" D on top and bottom up to 2" wide at edge with 3/16" D Section loss on edge
	left	forward	end 3' L of bottom flange	Section loss: 1/16" D on top and bottom up to 2" wide at edge with 3/16" D Section loss on edge
	left	-	bottom flange	Active corrosion: 5' L
	-	rear	bottom flange top face	Laminate rust Section loss: 1/16" D
	right	rear	bottom flange about 5' from truss	Section loss: 8' L x 3" W x 1/4" D
	right	rear	web about 5' from truss	Section loss: 12' L x 6" H x 3/16" D (isolated 1/4" D)
	right	both	web at top cope	Overcut: 1/4" long
	right	-	bottom flange	Active corrosion: 10' L
	right	rear	web around LLB connection	Section loss: 1/16" D x 1" perimeter
	right	rear	web	Section loss: 1/8" D x 4" H x 1" W at bottom
	right	forward	web	Section loss: 1/16" D x 4" H x 1" W at bottom
	right	both	web	Section loss: 1/16" D x 4"H x 1" W at top
1	right	rear	web	Section loss: 1/8" D with isolated 3/16" D x 4" H x 1 1/2" W at top Section loss: 4" W x 5" H x 1/16" D at bottom
	right	rear	web	Overcut: 1/4" long
	right	forward	web	Section loss: 1/16" D x 1" H x 4" L at bottom
	right	forward	web at Stringer 8	Section loss: 1/8" D x 2" H x 1" L (with active corrosion)
	-	rear	web at Stringer 7	Gouges: 3" L x 1/8" D (several over 10" L x 5" W)
	left	rear	web	Section loss: <1/16" D x 6" H x 4" long at top Section loss: 1/8" D x 4" H x 6" W at bottom
	left	forward	web	Section loss: 1/16" D x 16" H x 4" L at top Section loss: 1/8" D x 6" H x 6" L at bottom (with some active corrosion)
2	right	both	web	Section loss: 1/8" D x 3" H x 1" W at top (active corrosion) Section loss: 1/8" D x 1" H x 12" W at bottom
	right	forward	top flange	Section loss: < 1/16" D x 6" W x 8" L
	right	forward	web	Section loss: 1/4" D x 1 1/2" H x 1" L at top
	left	both	web	Section loss: 1/8" D x 5" W x 5" H at bottom (active corrosion)
3	right	rear	web	Section loss: 1/8" D x 2" H x 1" L at top Section loss: 1/8" D x 5" H x 4" L at bottom
	right	-	web at top cope	Overcut: 9/16" vertical
	left	rear	web	Section loss: isolated up to 1/16" D x FH x 1 1/2" L
	left	forward	web	Section loss: 1/16" D x 3" H x 4" L
	right	forward	web	Section loss: 1/16" D x 2" H x 1 1/2" L at top Section loss: 1/8" D x 5" H x 3" L at bottom
4	left	forward	web	Section loss: 1/8" D x 4" H x 1" L at top Section loss: 3/16" D x 5" H x 3" L at bottom
	left	rear	web	Section loss: 1/8" D x 3" H x 2" L at top and bottom
	right	forward	web	Section loss: 3/16" D x 2" H x 2" L at bottom
	right	rear	web	Section loss: 1/8" D x 4" H x 1" L at bottom

New findings in red

Legend:

Left = North Forward = East FH = Full Height L = Long

Right = South Rear = West W = Wide D = Deep

STRINTEG

Appendix C

Table C.2 Truss Floorbeam Defects				
Floorbeam	**End**	**Face**	**Location**	**Defect Description**
5	left	forward	web	Section loss: 1/16" D x 3" H x 2" L at top Section loss: 1/8" D x 6" H x 5" L at bottom (some active corrosion)
	left	rear	web	Section loss: 4" W x 7" H x 1/8" D at bottom (some active corrosion)
	left	rear	web at Stringer 1	Section loss: 4" W x 5" H x 1/16" D at top
	left	rear	web	Section loss: 3" W x 6" H x 1/16" D at top
	right	forward	web	Section loss: 1/8" D x 4" H x 2" L at top Section loss: 1/8" D x 4" H x 5" L at bottom
	right	rear	web	Section loss: 1" W x 1" H x 1/8" at top Section loss: 8" W x 4" H x 1/8" D at bottom
6	right	both	web	Section loss: 3" H x 3/16" D x 1" W at top Section loss: 4" W x 4" H x 3/16" D at bottom
	left	rear	web	Section loss: 4" W x 5" H x 3/16" D at bottom
	left	forward	web	Section loss: 1/16" D x 2" H x 4" W at bottom
	left	rear	web	Paint failure: 3" Ø with active corrosion at top
7	left	forward	web	Section loss: 1/16" D x 3" H x 3/4" L at bottom
	left	rear	web	Section loss: 1/8" D x 4" H x 12" L at bottom
	left	rear	web at top cope	Overcut: 1/4" long
	right	forward	web	Section loss: 3/16" D x 4" H x 2" L (some active) at bottom
	right	rear	web	Section loss: 1/8" D x 2" Ø (active) at bottom
8	right	forward	web	Section loss: 1/16" D x 2" H x 1" L at top
	right	rear	web	Section loss: 3/16" D x 1" H x 1" L at top Section loss: 3/16" D x 4" H x 4" W at bottom
	left	forward	web	Section loss: 1/16" D x 2" H x 1" L at top
	left	rear	web	Section loss: 1/8" D x 4" H x 1" L at top Section loss: 3/16" D x 3" H x 3" L at bottom
9	right	both	web	Section loss: 1/16" D x FH x 3" L
	right	forward	web between Stringers 6 and 7	Section loss: 1/16" D x up to 6" H
	right	-	bottom flange end 3'	Section loss: Isolated 1/4" D x 6" Ø Section loss: 1/16" D x 3" W to edge of top face Section loss: 1/4" deep to edge of east flange
	right	-	web at top cope	Three cracks: 1" L, 5/8" L, and 1/4" L diagonal Overcut: 1/2" L diagonal
	left	forward	bottom flange end 2'	Freckled pitting: 1/8" D x FW on top face Freckled pitting: 3/8" D x FH on flange edge
	left	forward	web around LLB connection	Section loss: 1/8" D x 1" H x 1" L around perimeter with active laminate rust on both faces
	left	-	web at top cope	Two cracks: 1" L horizontal and 1 3/8" L diagonal - "previously noted as 1 1/4" maximum." Overcut: 1/4" L diagonal
	left	both	web	Section loss: 1/8" D x FH x up to 2" L
	left	both	web	Section loss: 1/16" D x 6" Ø at top

New findings in red

Legend:

Left = North Forward = East FH = Full Height L = Long

Right = South Rear = West W = Wide D = Deep

STRINTEG

Appendix C

Table C.3 Truss Gusset Plate Defects					
Truss	**Panel Point**	**Gusset Plate**	**Face**	**Location**	**Defect Description**
Right	L0	outboard	exterior	around bearing pin	Section loss: < 1/16" D
				behind sidewalk tension bolt	Section loss: 1/8" D x 4" H x 8" W
		inboard	exterior	at bearing casting	Loose Pack rust
				around bearing pin	Section loss: 3/16" D
	L1	outboard	exterior	behind sidewalk tension bolt	Section loss: 1/16" D x 4" H x 5" W
		both	interior	along bottom of lower chord	Pack rust: Up to 1/4" thick
				along top of lower chord	Section loss: 1/32" D (Up to 1/16" D) x 1" H with light active corrosion
	L2	outboard	interior	at L1-L2 & U1-L2	Pack rust: 3/16" thick Pitting: 1/8" D
				along top of lower chord L1-L2	Section loss: < 1/16" D x 1 1/2" H x 6" W
				along top of lower chord L2-L3	Section loss: 3/16" D x 2 1/2" Ø
			exterior	behind sidewalk tension bolt	Section loss: 1/4" D x 4" H x 5" W (active)
		inboard	interior	at L1-L2	Pack rust: 1/16" thick
				along top of lower chord L1-L2	Section loss: 1/8" D x 2" H x 3" W at vertical
				along top of lower chord L2-L3	Section loss: 1/8" D x 1" H x 1" W at vertical
	L3	outboard	interior	along top of lower chord L2-L3	Section loss: 1/16" D x 1" H x 2" W
		both	interior	along bottom of lower chord	Pack rust: Up to 1/8" thick
				at L2-L3 interface	Pack rust: Up to 1/8" thick
	L4	inboard	interior	along L3-L4	Section loss: 1/16" D x 9" L
		both	interior	along bottom of lower chord	Pack rust: Up to 1/4" thick
		outboard	interior	along L3-L4	Section loss: 1/8" D x 4" L
	L5	inboard	interior	along L5-L6 below U6-L5	Section loss: 1/16" D x 3" H x 8" L
		outboard	interior	along L5-L6 below U6-L5	Section loss: 3/16" D x 4" H x 10" L
		both	interior	bottom and west edges	Active pack rust: up to 3/8" thick
	L6	both	interior	along top of lower chord	Section loss: 1/16" D x 6" H x 12" L
				at L6-L7	Pack rust: 1/8" thick at bottom (sides up to 3/16")
	L7	outboard	interior	along top of lower chord west of L7U7	Section loss: 1/8" D x 12" L
				along top of lower chord east of L7U7	Section loss: 1/16" D x 8" L
				at L6-L7	Pack rust: 1/4" thick at west free edge
			-	forward free edge	Pack rust: Isolated 1/16" thick
		both	interior	along bottom of lower chord	Active pack rust: up to 3/16" thick
		inboard	interior	at L6-L7	Pack rust: 1/16" thick at very bottom of west edge
				along top of lower chord	Section loss: < 1/16" D for 50% L (isolated 1/16" D)
			-	forward free edge	Pack rust: Isolated 1/8" thick
	L8	outboard	exterior	behind sidewalk tension bolt	Section loss: 1/16" D x 4" H x 8" W
			interior	along top of lower chord	Section loss: 1/16" D x 1" H x 14"W
		inboard	interior	along top of lower chord	Section loss: 1/16" D x 1" H
	L9	outboard	interior	along top of lower chord	Section loss: 1/8" D x 1" H x FL
			-	free edge between U8-L9	Active Pack rust: 1/2" thick
		inboard	exterior	around bearing pin	Section loss: 1/8" D
	U6	inboard	interior	throughout rear half	Section loss: 1/32" D
	U8	inboard	interior	throughout rear half	Section loss: 1/32" D

New findings in red

Legend:

Left = North Forward = East FH = Full Height L = Long

Right = South Rear = West W = Wide D = Deep

STRINTEG

Appendix C

Table C.3 Truss Gusset Plate Defects					
Truss	**Panel Point**	**Gusset Plate**	**Face**	**Location**	**Defect Description**
Left	L0	both	exterior	around bearing pin	Section loss: 1/16" D x 4" Ø Loose Pack rust: Up to 3/8" thick at casting
		inboard	-	free edge between U1-L0 & L0-L1	Pack rust: 1/16" thick
		outboard	-	free edge between U1-L0 & L0-L1	Pack rust: 1/8" thick at top 2"
	L1	both	interior	along bottom of lower chord	Active pack rust: Up to 1/8" thick
		outboard	interior	along top of lower chord	Section loss: < 1/16" D x 1" H x 4" L
	L2	both	interior	along bottom of lower chord	Pack rust: 1/8" thick Pitting: <1/16" D x 10" L
		outboard	interior	along top of lower chord	Section loss: < 1/16" D x 4" L
		inboard	exterior	at floorbeam connection	Section loss: 1/8" D x 1 1/2" H x 6" W bottom Section loss: 1/16" D x 3" H x 2" W forward side
	L3	both	interior	along top of lower chord	Section loss: Up to 1/16" D x 15" L
	L4	inboard	exterior	at floorbeam connection	Section loss: 3/8" D x 1 1/2" H x 6" W at bottom
		both	interior	along bottom of lower chord	Pack rust: Up to 3/16" D
				along top of lower chord	Section loss: 1/16" D x 2" H rear side Section loss: 1/16" D x 2" H x 10" L forward side
	L5	both	interior	along bottom of lower chord	Active Pack rust: Up to 1/8" thick
				along top of lower chord near vertical	Section loss: 3" H x < 1/16" D rear side Section loss: 1/16" D x 3" Ø forward side
	L6	both	interior	bottom edge along lower chord	Pack rust: 1/8" thick
				along bottom of lower chord	Active Pack rust: Up to 1/8" thick
				along U5-L6	Pack rust: 1/8" thick between members
			-	along L6-L7	Section loss: <1/16" D x 4" H x 10" long
		inboard	interior	along bottom of lower chord	Pack rust: Up to 1/8" thick
	L7	both	interior	along bottom of lower chord	Pack rust: Up to 1/8" thick
				along top of lower chord L7-L8	Section loss: Up to 1/16" D x 1" H x 10" L
	L8	both	interior	along bottom of lower chord	Pack rust: Up to 1/8" thick
				along top of lower chord L8-L9	Section loss: 1/16" D x 1" H x 14" L
		inboard	exterior	floorbeam bottom flange	Pitting: 1/8" D x 1 1/2" H x 6" L at bottom with active corrosion
	L9	both	exterior	around bearing pin	Section loss: 1/8" D
		-	-	top cover plate	Localized indent: 3/4" D
		outboard	-	free edge between L9-L8	Active Pack rust: 1/16" thick
	M6	inboard	interior	below lower diagonals	Section loss: 1/16" D x 6" H x 3" L

New findings in red

Legend:

Left = North Forward = East FH = Full Height L = Long

Right = South Rear = West W = Wide D = Deep

STRINTEG

APPENDIX D

Span 2 Floorbeam Crack Photographs

(THIS PAGE INTENTIONALLY LEFT BLANK)

Photo D1 – Floorbeam 0 in Span 2 cracks in the rear top web cope at the Left Truss prior to grinding.

Photo D2 – Floorbeam 0 in Span 2 bottom 1 3/4" long crack in the rear top web cope at the Left Truss after grinding and magnetic particle testing. Note crack has propagated 1/4" since previous inspection.

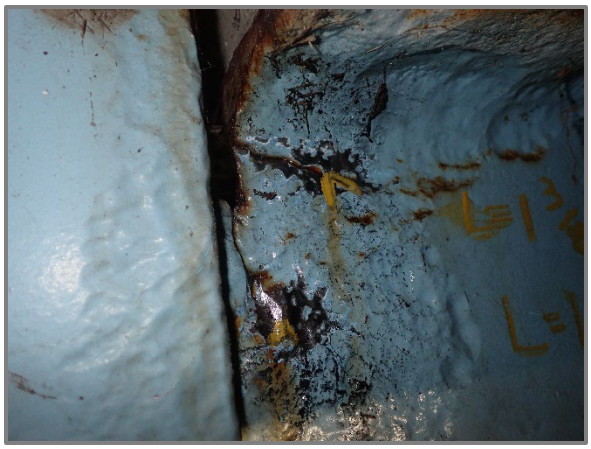

Photo D3 – Floorbeam 0 in Span 2 top 1 3/8" long crack in the rear top web cope at the Left Truss after grinding and magnetic particle testing.

Photo D4 – Floorbeam 9 in Span 2 cracks in the forward top web cope at the Right Truss prior to grinding.

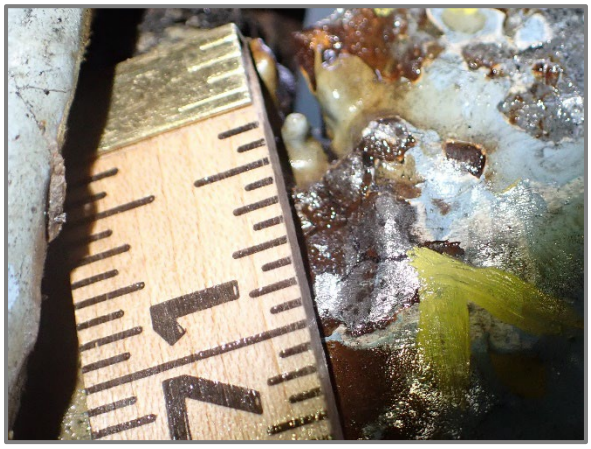

Photo D5 – Floorbeam 9 in Span 2 bottom 5/8" long crack in the forward top web cope at the Right Truss after grinding and magnetic particle testing.

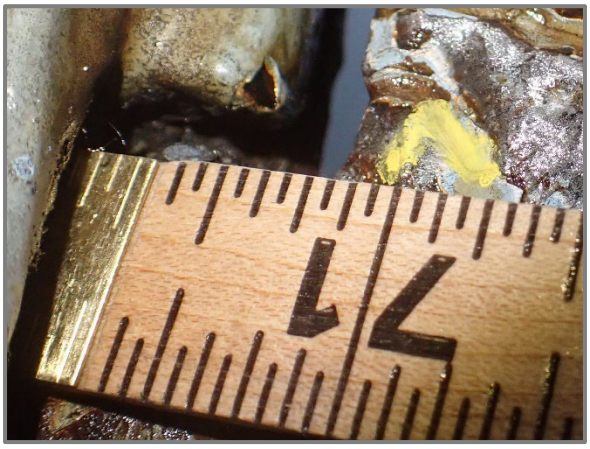

Photo D6 – Floorbeam 9 in Span 2 middle 1/4" long crack in the forward top web cope at the Right Truss after grinding and magnetic particle testing.

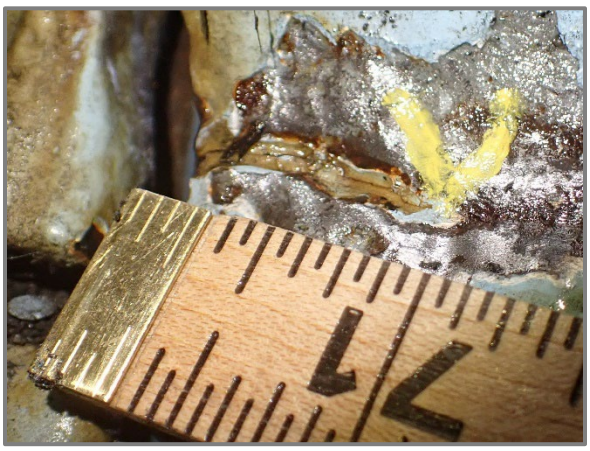

Photo D7 – Floorbeam 9 in Span 2 top 1" long crack in the rear top web cope at the Left Truss after grinding and magnetic particle testing.

Photo D8 – Floorbeam 9 in Span 2 cracks in forward top web cope at the Left Truss prior to grinding.

Photo D9 – Floorbeam 9 in Span 2 cracks in the forward top web cope at the Left Truss after griding and magnetic particle testing.

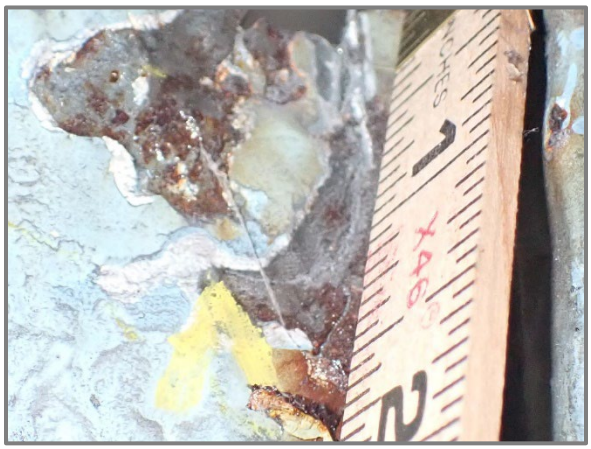

Photo D10 – Floorbeam 9 in Span 2 bottom 1 3/8" long crack in the rear top web cope at the Left Truss after grinding and magnetic particle testing. Note crack has propagated 3/8" since previous inspection.

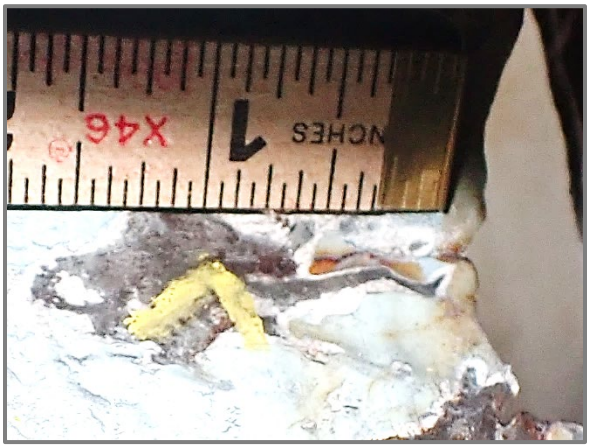

Photo D11 – Floorbeam 9 in Span 2 top 1" long crack in the rear top web cope at the Left Truss after grinding and magnetic particle testing.