

2014 FRACTURE CRITICAL ELEMENT LEVEL INSPECTION BRIDGE INSPECTION FIELD REPORT

Structure File Number: 1811991

Inventory Bridge Number: CUY 00490 01.000 N

Bridge Type: 3 - STEEL/6 - GIRDER (FLOOR SYSTEM)/3 - DECK

Sufficiency Rating: 89.3

Date Built: 7/1/1990

District: 12 Place Code (FIPS): CLEVELAND

I-490 over CUYAHOGA RIVER

Type of Service on: HIGHWAY

APPROACH ITEMS

- c1. Approach Wearing Surface (EA)
- c2. Approach Slabs (SF)
- c3. Relief Joint (LF)
- c4. Embankment (EA) d
- c5. Guardrail (EA)

QTY.	condition state				TR
	1	2	3	4	
8	4	2	2	0	2.56
11834	1080	565	468	0	1.58
473.4	289.1	64.7	119.6	0	2.54
8	8	0	0	0	1.00
7	5	0	1	1	3.25

N36. Safety Features:
Tr, Gr, Tm

36)B 1 36)C 1 36)D 1
(9-0) 5

c6. Approach Summary

DECK ITEMS

- c7.1 Floor/Slab (SF)
- c7.2 Edge of Floor/Slab (LF)
- c8. Wearing Surface (SF)
- c9. Curb/Sidewalk/Walkway (LF)
- c10. Median (LF)
- c11. Railing (LF)

QTY.	condition state				TR
	1	2	3	4	
510184	3859	1225	1715	24	1.37
15105	1496	65	71	0	1.09
518995	3928	1245	1431	112	1.37
6914	6753	161	0	0	1.03
8192	8073	4	107	8	1.26

N36. Safety Features: Rail

36)A 1
35 1 32 2 0 2.25
1256 908 289 58 1 1.81
(9-0) 7

- c12. Drainage (EA) d
- c13. Expansion Joint (LF) d

N58. Deck Summary

SUPERSTRUCTURE ITEMS

- c14. Alignment (EA) d
- c15.1 Beams/Girders (LF)
- c15.2 Slab (SF)
- c16. Diaphragm/X-Frames (EA)
- c17. Stringers (LF)
- c18. Floorbeams (LF)
- c19. Truss Verticals (EA)
- c20. Truss Diagonals (EA)
- c21. Truss Upper Chord (EA)
- c22. Truss Lower Chord (EA)
- c23. Truss Gusset Plate (EA) d
- c24. Lateral Bracing (EA)
- c25. Sway Bracing (EA)
- c26. Bearing Devices (EA) d
- c27. Arch (LF)
- c28. Arch Column/Hanger (EA)
- c29. Arch Spandrel Walls (LF)
- c30. Prot. Coating System (LF) d
- c31. Pins/Hangers/Hinges (EA) d
- c32. Fatigue (LF) d

QTY.	condition state				TR
	1	2	3	4	
54	54	0	0	0	1.00
55590	5503	492	63	0	1.03
2341	2296	28	17	0	1.14
16943	1676	175	0	0	1.02
18629	1847	105	52	1	3.00
465.00	457	8	0	0	1.03
91162	0	8593	3172	2059	3.00
65	5	1	60	0	1.95
91162	9114	17	1	0	1.00

N59. Superstructure Summary

(9-0) 6

SUBSTRUCTURE ITEMS

- c33. Abutment Walls (LF)
- c34. Abutment Caps (LF)
- c35. Abut. Columns/Bents (EA)
- c36. Pier Walls (LF)
- c37. Pier Caps (LF)
- c38. Pier Columns/Bents (EA)
- c39. Backwalls (LF)
- c40. Wingwalls (EA)
- c42. Scour (EA) d
- c43. Slope Protection (EA) d

N60. Substructure Summary

CULVERT ITEMS

- c44. General (LF)
- c45. Alignment (LF) d
- c46. Shape (LF) d
- c47. Seams (LF) d
- c48. Headwall/Endwall (LF)
- c49. Scour (LF) d
- c50. Abutments (LF)

N62. Culvert Summary

CHANNEL ITEMS

- c51. Alignment (LF) d
- c52. Protection (LF) d
- c53. Hydraulic Opening (EA) d
- c54. Navigation Lights (EA) d

N61. Channel Summary

SIGN/UTILITY ITEMS

- c55. Signs (EA) d
- c56. Sign Supports (EA) d
- c57. Utilities (LF) d

General Appraisal

N41. Operating Status

Inspector Name

Burgholder, Jason

Inspection Date/Type

09/26/2014 In-Depth and Fracture Critical

PE Number

69829

Reviewer Name

Kapustar, Kent

Review Date

12/31/2014

PE Number

64067

QTY.	condition state				TR
	1	2	3	4	
524.6	523.1	1.5	0	0	1.00
524.6	524.6	0	0	0	1.00
0	0				
25.3	24.3	1	0	0	1.06
3821.2	3801.9	13.3	6	0	1.03
132	131	0	1	0	1.13
524.6	455.1	69.5	0	0	1.19
8	8	0	0	0	1.00
58	58	0	0	0	1.00
6	6	0	0	0	1.00
					(9-0) <u>7</u>

QTY.	condition state				TR
	1	2	3	4	
0					
					(9-0) <u>N</u>

QTY.	condition state				TR
	1	2	3	4	
200.00	200	0	0	0	1.00
400	400	0	0	0	1.00
60	60	0	0	0	1.00
6	6	0	0	0	1.00
					(9-0) <u>8</u>

QTY.	condition state				TR
	1	2	3	4	
12	11	1	0	0	1.12
9	6	3	0	0	1.43
4600.00	4599	0	0	1	1.01
					(9-0) <u>6</u>
					<u>A</u>

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Key: "Qty" = Quantity for Element Level inspection; "(LF)" = Linear Feet; "(SF)" = Square Feet; "(EA)" = Each or count; "CR" = 1-4 Condition Rating or average of worst span unless Summary item 9-0, then the average of entire bridge influenced by the bold boxes; "TR" = Transition Rating or weighted average of condition states; "d" = dedicated or specific chart and guidance, all others use Material specific chart/guidance; "c" = condition prefix; "N" = NBIS rating

Inspection Procedures

Next Insp Cycle is in 2014 and Est. Hours is 30 and TTC is MT-95.31 and other TT notes include. . .
VERIFY_PLCVERIFY_PLC . . . with 2014 lead insp. DT and truck req'd . . . 62

Comments

APPROACH

c1. Approach Wearing Surface

The wearing surface on the approaches is concrete. The eastbound and westbound rear approaches, and the westbound forward approach slab have multiple concrete patches. Most of these patches have visible cracks. Portions of several patches have broken apart and are currently filled with asphalt concrete. The asphalt patching is less than 5% of the surface area of the approaches. The wearing surfaces on the eastbound forward approach, and the Ramp C-B and Ramp B-C approaches are in good condition.

c2. Approach Slabs

The eastbound and westbound rear approach slabs, and the westbound forward approach slab have multiple concrete patches, typically with visible cracking in the patching concrete. These patches cover less than 10% of the slab. Several concrete patches have deteriorated and are currently filled with asphalt concrete. The eastbound forward approach slab, and the Ramp C-B and Ramp B-C approach slabs are in good condition.

c3. Relief Joint

The eastbound ramp C-B relief joint is heavily cracked in the roadway shoulder and has settled in the travelled lanes. The westbound rear approach mainline joint has large cracks in the asphalt pavement across all traffic lanes. The westbound forward abutment joint is breaking up at its edges. The relief joint pavement for ramp N-W at the forward abutment has settled.

c4. Embankment

The approach embankments behind the wingwalls is in good condition. There is erosion around pier 4 from the drainage system overflowing. This is currently not affecting the structure.

c5. Guardrail

Five of the guardrail runs at the ends of the bridge are in good condition. Two ends have sustained collision damage and are in poor or serious condition. The guardrail to the inside of eastbound Ramp C-B has damaged rail and 4 posts damaged from a collision. It is in poor condition. The guardrail at mainline eastbound forward abutment has sustained a more serious collision and has three adjacent posts missing or broken.

DECK

c7.1 Floor/Slab

Regularly spaced cracking in the wearing surface allows moisture to penetrate the

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reinforced concrete deck. There are typically several transverse cracks exhibiting efflorescence and or dampness on the underside of the deck in each span. The most concentrated location was noted in span 10R.

Little spalling or delamination was noted on the underside of the deck, even at the fully cracked locations. One exception is full-depth damage between girders 4-A and 4-B in span 14. This is located over the east edge of Independence Road. The concrete is saturated, cracked and spalled, exposing deck reinforcing steel. The surrounding area is delaminated, with about 6 feet of loose concrete present the full width of the bay between girder 4-B and stringer 4-3. The location corresponds to a deep asphalt patch on the top of the deck. The patch is breaking up and reinforcing steel is exposed in the cracks.

There is also typically dampness and saturation of the concrete in the vicinity of the access manholes over the piers. An open core hole in the deck off girder 3-F in span 10, near pier 10 is also permitting moisture to leak through. Another core hole is only partially filled about 80 feet west of the abutment on Ramp C-B.

c7.2 Edge of Floor/Slab

The slab edges are protected by the concrete railing above. The exterior edges are also sealed with epoxy. Deficiencies include some full-width transverse deck cracks that extend to the edges of the slab; and several spalls along the interior median joint along the length of the bridge.

c8. Wearing Surface

The latex modified concrete overlay wearing surface is generally smooth and intact. The overlay does exhibit numerous transverse cracks, some of which extend the full width of the deck. The density of cracks was measured to be between three to five cracks every 12 feet (longitudinally) of deck. There are also random longitudinal cracks throughout the deck.

Some of the cracks have a width exceeding 1/8". Broken up areas of the wearing surface have been previously patched, mainly with concrete. The concrete patches are typically intact, however; some continued to break up and have been filled with asphalt. A few of the previous patches have continued to break up, with reinforcing steel exposed in some areas. The top mat of deck reinforcing steel is visible at 1005+90, eastbound deck, and at pier 14, westbound deck. Several of the locations have loose chunks of concrete sitting in the potholes that will present hazards to traffic when they eventually work out of the holes. The patching is typically transverse to traffic; with several sets of patches running along longitudinal construction joints in the deck.

c10. Median

There are multiple areas exhibiting old scaling of the concrete surfaces and/or loss of the protective epoxy coating. These are typically located in the vicinity of light poles and expansion joints. The length is typically about 15 feet long, with some damage as long as 35 feet. There is fire damage to the eastbound parapet in unit 2, near station 992+00.

c11. Railing

The parapets have multiple areas with cracks and spalling, predominantly at the tops. There are also multiple deficiencies to the vandal protection on top of the parapets. See the REL Physical Conditions Report for specific locations.

c12. Drainage

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The bridge roadway drainage system consists of scuppers, neoprene drain troughs and steel downspouts. The system generally removes water from the bridge deck.

The scuppers on the deck are typically partially clogged in the collection boxes embedded into the deck. Vegetation is growing out of the scupper at expansion joint 4 along the eastbound median. Water ponds at a single location on the westbound deck along the outside railing. The vertical drainage pipes in the scuppers are typically clear.

Dirt and debris has accumulated at various depths within the neoprene troughs below the finger joints at the intermediate expansion joints, except where the joints are torn and permit the dirt to fall freely onto the steelwork and ground.

c13. Expansion Joint

The mainline eastbound rear abutment has several locations where the steel bearing retainer plate at the roadway surface is missing. One location appears to be wide enough to fit a vehicle tire in the gap. The concrete beneath the hole in the retaining is missing and the hole appears to be fairly deep. This presents a driving hazard to those driving in that lane. Several areas of the steel bearing retainer are also missing at the westbound ramp B-C abutment joint. The underlying concrete is visible beneath the missing steel, but the condition is not as serious as that of the mainline rear abutment.

The mainline rear abutment and the adjacent abutment at ramp C-7 exhibit the worst active spalling in the concrete headers, with small spalls developing across the full width of the both abutments.

The intermediate finger joints are generally in good condition. The fingers in the joints are well aligned both vertically and horizontally. Four intermediate joints have a non-uniform gap between the fingers. A finger is missing; but based on the arrangement of the individual finger joint plate sections, it appears to be the result of original construction modification or fabrication necessary to mesh the fingers on each side of the joints. It does not appear that the individual fingers have recently broken off.

SUPERSTRUCTURE

c15.1 Beams/Girders

The beams and girders are in good condition away from the expansion joints. There is active deterioration and minor section loss under the deck joints. This is typically limited to an area within 10 feet of the joint.

One active 1" crack was found at the top of the transverse stiffener on the north face of girder M in span 8R. The crack is near the compression flange, but should be monitored during future inspections.

c16. Diaphragm/Cross Frames

There are loose and missing connection bolts as well as misdrilled holes in several locations. This is from original construction and no distress was noted in adjacent members. See REL Physical Conditions Report for specific locations.

c17. Stringers

The stringers are in good condition with only minor section loss next to the expansion joints. Stringer 5 is lifted 3/4" off of floorbeam 6 in span 7L (original construction).

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This doubles the span length of this stringer, but no distress was noted. Several other stringers have smaller gaps and a few locations have cracked stringer to floorbeam welds. None of the cracks extend into the base metal of the members.

c18. Floorbeams

There are loose and missing connection bolts as well as misdrilled holes in several locations. This is from original construction and no distress was noted in adjacent members. See REL Physical Conditions Report for specific locations.

c26. Bearing Devices

Bearings are generally in good condition with minor surface rust and debris around several rockers. Slight misalignments are within design tolerances. Several bolts connecting girder bottom flanges to bearings were never fully tightened during original construction.

c30. Protective Coating System

Light surface rust and peeling top coat throughout. Paint has failed and corrosion is active under the deck joints. East end of the bridge is EXTREMELY dirty making it difficult to inspect girders for cracks.

c31. Pins/Hangers/Hinges

Typical covered in dirt and debris with active corrosion, but still functioning as intended. A few random missing bolts in sole plates and roller guides. See REL Physical Conditions Report for specific locations.

c32. Fatigue

There are a few tri-axial welds (due to poor fabrication) at hinges, but no cracks were noted. No cracks noted at the ends of the longitudinal stiffeners. One active 1" crack was found at the top of the transverse stiffener on the north face of girder M in span 8R. The crack is near the compression flange, but should be monitored.

SUBSTRUCTURE

c33. Abutment Walls

Minor cracks with efflorescence. A few spalls.

c34. Abutment Caps

Dirt and debris, but generally in good condition.

c38. Pier Columns/Bents

The south column of pier 9R is in poor condition with large delaminations and exposed rusting rebar. The remainder of the pier columns are generally in good condition with minor spalls and cracks with efflorescence.

c36. Pier Walls

Pier 9L is the only hammerhead pier on the bridge. It is generally in good condition with minor spalls and cracks with efflorescence.

c37. Pier Caps

The pier caps are generally in good condition. The south cantilever of pier 7R has a

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large delaminated area with corroded rebar. This is directly below the pier access manhole in the deck and above Quigley Road. All loose concrete was removed during the snooper portion of this inspection to protect traffic. Piers 7L, 9L and 10L have a few spalls, but are in better condition than pier 7R.

c39. Backwalls

Several spalls and delaminations on the forward abutment backwall.

c40. Wingwalls

Wingwalls are all in good condition with minor cracks and efflorescence.

c43. Slope Protection

Concrete slope protection at rear abutment and east of Independence Road is in good condition. Crushed aggregate slope protection at forward abutment has minor erosion from plugged drainage.

CHANNEL

c54. Navigation Lights

New solar powered navigation lights were recently installed and operating normally.