STATE OF OHIO DEPARTMENT OF TRANSPORTATION
BRIDGE INSPECTION FIELD REPORT

Structure File Number: 1800930 Inventory Bridge Number: CUY 00006 14.560 N Bridge Type: 3 - STEEL/5 - ARCH/4 - THRU

Sufficiency Rating: 48.8 Date Built: 7/1/1917

District: 12 Place Code (FIPS): CLEVELAND USR 6 over (1499)CUY. RIVER & RTA Type of Service on: HIGHWAY-PEDESTRIAN

APPROACH ITEMS

	QTY.	1	2	3	4	TR
c1. Approach Wearing Surface (EA)	2		2			2
c2. Approach Slabs (SF)	-					
c3. Relief Joint (LF)	-					
c4. Embankment (EA) d	4		3	1		2.67
c5. Guardrail (EA)	1		1			2
N36. Safety Features: Tr, Gr, Tm	36)B N	36)C 1	36)D 0			
c6. Approach Summary					(9-0)	6

DECK ITEMS

	QTY.	1	2	3	4	TR
c7.1 Floor/Slab (SF)	303000	29411	264692	8897		2.1
c7.2 Edge of Floor/Slab (LF)	6063	3342	2721			
c8. Wearing Surface (SF)	235128		199859	35269		2.51
c9. Curb/Sidewalk/Walkway (LF)	5449		5449			2
c10. Median (LF)	675		323	322	30	3.01
c11. Railing (LF)	6063	6053		10		1.03
N36. Safety Features: Rail	36)A 1					
c12. Drainage (EA) d	28		26	2		2.32
c13. Expansion Joint (LF) d	2578		2538	40		2.09
N58. Deck Summary					(9-0)	6

SUPERSTRUCTURE ITEMS

	QTY.	1	2	3	4	TR
c14. Alignment (EA) d	28	28				1
c15.1 Beams/Girders (LF)	19213		18713	500		2.14
c15.2 Slab (SF)	303000	29411	264692	8897		2.1
c16. Diaphragm/X-Frames (EA)	-					
c17. Stringers (LF)	17730		17130	500	100	2.25
c18. Floorbeams (LF)	37468		36268	1000	200	2.24
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)	36		32	4		2.43
c25. Sway Bracing (EA)	26		26			2
c26. Bearing Devices (EA) d	4		4			2
c27. Arch (LF)	7922		6994	928		2.44
c28. Arch Column/Hanger (EA)	1118	136	932	50		2.16
c29. Arch Spandrel Walls (LF)	-					
c30. Prot. Coating System (LF) d	19291		14469	4822		3.37
c31. Pins/Hangers/Hinges (EA) d	2		2			2
c32. Fatigue (LF) d	19291		19291			2
N59. Superstructure Summary					(9-0)	5

SUBSTRUCTURE ITEMS

	QTY.	1	2	3	4	TR
c33. Abutment Walls (LF)	3889		3289	600		2.52
c34. Abutment Caps (LF)	-					
c35. Abut. Columns/Bents (EA)	-					
c36. Pier Walls (LF)	200		200			2
c37. Pier Caps (LF)	-					
c38. Pier Columns/Bents (EA)	40		40			2
c39. Backwalls (LF)	92		92			2
c40. Wingwalls (EA)	795		735	60		2.33
c42. Scour (EA) d	2		2			2
c43. Slope Protection (EA) d	2		2			2
N60. Substructure Summary					(9-0)	5

CULVERT ITEMS

	QTY.	1	2	3	4	TR
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					(9-0)	N

CHANNEL ITEMS

	QTY.	1	2	3	4	TR
c51. Alignment (LF) d	200	200				1
c52. Protection (LF) d	200		200			2
c53. Hydraulic Opening (EA) d	1	1				1
c54. Navigation Lights (EA) d	6		6			2
N61. Channel Summary					(9-0)	6

SIGN/UTILITY ITEMS

	QTY.	1	2	3	4	TR
c55. Signs (EA) d	40		39	1		2.13
c56. Sign Supports (EA) d	4		4			2
c57. Utilities (LF) d	12000		12000			2
General Appraisal					(9-0)	5
N41. Operating Status						A

Inspector Name Mark E. Moellman, P.E.

Inspection Date/Type 5-1-2014 to 9-1-2014 In-Depth/Fracture Critical

PE Number 45120

Reviewer Name Michael J. Malloy, P.E.

Review Date 09-01-2014

PE Number 60048

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District: 12 Place Code (FIPS): CLEVELAND USR 6 over (1499)CUY. RIVER & RTA Type of Service on: HIGHWAY-PEDESTRIAN

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

Comments

c1. Approach Wearing Surface: This bridge lacks conventional approach slabs so the asphalt area the width of the tunnels and extending 30' beyond the tunnel bulkhead was rated. Though the approach tunnels on the west end of the bridge diverge to the south, only the approach surfaces on the main route US 6 were considered in the rating of this item. These regions lie just west of the intersection with West 28th and east of the intersection with West Huron Road. Overall, these areas are in fair condition with some cracking and isolated patched areas.

c4. Embankment: The south east embankment has been shored at its interface with the parking lot below where some erosion has occurred. Otherwise, all embankments are in good condition, well vegetated, with only some bare soil exposed from drainage or foot traffic. At the North East Corner, where the bridge shares the embankment with the old Detroit Superior Swing Bridge Viaduct there are some sink holes. These do not affect the rating of the embankment. The embankment at the south west corner of the structure is immediately adjacent to the River Bend Road which has been closed due to slope failure. This failure has led to the movement and cracking of the south west approach wingwall immediately adjacent to this embankment.

c5. Guardrail: For approach guardrail only the portion at the southeast extent of the bridge bordering the adjacent parking lot to the south was considered. The guardrail is composed of a concrete parapet topped with an aluminum picket. The guardrail is in good condition with only very minimal cracking noted. (Note median impact attenuator is rated with the median)

c7.1 Floor/Slab: Excluding deck edges this item includes all quantity on the bridge as well as the slabs that support the roadway in the tunnel section. The entirety of its top side is concealed by wearing surface, curb, walk, or railing, so this rating is governed primarily by the underside inspection.

The Detroit and West 25th approach tunnels showed some of the largest defects. Aside from the recently rehabilitated portions surrounding the expansion joints, large areas of saturation, staining, delamination, spalling, cracking, and efflorescence were noted. In some isolated areas, up to about 90 percent of the slab area between columns showed saturation.

Moving north and east into the Detroit Station, many of the same deficiencies were observed. Many cracks had rows of suspended mineral stalactites. Active dripping in these areas also led to deposition mounds or corrosion in utilities below. In spall areas with rebar showing, sometimes up to about 50% of the bar circumference was exposed. An estimated 20% of the ceiling was saturated and stained.

East of the Detroit Station, the slab on the main concrete and steel spans was in very good condition. Having been replaced in a recent rehabilitation, the slab in these areas was dry with only minimal hairline cracking. There were some very isolated areas with cracks, moisture, or efflorescence in the main steel span slab. The most notable deficiencies occurred in the stay in place forms adjacent to the locations where the main steel arch or hangers penetrate the deck. The east approach tunnel slab was also in very good condition with only some small isolated cracks with efflorescence noted.

c7.2 Edge of Floor/Slab: Since the tunnel portions of the slab quantity are bordered by adjacent roadway, only the exposed quantity of slab on the concrete bridge sections was rated. Being recently replaced, the slab edge is still in good condition with only minor cracking noted.

c8. Wearing Surface: Included in this quantity is the concrete wearing surface on the three lanes carried by the bridge as well as the asphalt overlaying the tunnel portions. Overall, the concrete wearing surface is in good condition with isolated spalls, patches, and plow damage. As part of an in-progress rehabilitation, many of these deficiencies were being repaired while the wearing surface inspection took place.

c9. Curb/Sidewalk/Walkway: The bridge has two walks that run its length. Both the south walk and larger north walk and respective curbs on the bridge were inspected; no walk quantities paralleling the tunnel sections were considered. The walk concrete is sound and in good condition but has some cracking throughout, primarily around the trench drain that runs for much of its length. Some of the drain cover panels are damaged and much of the drain is filled with sediment or vegetation. There is also plow debris accumulating on the walk at several points along the bridge.

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Comments

c10. Median: The bridge has a single median at the point where the southern eastbound lane diverges around the steel arch superstructure. The median received a poor rating due to the condition of the attenuator on the eastbound leading edge. As shown in the pictures below, several of the attenuator bays show evidence of collision damage. The visibility paint on the west end of the barrier is also nearly gone.

c11. Railing: The entire length of concrete railing on the bridge was considered in this item. There was also Type 5 railing on the north side of Span 4 protecting the bridge chords. All concrete railing was in good condition with minor cracking, staining, and isolated distress.

c12. Drainage: This item encompassed the entire drainage system of the bridge moving from the deck scuppers to the outlets at the bases of the piers. During rainfall the deck had little to no ponding. The majority of the deficiencies occurred at the drainage outlets. Some of the downspouts or the basins into which they drained were completely clogged. There was also one catchbasin with dislodged lid. The south drain outlet at pier 1 is clogged up to the downspout and is preventing drainage from the structure.

At the south side of pier 3, downspout is broken and disconnected 10 feet up from the river.

Most of the curb drains are partially clogged, but drainage is not impacted.

c13. Expansion Joint: The bridge has expansion joints within the tunnel sections, concrete spans, and main steel arch. The expansion joints in the west approach tunnels are in good condition having been previously rehabilitated, but some tunnel joints are stained and show signs of minor leakage. The concrete arches sections have expansion joints between spans. These joints are in good condition, showing little to no leakage. The armor above is in good condition, but some surrounding concrete has occasional delaminations and spalls on both the leading and trailing edges. The joints are nearly full of debris. There are four joints within the steel arch section. On the deck these joints show similar concrete damage and debris accumulation with minimal staining at the interface with the concrete spans. There is some plow damage. The expansion joint just east of the steel arch span has a slight (less than 1/4") vertical misalignment.

c15.1 Beams/Girders: This item is the concrete beams between the columns in the tunnel section. Overall these are in fair condition. Some were repaired during our inspection process.

c17. Stringers: Overall, the stringers are in fair condition with isolated deficiencies. Stringers supporting the upper deck adjacent to areas where the steel arch or hangers penetrate through show more distress than interior stringers with severity ranging from isolated staining to section loss. In the lower deck, the stringers show most damage at their connections with the floorbeams with severe section loss occurring in isolated areas. Also present in many of the lower stringers are bolt holes from removed lateral bracing gussets.

c18. Floorbeams: Rating of this item includes all concrete and steel floorbeams in both the upper and lower decks. Concrete floorbeams are supported by columns in the spans approaching the central steel arch. Floorbeams in the steel section are supported from hangers from the lower arch chord.

Most of the concrete floorbeams in the spans approaching the central steel span are in good condition. Hairline cracks are common and larger cracks have been previously repaired using epoxy injection. There are a few isolated spalls which are already marked for repair in the current rehabilitation.
The steel floorbeams in Span 4 are in poor condition. All show severe corrosion and section loss especially around the verticals connecting the decks. Pack rust is common between the plates that compose the members. Through holes in the web, flanges, and stiffeners were also noted.

c24. Lateral Bracing: Lateral Bracing Below deck at connections to arch are in poor condition.

c26. Bearing Devices: Steel Arch bearing show pitting and deterioration. Debris is prevalent within. The bearing pin covers have cracks, at all four bearing locations. Appear to be growing at the South West Bearing. Cracks do not affect the performance of the bearing.

c27. Arch: This item consists 6740 feet of concrete arch ribs and 1182 feet of steel arch panels. Overall the concrete arch ribs are in fair condition with about 5% areas with spalls. The contractor was is the process of patching unsound area. This rating is based prior to the contractors work.

The steel arch panels of the structure are in fair condition above the deck and in poor condition below the deck. Below the deck, there are through holes in the channel lacing between the box chord members, pack rust bent gusset plate, and section loss. See detailed report for additional information.

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Comments

c28. Arch Column/Hanger: This item comprises both the steel hangers and the concrete arch columns. There are 68 Steel hangers and 1118 Concrete Columns. Most of the Steel Hangers were replaced with the 1994 Rehab and are in good condition. Overall the Concrete Columns are in fair condition, with the once that were replaced with the 1994 rehab in fair condition. Most of the deteriorated columns from the 2013 bridge inspection are were being repaired under the current construction project. This rating was completed after the majority of the columns had been repaired.

c30. Protective Coating System: Numerous deficiencies, the structural coating system is in poor condition. Staining, blistering, flaking, and exposure of structure steel are common in the areas below the upper deck, especially at the floor beam hangers.
The structural steel above the deck is in better condition but still has prevalent problems. Both the upper and lower chords show more deterioration closer to the bridge deck.
Contractor was setting up to paint the Arch Hanger. this work was not completed at the time of this inspection.

c31. Pins/Hangers/Hinges: The bridge has a single pin on each side at the center of each lower steel arch chord. Visually, they appear to be in fair condition. No signs of wear and tear. Pain is cracked at edges which is expected for a functioning hing. The non riveted portions of the washers outside the chord member are bent away from the chord. This condition is believed to be from pack rust that has since been removed as part of a painting project since there is no evidence of movement within the chord at the pin.

c32. Fatigue: No fatigue distress was noted at the eyebar heads. Lower pins with grease fitting were greased as part of this inspections.

c33. Abutment Walls: The abutment wall include the tunnel walls. Abutment wall concrete shows signs of staining and minor cracking with some spalls. North East Approach Tunnel Wall was under construction during out initial inspections, with many areas of 360 degree rebar exposure during the repair process. These ares were repaired by the completion of the inspection and the rating is based on the repaired walls.
Overall the Pier Columns are in fair condition.

c38. Pier Columns/Bents: Piers 1-3 and 5-12. Minor cracking and some unsound areas where previously patched with shotcrete. (Note South Tower B is rated under wingwall)

c36. Pier Walls: Arch Span Abutments and Piers 3 and 4. Minor Cracking and Staining.

c39. Backwalls: Tunnel Ends. Minor Staining, Wet, and isolated cracking.

c40. Wingwalls: Soft concrete at southwest wingwall and cracking. Spalls at curtain walls typical with no significant change.
South Tower B settlement has continued. See crack monitor pictures in report.

c43. Slope Protection: Stone in some areas along West Side.

c52. Protection: Sheet Pile walls at Pier 4. Small sink hole behind sheet pile wall.
There is no functional collision protection present at pier 3. Sheet pile wall at pier 3 is deteriorated and deformed and is just visible above the water.

c54. Navigation Lights: Navigation lights are all functioning but are very dim.

c55. Signs: The West Approach "X" overhead sign at the south end of the cantilever sign support, facing eastbound traffic is faded and non functioning.
A sign is missing at the south west terminal of the steel arch sections just beyond the impact attenuator.

c57. Utilities: UTILITY JUNCTION BOXES IN SPANS 3, 6 & 13 EXHIBIT ADVANCED CORROSION THROUGHOUT COMPONENTS WITH FAILED CORRUGATED METAL OUTER CONTAINMENT. AREAS OF LOOSELY CONNECTED/HANGING WIRES. DAMAGE TO SOME HANGERS. AREAS OF DISCONNECTED CONDUIT. RUSTED SECTION LOSS TO CONDUIT, MOSTLY IN TUNNELS.

Confined Space Entry. The Gas Monitor went into alarm for Methane in the four westernmost norht lower cellular units in the west approach immediatly west of the access shaft just west of the county garage door entrance.