



MEMORANDUM

Missouri Department of Transportation
Maintenance
2211 St Mary's Jefferson City

TO: Pat Martens - mt
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CC: Scott Stotlemeyer – mt
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FROM: John Wiesenmeyer - mt

DATE: December 2, 2009

SUBJECT: Major Bridge Inspection Reports
D 6 -- St. Louis County
L0623 and A2643 - Fenton
I – 44 over the Meramec River

Attached for your use are the subject reports.

**MAJOR BRIDGE INSPECTION REPORT
BRIDGE NO. L0623 (FENTON)
IS 44 WESTBOUND, ST. LOUIS COUNTY
OVER THE MERAMEC RIVER**



An inspection of the subject bridge was performed on June 9, 2009. This inspection serves as the general routine, in-depth and special pin plate inspection. An Aspen Aerial 50 Under Bridge Inspection Unit was used to access the underside and profile sides.

The inspection team included:

John C. Wiesenmeyer	Bridge Inspection Engineer
Keith Cason-Gossett	Bridge Maintenance Supervisor
Harold Smith	Senior Bridge Maintenance Worker
Darryl Wilson	Bridge Maintenance Supervisor
Freddie Johnson	Bridge Maintenance Supervisor

The structure was built in 1954 with a 28' roadway. It was widened to the north in 1972 to a 58' roadway. The structure length is 1,103 feet long. The facility carries 5 lanes of traffic, and is situated just west of IS 270. The load posting on the bridge is 65 tons. The ADT is 59,222.

The condition ratings as a result of the inspection are 6-5-4-7. The superstructure was rated down from 6 due to bulging and cracks at hanger plate. The substructure was lowered from a 5 due to major disintegration at bent 3. Precautionary blocking installed at bearing seat.

An underwater inspection, which consisted of wading and probing to check scour, was last performed on July 31, 2006. Nothing was found.

Deck Condition Rating (Item 58) = 6 (Satisfactory), due to the amount of cracking in the deck and the moderate delamination throughout

There is moderate delamination throughout, with moderate random cracking and efflorescence throughout the overhang areas.

Superstructure Condition Rating (Item 59) = 5 (Fair), pack rust bulging hanger pin plates and crack at hanger pin plate



Superstructure of the bridge consists of 15 spans with individual span lengths arranged as follows: simple span 30" WF beams (42'-41'), continuous span 36" WF beams (61'-83'-61'-61'-83'-61'), simple span 54" PL girder (62'), continuous span 72" PL girders (132'-132'-132'), simple span 54" PL girder (62'), simple span 33" WF beams (46'-46'). There are three plate girder lines and four wide flange beam lines that were added in 1972 for widening the bridge to the North. The original construction had four plate girder lines, with five wide flange lines.

In February 2004, six locations of cracking were noted, in the web of the original girders. This cracking was observed where the diaphragms for the widened girders are bolted to the webs of the existing girders. Also at this 2004 inspection, a crack was observed in an older replaced diaphragm connection angle. These cracks were repaired in 2005. Hanger plates at bents 10 and 13 are bulging and rusting.



As of this inspection, we have the following three cracks documented:

- ❖ (New in 6-19-07) Diaph conn angle Sp 10, G4
- ❖ (New in 6-09-09) Diaph conn angle (9") Sp 12, G5
- ❖ (New in 6-11-09) Hanger plate (1-1/4") Bt 13, G2



Substructure Condition Rating (Item 60) = 4 (Poor Condition), major disintegration of step cap at bent 3

The step cap bent 3 is in need of immediate repair. Blocking was installed under diaphragms during this inspection, as a precaution. Heavy cracking and leaching is common among most of the bents. Previous patchwork has map cracked and is delaminating. Extensive repairs of the substructure are needed in the near future. Rockers are tipped and need to be reset at bents 6, 9, 13 & 14.



Bank and Channel Condition Rating (Item 61) = 7, Minor Damage – Some minor damage to bank

Scour Evaluation (Item 113) = 8, Stable for calculated

Wearing Surface Condition: Poor

1-1/2" asphalt overlay over entire deck has open cracks mainly over joints. Before this asphalt overlay, an epoxy wear surface was prevalent. Numerous repairs to the epoxy were done in 2002 & 03.

Expansion Devices: Poor

Location	Type	Condition	Comments
Bt 2	Closed	Poor	Failing, Leaking
Bt 3	Closed	Poor	Failing, Leaking
Bt 6	Closed	Poor	Failing Seal debonding
Bt 9	Closed	Poor	Failing Seal debonding
Bt 10	Closed	Poor	Failing Seal debonding, nose break
Bt 13	Closed	Poor	Failing
Bt 14	Closed	Poor	Seal debonding, nosing breaking out
Bt 15	Closed	Poor	Leaking



Paint Condition = Good, Rust Code 6, rusting at diaphragms and bearings at joints

Existing paint systems includes System S (Calcium Sulfonate over lead), Gray, painted in 2006, good condition. The girder ends under the expansion devices are System G (Inorganic Zinc), Gray, painted in 2006, good condition. There is general rust staining evident at hanger pin locations.



Programming:

- ❖ Future needs – Total surface hydrodemolition of deck, replacement of expansion devices, large scale repairs / replacement to various substructure units.
- ❖ There is a project to repair substructure units in 2010. The scope of this is probably not enough to cover all the needs.

Past Rehabilitation / Painting Work:

- ❖ 2006 Calcium Sulfonate overcoat / System G at joints and seal deck outlets
- ❖ 2004 deck repair and overlay
- ❖ 1997 deck repair, wearing surface (EPO), substructure repairs, fatigue crack repairs
- ❖ 1983 expansion devices
- ❖ 1972 widen bridge

Maintenance Work:

- ❖ Install missing load post sign (65t) at east approach
- ❖ Replace or re-build step cap at bent 3
- ❖ Clean & seal pin connector plate areas with “anti rust” gel
- ❖ Repair expansion joints, bents 6, 9, 14
- ❖ Seal holes in asphalt overlay at expansion joints (pave mend), bents 2, 3, 10, 13, 15
- ❖ Cut trees / brush
- ❖ Clean, paint, reset rockers at bents 6, 9, 13, 14
- ❖ Remove drift at bent 12



Bridge Log – L0623 (Fenton) - Inspection June 9, 2009

<u>Item</u>	<u>Deficiency</u>	<u>Location</u>	<u>Recommend</u>	<u>Photos</u>
1	Deterioration	Bt 3	Repair	6-9-09- IMG0029
2	Drift	Bt 12	Remove	6-9-09- P6090107
3	Rusting Plates	Bt 10	Clean/paint	6-9-09- P6090117
4	Rusting Plates	Bt 10	Clean/paint	6-9-09- P6090112
5	Delaminations	Bt 10	Repair	6-9-09- P6090120
6	Holes in overlay	Bt 15	Seal	6-9-09- IMG0002
7	Holes in nosing	Bt 14	Repair	6-9-09- IMG0004
8	Holes in overlay	Bt 13	Seal	6-9-09- IMG0006
9	Holes in overlay	Bt 10	Seal	6-9-09- IMG0008
10	Exp full of debris	Bt 9	Clean	6-9-09- IMG0010
11	Exp full of debris	Bt 6	Clean	6-9-09- IMG0012
12	Holes in overlay	Bt 3	Seal	6-9-09- IMG0014
13	Holes in overlay	Bt 2	Seal	6-9-09- IMG0016

**MAJOR BRIDGE INSPECTION REPORT
BRIDGE NO. A2643 (FENTON)
IS 44 EASTBOUND, ST. LOUIS COUNTY
OVER THE MERAMEC RIVER**



An inspection of the subject bridge was performed on June 9, 2009. This inspection serves as the general routine and in-depth inspection. An Aspen Aerial 50 Under Bridge Inspection Unit was used to access the underside and profile sides.

The inspection team included:

John C. Wiesenmeyer	Bridge Inspection Engineer
Keith Cason-Gossett	Bridge Maintenance Supervisor
Harold Smith	Senior Bridge Maintenance Worker
Darryl Wilson	Bridge Maintenance Supervisor
Freddie Johnson	Bridge Maintenance Supervisor

The eastbound IS 44 structure over the Meramec River at Fenton, was built in 1972. It has a 58' roadway and is 1,081 feet long. It carries 4 lanes of traffic and is located just west of IS 270. The load posting on the bridge is 60 tons. The ADT is 48,485.

Condition ratings, as a result of the inspection, are 6-6-6-7. The substructure was rated down from 7 due to heavy spalls near the bearing at bent 4. An underwater inspection, which consisted of wading and probing to check scour, was last performed on July 31, 2006. Nothing was found.

Past program work has included:

- ❖ 2006 Calcium Sulfonate overcoat / System G at joints and seal deck outlets
- ❖ 2004 deck repair and fatigue crack retrofitting
- ❖ 1997 deck repair, epoxy surface, substructure repair, superstructure repairs

Deck Condition Rating (Item 58) = 6 (Satisfactory), due to moderate efflorescence and transverse cracking with minor saturation and a few patches in the deck.

There is moderate transverse cracking and efflorescence throughout. There are a few patches throughout. Large spalling with exposed rebar all along the underside of the south parapet wall.

Superstructure Condition Rating (Item 59) = 6 (Satisfactory), due to fatigue cracking.

The superstructure of the bridge consists of 12 spans with continuous composite plate girders: (70'-89'-70'-4')(70'-89'-89'-70')(4'-120'-150'-4')(74.5'-74.5'). The bridge uses fixed bearings at bents 2, 6, 10 and 12: rocker bearings at bents 1, 3, 4, 5, 7, 9, 11 and 13; and cantilever expansion rocker bearings at intermediate bents 4, 8 and 11.

In 1997 cracks were repaired in welds located in the girder web-diaphragm stiffener area. By 2003, there were 7 cracks that hadn't been repaired. At the 2006 inspection there were only two locations where cracks were found, and all previous repairs looked good. There were no changes to those cracks at this inspection.



As of this inspection, we have the following three cracks were documented:

- ❖ (6-13-06) In weld of lat guss pl (4-1/2") Sp 9, G5
- ❖ (6-13-06) Top flange weld (2-1/2") Sp 2, G6
- ❖ Bott of Vert Stiff to web weld, s side (1") Sp 8, G5

At pier 11, the entire webs of adjacent girders are touching in the top half, due to the cantilever rockers being maxed out.



Substructure Condition Rating (Item 60) = 6 (Satisfactory Condition), spalling on Bt 4, not affecting bearing



Cantilever rockers tipped and need reset at bents 4 & 11.



Bank and Channel Condition Rating (Item 61) = 7, Minor Damage – Some minor damage to bank

Scour Evaluation (Item 113) = 8, Stable for calculated scour

Wearing Surface Condition: Fair

In 1997 an epoxy polymer wearing surface was applied. Many epoxy areas had been repaired over the years. 1-1/2” asphalt overlay was laid a few years ago with SRI. There are a few patches in the surface and one area that needs repair.



Expansion Devices: Poor Condition

Location	Type	Condition	Comments
Bt 4	Closed	Fair	Nosing Cracking-Dry
Bt 8	Closed	Poor	Failing, Leaking, Pounding
Bt 11	Closed	Fair	Nosing Cracking-Dry



Paint Condition = Good, Rust Code 9

Existing paint systems include System S (Calcium Sulfonate over lead), Gray, painted 2006, on main girders. The girder ends under expansion device areas were sandblasted and recoated System G (Inorganic Zinc), Gray, painted 2006. Both systems are in good condition.

Programming:

- ❖ Future needs – Total surface hydrodemolition of deck; expansion device replacement
- ❖ Nothing currently in STIP

Maintenance Work:

- ❖ Install missing load post sign (60 Tons) at west approach
- ❖ Repair spall on cap at bt 4
- ❖ Repair expansion joint at bent 8
- ❖ Clean & flush drain outlets
- ❖ Cut trees / brush
- ❖ Reset rockers bents 4 & 11
- ❖ Deck repair span 8
- ❖ Trim girder ends bt 11

Bridge Deficiency Log – A2643 (Fenton) - Inspection June 9, 2009

<u>Item</u>	<u>Deficiency</u>	<u>Location</u>	<u>Recommend</u>	<u>Photos</u>
1	Exp jt	Bt 4		6-10-09- IMG0031
2	Exp jt	Bt 8		6-10-09- IMG0033
3	Cracked nosing	Bt 8		6-10-09- IMG0034
4	Cracked nosing	Bt 8		6-10-09- IMG0035
5	Cracked nosing	Bt 8		6-10-09- IMG0036
6	Cracked nosing	Bt 11		6-10-09- IMG0038
7	Surface repair	Sp 3		6-10-09- IMG0039
8	Exp jt	Bt 4		6-10-09- IMG0040
9	Surface repair	Sp 11		6-10-09- IMG0041
10	Cracked nosing	Bt 11		6-10-09- IMG0042
11	Surface repair	Sp 8	Conc deck repair	6-10-09- IMG0043
12	Cracked nosing	Bt 8		6-10-09- IMG0044