

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 31510
CSAH NO. 62
OVER THE
MISSISSIPPI RIVER
DISTRICT 1 - ITASCA COUNTY



PREPARED FOR THE
MINNESOTA DEPARTMENT OF TRANSPORTATION
BY
COLLINS ENGINEERS, INC.
JOB NO. 5221 (CEI 29)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected below water at Bridge No. 31510, Piers 1, 2, and 3, were found to be in good to satisfactory condition with coating failure and widespread nodular corrosion covering most of the steel pile surfaces from the waterline to the mudline. The corrosion was accompanied by only minor section loss. The split that was observed along a vertical welded seam during a prior inspection has been sufficiently repaired with a bolted steel collar. The channel bottom around the substructure units appeared stable and relatively unchanged; however, minor scour depressions have developed at the upstream piles of Pier 2 since the previous inspection.

INSPECTION FINDINGS:

- (A) Moderate corrosion was observed on the steel pipe piles from the waterline to the mudline. The piles exhibited minimal section loss with typical pitting penetrations of no more than 1/32 of an inch and up to a maximum of 1/16 of an inch in random instances.
- (B) The vertical crack noted in a prior inspection has been adequately repaired with a bolted steel collar extending from the top of the pile to 3 feet below the waterline.
- (C) Minor scour depressions, 1 to 2 feet deep with a 1 to 2 foot radius, have developed around the two upstream piles of Pier 2 since the previous inspection.
- (D) A heavy accumulation of organics/vegetation with occasional timber debris was observed at the upstream nose and along the entire bank side of Pier 3 extending from the channel bottom to 4 feet above the channel bottom. Scattered steel and timber debris was also observed on the channel bottom at Pier 2 along with a 55 gallon drum at both Piers 1 and 2.

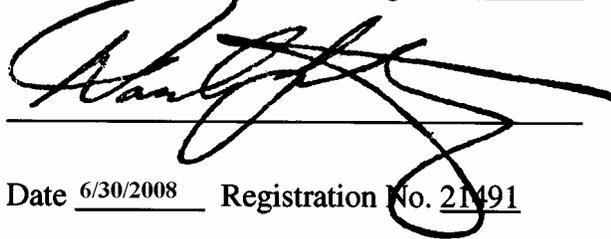
- (E) The downstream battered pile on Pier 3 becomes a straight pile (15° Bend) at 5 feet below the waterline (possible installation related deformation).

RECOMMENDATIONS:

- (A) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Daniel G. Stromberg

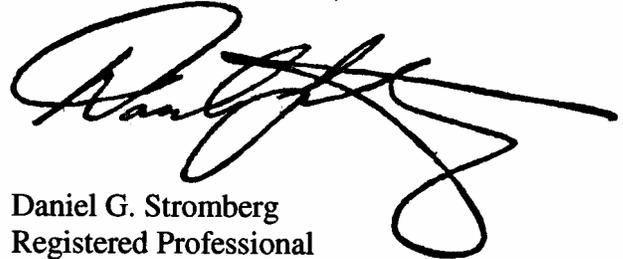


A large, stylized handwritten signature in black ink, appearing to read 'Daniel G. Stromberg', is written over a horizontal line. Below the signature is another horizontal line.

Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



A large, stylized handwritten signature in black ink, appearing to read 'Daniel G. Stromberg', is written over a horizontal line. Below the signature is another horizontal line.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 31510

Feature Crossed: The Mississippi River

Feature Carried: CSAH No. 62

Location: District 1 - Itasca County

Bridge Description: The superstructure consists of four spans of multiple prestressed concrete beams. The superstructure is supported by two reinforced concrete abutments and three steel pipe pile bent piers. The piers are numbered 1 through 3 starting from the south end of the bridge.

2. INSPECTION DATA

Professional Engineer Diver: Daniel G. Stromberg, P.E., S.E.

Dive Team: John Loftus, Valerie Roustan

Date: August 28, 2007

Weather Conditions: Cloudy, 68 °F

Underwater Visibility: 5 feet

Waterway Velocity: 0.5 f.p.s.

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1, 2, and 3.

General Shape: Piers 1 and 3 consist of a single line of 10 steel pipe piles supporting a reinforced concrete cap. Pier 2 consists of two lines of 5 steel pipe piles supporting a reinforced concrete cap.

Maximum Water Depth at Substructure Inspected: Approximately 14.4 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap at the east end of Pier 3.

Water Surface: The waterline was approximately 8.1 feet below reference.
Waterline Elevation = 1272.9.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 6

Item 61: Channel and Channel Protection: Code 7

Item 92B: Underwater Inspection: Code B/08/07

Item 113: Scour Critical Bridges: Code R/96

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

 Yes X No



Photograph 1. Overall View of the Structure, Looking Southeast.



Photograph 2. View of Pier 1, Looking Southwest.



Photograph 3. View of Pier 2, Looking Northeast.



Photograph 4. View of Pier 3, Looking Northeast.



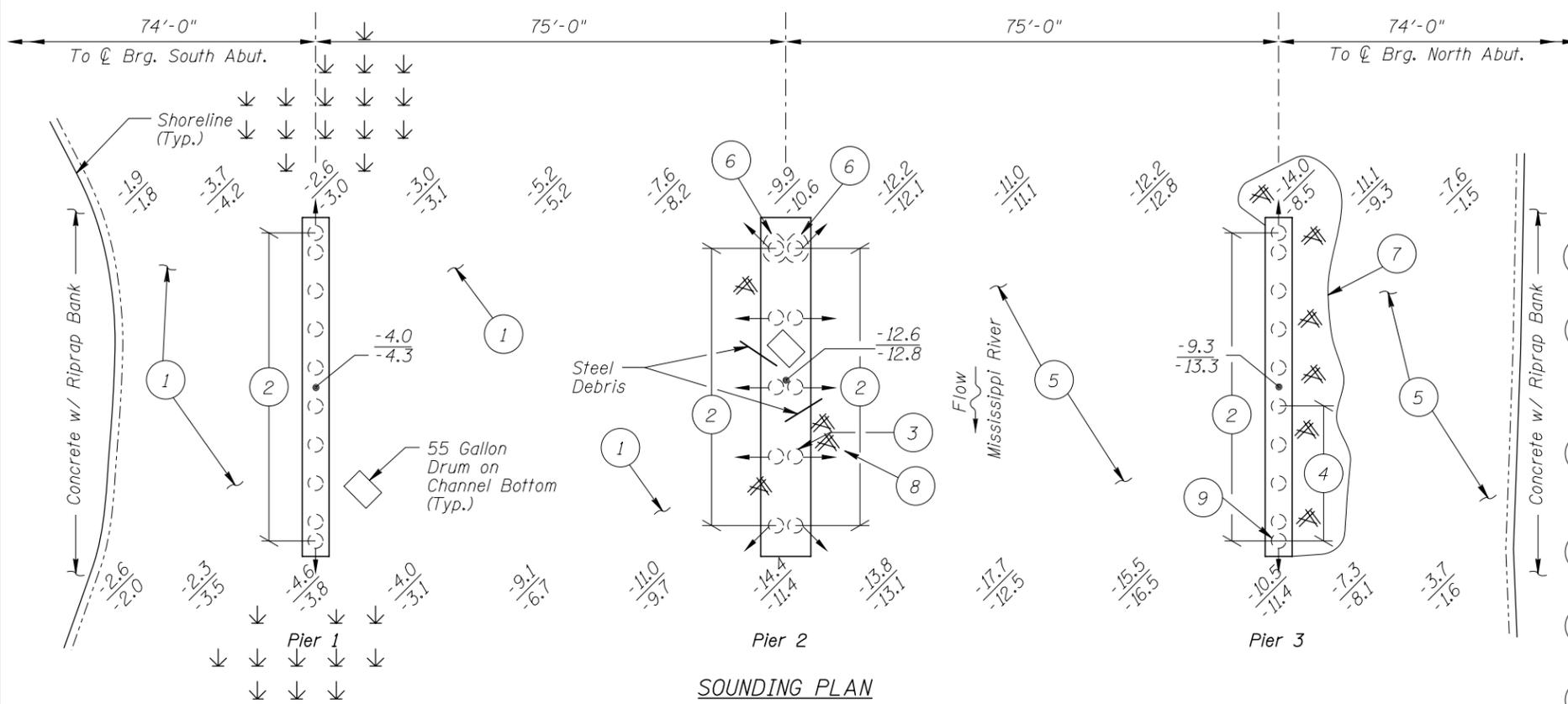
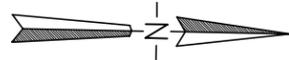
Photograph 5. View of North Abutment, Looking Northeast.



Photograph 6. View of South Abutment, Looking Southwest.



Photograph 7. View of Downstream Pile of Bent 3 (bend/deformation), Looking North.



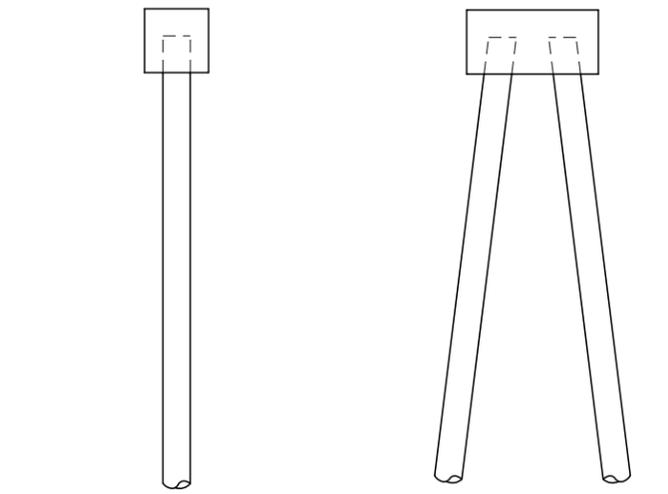
SOUNDING PLAN

GENERAL NOTES:

1. Piers 1, 2, and 3 were inspected underwater.
2. At the time of inspection on August 28, 2007, the waterline was located approximately 8.1 feet below the top of pier cap at east end of Pier 3. This corresponds to a waterline elevation of 1272.9 feet based on previous report dated August 23, 2002.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between substructure units

INSPECTION NOTES:

- 1 The channel bottom material consisted of soft silty sand with maximum probe rod penetrations of 1 foot.
- 2 Moderate corrosion covered 75 to 100 percent of the pile surfaces from the waterline to the channel bottom. Minimal section loss was observed with typical pitting up to 1/32 inches deep and maximum pitting up to 1/16 inches deep near the waterline.
- 3 Vertical crack along welded joint noted in previous inspection, August 27, 1997, has been repaired with a bolted steel collar extending from the underside of the pile cap to 3 feet below the waterline.
- 4 Random heavy rust nodules extending from 3 feet below the waterline to the mudline.
- 5 The channel bottom material consisted of firm sandy gravel with 6 inch to 2 foot diameter rocks and probe rod penetrations of 2 to 4 inches.
- 6 Minor scour depressions, 1 to 2 foot deep with 1 to 2 foot radius, were observed around the upstream piles of Pier 2.
- 7 Heavy accumulation of organics/vegetation was observed at the upstream nose and along the entire bank side of Pier 3 with occasional 1 foot diameter timber debris extending from the mudline up 3 to 4 feet above the channel bottom.
- 8 Minor accumulation of 1 foot diameter timber debris was scattered on the channel bottom along the pier.
- 9 The downstream battered pile at Pier 3 exhibited a 15 degree bend 5 feet below the waterline where the pile then extends vertically into the channel bottom.



PIERS 1 & 3 END VIEW

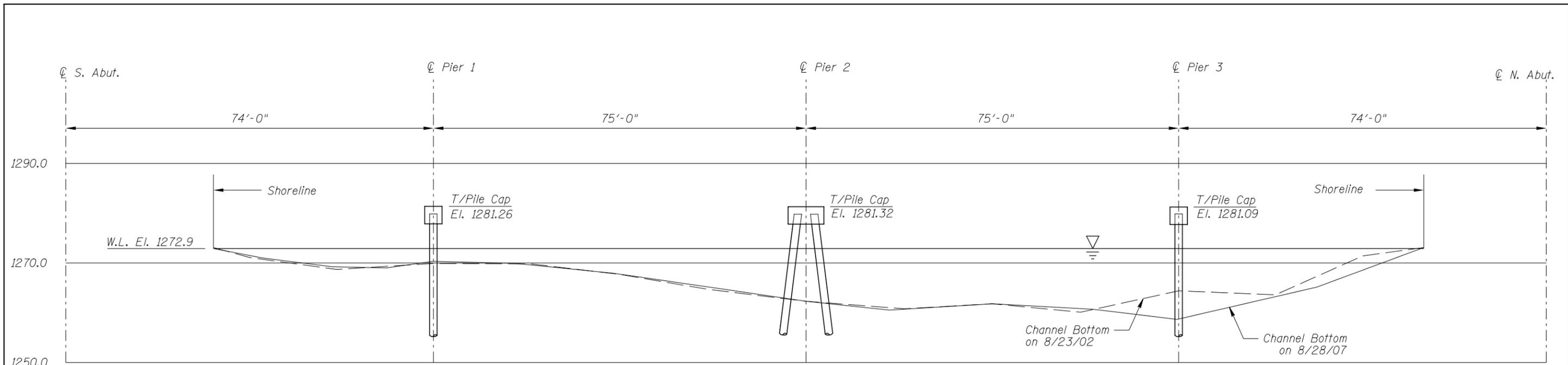
PIER 2 END VIEW

Note:
All soundings based on 2007 waterline location.

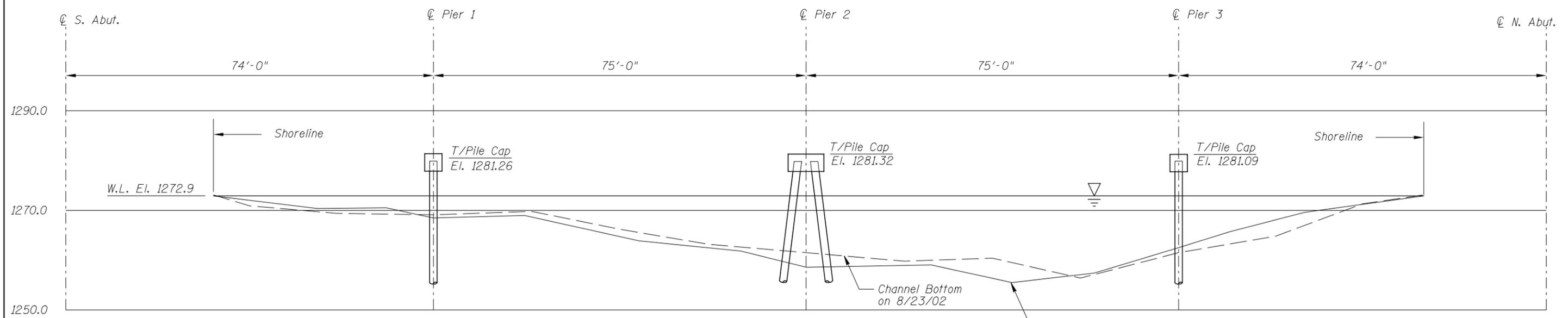
Legend

- 2.2 Sounding Depth (8/28/07)
- 3.0 Sounding Depth (8/23/02)
- (○) Steel Pipe Pile
- (○) Battered Steel Pipe Pile
- ↓ Vegetation/Grass
- /// Timber Debris
- (- -) Scour Depression

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 31510 OVER THE MISSISSIPPI RIVER DISTRICT I, ITASCA COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: MDK	COLLINS ENGINEERS	Date: AUG, 2007
Checked By: DGS	<small>133 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Scale: NTS
Code: 52210029		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 31510 OVER THE MISSISSIPPI RIVER DISTRICT I, ITASCA COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: MDK	COLLINS ENGINEERS <small>133 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: AUG. 2007
Checked By: DGS		Scale: 1"=20'
Code: 52210029		Figure No.: 2

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: August 28, 2007

ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E., S.E.

BRIDGE NO: 31510 WEATHER: Cloudy, 68 °F

WATERWAY CROSSED: The Mississippi River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: John Loftus, Valerie Roustan

EQUIPMENT: Scuba, U/W Light, Scraper, Lead Line, Sounding Pole, and Probe Rod

TIME IN WATER: 9:20 A.M.

TIME OUT OF WATER: 9:50 A.M.

WATERWAY DATA: VELOCITY 0.5 f.p.s.

VISIBILITY 5 feet

DEPTH 14.4 feet at Pier 2

ELEMENTS INSPECTED: Piers 1, 2, and 3.

REMARKS: Overall, the submerged steel of the piles was in good to satisfactory condition with coating failure and nodular corrosion from the waterline to the mudline. Thus far, the corrosion has caused minimal section loss with most of the related pitting exhibiting penetrations of no more than 1/32 inch. In isolated instances, the pitting was up to 1/16 inch deep. There was scattered steel debris and/or timber drift on the channel bottom at each of the piers with a heavy (up to 4 foot high) accumulation of organic material and vegetation along the upstream and bank sides of Pier 3. Previously noted crack in pile weld at Pier 2 has been adequately repaired with a bolted collar. Downstream battered pile on Pier 3 becomes a straight pile (15° Bend) 5 feet below the waterline (possible installation related deformation).

FURTHER ACTION NEEDED: YES NO

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 31510
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Daniel G. Stromberg, P.E., S.E.
 WATERWAY CROSSED The Mississippi River

INSPECTION DATE August 28, 2007
 NOTE: USE ALL APPLICABLE CONDITION
 DEFINITIONS AS DEFINED IN THE MINNESOTA
 RECORDING AND CODING GUIDE INCLUDING
 GENERAL, SUBSTRUCTURE, CHANNEL AND
 PROTECTION, AND CULVERTS AND WALL
 DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

UNIT REFERENCE NO.	UNIT DESCRIPTION	MAXIMUM DEPTH OF WATER	SUBSTRUCTURE					CHANNEL					GENERAL						
			PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER (BRACING)	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	4.6'	6	N	N	9	N	6	8	8	8	7	7	N	6	N	6	N	N
	Pier 2	14.4'	6	N	N	9	N	6	8	N	N	7	7	N	6	N	6	7	N
	Pier 3	14.0'	6	N	N	9	N	6	8	8	8	6	7	N	6	N	6	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the submerged steel of the piles was in good to satisfactory condition with coating failure and nodular corrosion from the waterline to the mudline. Thus far, the corrosion has caused minimal section loss with most of the related pitting exhibiting penetrations of no more than 1/32 inch. In isolated instances, the pitting was up to 1/16 inch deep. There was scattered steel debris and/or timber drift on the channel bottom at each of the piers with a heavy (up to 4 foot high) accumulation of organic material and vegetation along the upstream and bank sides of Pier 3. Previously noted crack in pile weld at Pier 2 has been adequately repaired with a bolted collar. Downstream battered pile on Pier 3 becomes a straight pile (15° Bend) 5 feet below the waterline (possible installation related deformation).

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO. USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.