APPENDIX

SCOUR EVALUATION

113 Sour Critical Bridge: _____

Bridge Not Over Waterway	Code N	Stable, but Action Required	Code 4
Bridge Foundation Above Flood Level	9	Bridge Scour Critical, Foundation Unstable	3
Bridge Foundation Stable	8	Bridge Scour Critical, Immediate Action Required	2
Previous Problem Corrected	7	Bridge Scour Critical, Failure Imminent - Close	1
Scour Calculation/Evaluation Not Made	6	Bridge Scour Critical, Bridge Has Failed and Closed	0
Scour Within Footing Or Pile Limits	5		

Type of Scour Evaluation _____ C-Calculated O-Observed N - None

PROPOSED IMPROVEMENTS (To Be Completed By Central Office On Bridges Which Qualify For Federal Aid Only)

75 Type of Work _____

76 Improvement Length - Structure _____ Ft.

94 Bridge Improvement Cost..... $ _____,_____,000.

95 Roadway Improvement Cost $ _____,_____,000.

98 Total Project Cost..... $ _____,_____ ,000.

97 Year of Improvement Cost Estimate.....19/20 __ __

114 Future ADT..... __ __ __ __ __ __

115 Year of Future ADT.....20 __ __

INSPECTIONS

91 Designated Frequency..... __ __ (M M)

90 Inspection Date __ __ __ __ (M M Y Y)

93 Critical Feature Inspection Date:

	TYPE	(MONTHS) M	M	(YEAR) Y	Y
A) Fracture Critical Detail	__	__	__	__	__
B) Underwater Inspection	__	__	__	__	__
C) Other Special Inspection	__	__	__	__	__

92 Critical Feature Inspection

	(To be completed by C.O.) Y/N	(MONTHS) M	M
A) Fracture Critical Detail	__	__	__
B) Underwater Inspection	__	__	__
C) Other Special Inspection	__	__	__

Type of Underwater Inspection
D = Dive
W = Wade
Y = Dry

Type of Fracture Critical Inspection
C = Comprehensive
M = Most Fracture Critical Member

GENERAL _____

STRUCTURAL INVENTORY & APPRAISAL SHEET

COUNTY _____ BRIDGE NO. _____ ROUTE _____

IDENTIFICATION

[1] State MISSOURI
[2] Hwy District _____
[3] County _____
[4] Place _____
[5] Inventory Rte. _____ ☐ On ☐ Under
[6] Features Intersected _____
_____
[7] Facility Carried _____
[8] Structure No. _____
[9] Location S _____ T _____ R _____
[11] Milepoint _____ _____
[16] Latitude _____ __ D __ __ '
[17] Longitude _____ __ D __ __ '
[98] Border Bridge State _____
% Responsibility _____
[99] Border Br. Str. No. _____

STRUCTURE TYPE AND MATERIAL

CODE

[43] Structure Type–Main .....
[44] –Approach .....
[45] Number of Spans–Main _____
[46] –Approach _____
[107] Deck Structure Type: _____

1–Conc. CIP 2–Conc. P/C Panels
3–Open Grating 4–Closed Grating
5–Steel Plate 6–Corr. Steel
7–Aluminum 8–Timber
9–Other N–Not Applicable

( ) Check if Post Tensioned Concrete

AGE AND SERVICE

[19] By–pass, Detour Length ..... __ __
[27] Year Built ..... __ __ __ __
[28] Lanes on Str. _____ Under _____
[29] ADT on Str. _____ [30] Year _____
CODE
[42] Type Service .....
[106] Year Reconstructed .... __ __ __ __
[109] Truck ADT on Str.(percent) ... __ __

GEOMETRIC DATA

[10] Inventory Rte. Min. Vert. Clear. ___ Ft. ___ In.
[32] Appr. Rdwy. Width W/Sh'ld. _____ Ft.
Includes stabilized all weather sh'ld. (State System)
Includes sh'ld. with same surface as roadway (Non–State Off–System)
[33] Br. Median: _____ 0–None 1–Open
2 – Closed Median (No Barrier)
3–Closed/Non–Mountable Barriers
[34] Skew ..... __ __ Deg
[35] Struct. Flared ☐ Yes ☐ No
[47] Total Horiz. Clear. _____ Ft.
[48] Max. Span Length _____ Ft.
[49] Structure Length _____ Ft.
[50] Sidewalk or Curb Lt __ __ . __ Ft. Rt __ __ . __ Ft.
[51] Br. Width (Curb–Curb) ..... __ __ __ . __ Ft.
[52] Deck Width (Out–Out) ..... __ __ __ . __ Ft.
[53] Vert. Clearance Over Deck __ __ Ft. __ __ In.
[54] Under Clearance–Vert.: Ref __ ; __ __ Ft. __ __ In.
[55] –Lateral–Right: Ref __ ; __ __ . __ Ft.
[56] –Left ..... __ __ . __ Ft.

NAVIGATION DATA

[38] Navigation Control: ☐ N/A ☐ Yes ☐ No
[39] – Vertical _____ Ft.
[40] – Horizontal _____ Ft.
[111] Pier Protection(For Navigation): _____
[116] Vert–Lift Br .Nov. Min Vert. Clear. _____ Ft.

CLASSIFICATION

[20] Toll Status _____
1–Toll Bridge 2–On Toll Rd.
3–On Free Rd. 4–Interstate Toll, S.A.
5–Toll Br., S.A.
[21] Maintain _____
[22] Owner _____
[26] Functional _____
[37] Historical Significance _____
(To be completed by Main Office)
[100] Defense Hwy. ___ (To be completed by M.O.)
[101] Parallel Structure: _____ R–Rt. L–Lt. N–None
[102] Direction Traffic: _____ 0 – No Hwy.Tr. 1 – 1 Way 2–2 Way 3–1 Lane Br.2 Way Tr.
[103] Temporary Structure ☐ Yes ☐ No
[104] Highway System: _____
0–Not on NHS 1–On NHS
[110] Designated Nat. Network: _____
[112] NBIS Bridge Length: _____ 1–Yes 0–No
Y–Yes N–No

[108] WEARING SURFACE/PROTECTIVE SYSTEM

[108A] Type of Wearing Surface _____

1–Concrete 2–Integral Concrete*
3–Latex Concrete 4–Low Slump Concrete
5–Epoxy Overlay 6–Bituminous
7–Timber 8–Gravel
9–Other 0–None
N–Not Applicable (applies only to structures with no deck)

* Separate layer of concrete added but not latex modified, low slump, etc.

[108B] Type Membrane _____

1–Built – up 2–Preformed Fabric
3–Epoxy 8–Unknown
9–Other 0–None
N–Not Applicable (applies only to structures with no deck)

[108C] Type of Deck Protection _____

1–Epoxy Coated Reinforcing 2–Galvanized Reinforcing
3–Other Coated Reinforcing 4–Cathodic Protection
6–Polymer Impregnated 7–Internally Sealed
8–Unknownm 9–Other
0–None N–Not Applicable (applies only to structures with no deck)

CONDITION

	Material	Condition Analysis	Rating (9–0 or N)
[58] Deck			
[59] Superstructure			
[60] Substructure			
[61] Channel & Channel Protection			
[62] Culverts			

APPRAISAL

[71] Waterway Adequacy (See Table) _____
[72] Approach Roadway Alignment (See Manual) _____
[36] Traffic Safety Features ___ Bridge Rail ___ Transition ___ Approach Guard Rail ___ Approach Rail Terminal
0–Does not meet Standards 1–Meets Standards N–Not Applicable

LOAD RATING AND POSTING

[31] Design Load _____ Engr. Firm _____ Name of Engineer _____ P.E. No. _____
[41] Structure Open, Posted or Closed to Traffic _____ A–Open, No Restrictions B–Open, Posting Recommended
D–Open, Temporary Shoring E–Open, Temporary Structure G–New Structure Not Open
K–Closed P–Posted R–Posted, Other Than Load Capacity
[64] Operating Rating _____ [66] Inventory Rating _____
[70] Bridge Posting: _____ (To be completed by Central Office) Approved posting _____ (To be completed by Central Office)

FORM SI&A Rev. 8/94

STRUCTURAL INVENTORY & APPRAISAL SHEET

COUNTY _____ BRIDGE NO. _____ ROUTE _____

OF INDIVIDUAL PROVIDING THIS INFORMATION _____ P.E./ID. No. _____ ORGANIZATION _____

IDENTIFICATION

1 State MISSOURI
2 MODOT Hwy District _____
3 Mo. County Code _____
4 Place Code _____
5 Inventory Rte. _____ ☐ On ☐ Under
6 Features Intersected _____
7 Facility Carried _____
8 Struct. No. _____
9 Location S _____ T _____ R _____
11 Log point _____
12 Base Highway Network ___ (0=Off 1=On)
13A LRS Inventory Rte. _____
13B Subroute Numbers _____
16 Latitude . . . ___D___M___.___S
17 Longitudinal . ___D___M___.___S
98 Border Bridge State _____
% Responsibility _____
99 Brdr Br. Str. No. _____

STRUCTURE TYPE AND MATERIAL

CODE

43 Structure Type-Main ..... [ ][ ]
-Approach ..... [ ][ ]
Number of Spans-Main ___ ___ ___
-Approach ___ ___ ___ ___
107 Deck Structure Type: _____

1-Conc. CIP 2-Conc. P/C Panels
3-Open Grating 4-Closed Grating
5-Steel Plate 6-Corr. Steel
7-Aluminum 8-Timber
9-Other N-Not Applicable
( ) Check if Post Tensioned Concrete

AGE AND SERVICE

19 By-pass Detour Lgth (kilometers) ___
27 Year Built ..... ____
28 Lanes on Str. ___ Under ___
29 ADT on Str. _____ 30 Year ____
CODE
42 Type Service ..... [ ][ ]
106 Year Reconstructed .... ____
109 Truck ADT on Str. (percent) .... ___

GEOMETRIC DATA

10 Inventory Rte. Min. Vert. Clear ___.___ meters
32 Appr. Rdwy. Width W/Sh'ld. ____.___ meters
Includes stabilized all weather sh'ld. (State System)
Includes sh'ld. with same surface as roadway (Non-State Off-System)
33 Br. Median: _____ 0-None 1-Open
2 - Closed Median (No Barrier)
3-Closed/Non-Mountable Barriers
34 Skew ..... ___ Degrees
35 Struct. Flared ☐ Yes ☐ No
47 Total Horiz. Clear ..... ___.___ meters
48 Max. Span Length ____.___ meters
49 Structure Length ____.___ meters
50 Sidewalk or Curb Lt ___.___m. Rt ___.___m.
51 Br. Width (Curb-Curb) ..... ___.___m.
52 Deck Width (Out-Out) ..... ___.___m.
53 Vert. Clearance Over Deck ___.___ meters
54 Under Clearance-Vert.: Ref ___.___m.
55 -Lateral-Right: Ref ___.___ meters
56 -Left ..... ___.___ meters

NAVIGATION DATA

38 Navigation Control: ☐ N/A ☐ Yes ☐ No
39 - Vertical ___.___ meters
40 - Horizontal ___.___ meters
111 Pier Protection (For Navigation): _____
116 Vert-Lift Br. Nav. Min Vert. Clear. ____ Ft.

CLASSIFICATION

20 Toll Status ____
1-Toll Bridge 2-On Toll Rd.
3-On Free Rd. 4-Interstate Toll, S.A.
5-Toll Br., S.A.
21 Maintain _____
22 Owner _____
26 Functional _____
37 Historical Significance _____
(To be completed by Main Office)
100 Defense Hwy. ___ (To be completed by M.O.)
101 Parallel Structure: ____ R-Rt. L-Lt. N-None
102 Direction Traffic: ____ 0 - No Hwy.Tr. 1 - 1 Way 2-2 Way 3-1 Lane Br.2 Way Tr.
103 Temporary Structure ☐ Yes ☐ No
104 Highway System: ____
0-Not on NHS 1-On NHS
110 Designated Nat. Network: _____
112 NBIS Bridge Length: _____ 1-Yes 0-No
Y-Yes N-No

106 WEARING SURFACE/PROTECTIVE SYSTEM

106A Type of Wearing Surface _____ *
1-Monolithic Conc. 2-Integral Concrete
3-Latex Concrete 4-Low Slump Concrete
5-Epoxy Overlay 6-Bituminous
7-Timber 8-Gravel
9-Other 0-None
N-Not Applicable (applies only to structures with no deck)
* Separate non-modified layer of concrete added but not latex modified, low slump, etc.

106B Type Membrane _____
1-Built - up 2-Preformed Fabric
3-Epoxy 8-Unknown
9-Other 0-None
N-Not Applicable (applies only to structures with no deck)

106C Type of Deck Protection _____
1-Epoxy Coated Reinforcing 2-Galvanized Reinforcing
3-Other Coated Reinforcing 4-Cathodic Protection
6-Polymer Impregnated 7-Internally Sealed
8-Unknowns 9-Other
0-None N-Not Applicable (applies only to structures with no deck)

CONDITION

	Material	Condition Analysis	Rating (9-0 or N)
58 Deck			
59 Superstructure			
60 Substructure			
61 Channel & Channel Protection			
62 Culverts			

APPRAISAL

71 Waterway Adequacy (See Table) _____
(If 3", Estimated Frequency = ___Hrs., Estimated Duration ___Hrs.)
72 Approach Roadway Alignment (See Manual) _____
(If "3", Safe Speed on Rte ____, Safe Speed on Bridge ____)
Traffic Safety Features ____ Bridge Rail ____ Transition ____ Approach Guard Rail ____ Approach Rail Terminal
0-Does not meet Standards 1-Meets Standards N-Not Applicable

LOAD RATING AND POSTING

31 Design Load _____ Engr. Firm _____ Name of Engineer _____ P.E. No. _____

41 Structure Open, Posted or Closed to Traffic _____ A-Open, No Restrictions B-Open, Posting Recommended

D-Open, Temporary Shoring E-Open, Temporary Structure G-New Structure Not Open

K-Closed P-Posted R-Posted, Other Than Load Capacity

63 Method _____ 65 Method _____

Method: 1-Load Factor, 2-Allowable Stress, 3-Load and Resist. Factor, 4-Load Testing, 5-No Rating Analysis Performed

64 Operating Rating _____ 66 Inventory Rating _____

70 Bridge Posting: _____ (To be completed by Central Office) Approved posting _____ (To be completed by Central Office)

SCOUR EVALUATION

113 Sour Critical Bridges: _____

Bridge Not Over Waterway	Code N	Stable, but Action Required	Code 4
Bridge Foundation Above Flood Level	9	Bridge Scour Critical, Foundation Unstable	3
Bridge Foundation Stable	8	Bridge Scour Critical, Immediate Action Required	2
Previous Problem Corrected	7	Bridge Scour Critical, Failure Imminent - Close	1
Scour Calculation/Evaluation Not Made (Do not Code a 6 on Non-state system bridge)	6	Bridge Scour Critical, Bridge Has Failed and Closed	0
Scour Within Footing Or Pile Limits	5		

Type of Scour Evaluation _____ C-Calculated O-Observed N - None

PROPOSED IMPROVEMENTS (To Be Completed By Central Office On Bridges Which Qualify For Federal Aid Only)

75 Type of Work _____ $ In thousands of dollars

76 Improvement Length - Structure _____ . _____ Meters

94 Bridge Improvement Cost _____ . _____ $ 95 Roadway Improvement Cost _____ . _____ $

96 Total Project Cost ... _____ . _____ $ 97 Year of Improvement Cost Estimate...19/20 _____

114 Future ADT (20 yrs. forcast) _____ 115 Year of Future ADT.....20 _____

INSPECTIONS

91 Designated Frequency..... _____ (M M)

90 Inspection Date _____ (M M Y Y)

93 Critical Feature Inspection Date:

92 Critical Feature Inspection (To be completed by C.O.)

	Y/N	(MONTHS) M M
A) Fracture Critical Detail		
B) Underwater Inspection		
C) Other Special Inspection (Pins)		

	TYPE	(MONTHS) M M	(YEAR) Y Y
A) Fracture Critical Detail			
B) Underwater Inspection			
C) Other Special Inspection			

Type of Underwater Inspection
D = Dive
W = Wade
Y = Dry

Type of Fracture Critical Inspection
C = Comprehensive
M = Most Fracture Critical Member

GENERAL _____

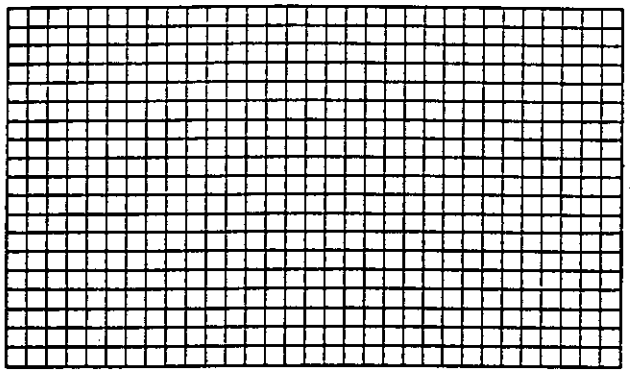
STRUCTURAL INVENTORY & APPRAISAL DATA SHEET

DATE _____

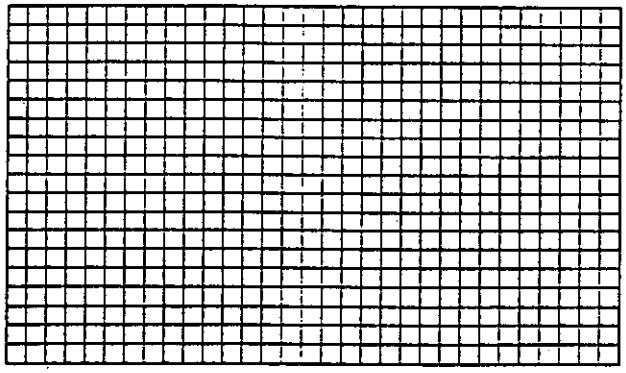
COUNTY _____ BRIDGE NO. _____ ROUTE _____

ENG. FIRM _____ ENG. NAME. _____ P.E. NO. _____

APPROACH ALIGNMENT



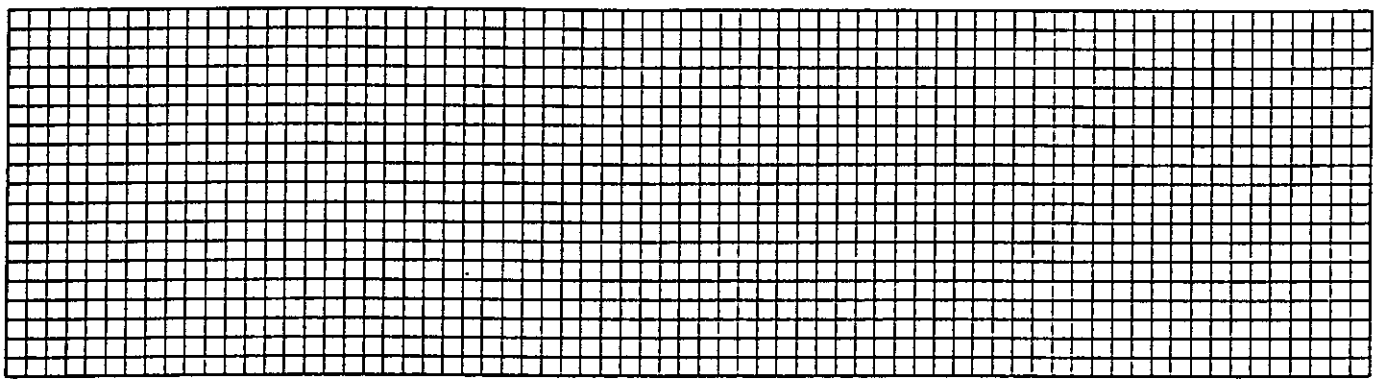
HORIZONTAL



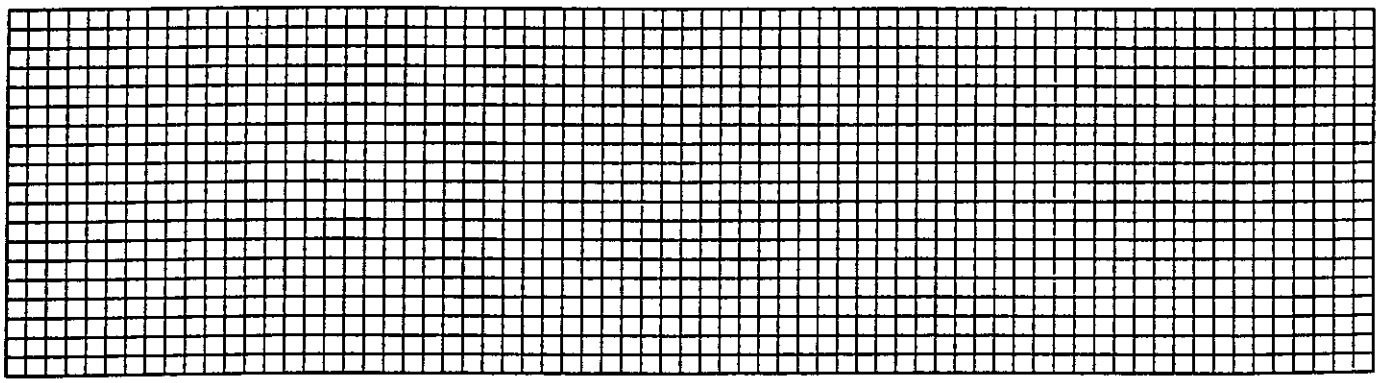
VERTICAL

SKEW: ☐ NO ☐ YES EST. DEG. _____

GENERAL ELEVATION



TYPICAL CROSS SECTION



Substructure Concrete fc' = _____ psi

Deck Concrete fc' _____ psi

Reinforcing Steel fy = _____ psi

Structural Steel fy = _____ psi

( )Rating Procedure Sheet Attached (Required only if calculations or Superstructure details not available

( )Rating Calculations Attached

HYDROLOGIC DATA
Drainage Area =
Design Discharge = Design High Water Elevation = Frequency =
BASIC FLOOD DATA
Q_{100} High Water Elevation =

SUPERSTRUCTURE DETAILS

REMARKS: _____

STEEL I-BEAM RATING PROCEDURE

NOTE: ALL DIMENSIONS ARE INCHES UNLESS OTHERWISE NOTED

USE BACK OF THIS SHEET TO INDICATE DETERIORATION. ☐

PAGE NO. _____

DATE _____

COUNTY _____

ROUTE _____

BRIDGE NO. _____

_____ OVERLAY WEIGHT (PSF)

_____ SPAN LENGTH(FT)

_____ MAXIMUM LATERAL SUPPORT DIMENSION (TIMBER DECK)

_____ ROADWAY WIDTH(FT)

_____ DECK MATERIAL

_____ STRINGER SPACING(FT.)

_____ DECK THICKNESS(IN)

_____ STRINGER DEPTH(IN)

_____ WEB DEPTH (IN)

_____ WEB THICKNESS (IN)

_____ FLANGE WIDTH(IN)

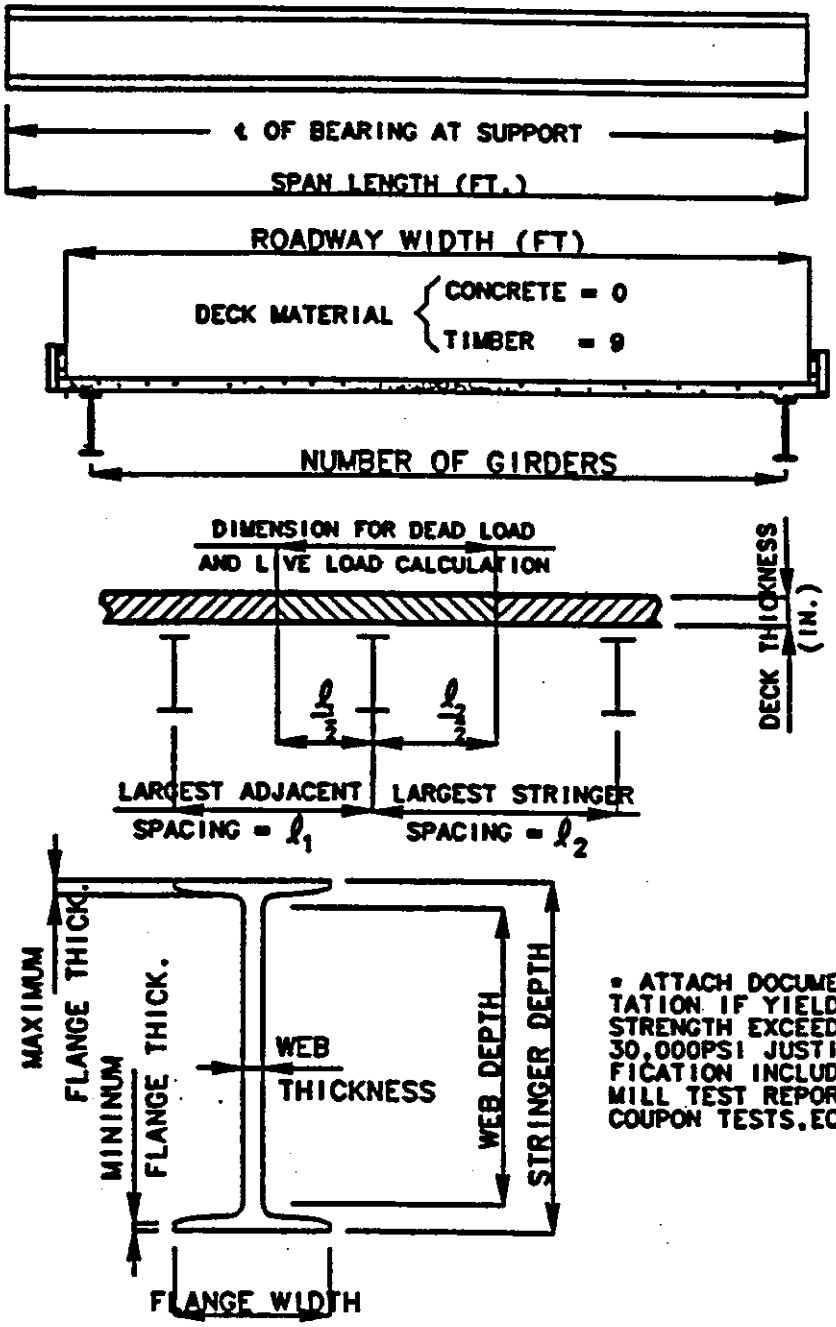
_____ AVERAGE FLANGE THICKNESS(IN)

_____ MAXIMUM FLANGE THICKNESS(IN)

_____ MINIMUM FLANGE THICKNESS(IN)

_____ YIELD STRENGTH *

(DOT IDENTIFY BY AREA AND SECTION NUMBER PLUS)



* ATTACH DOCUMENTATION IF YIELD STRENGTH EXCEEDS 30,000PSI JUSTIFICATION INCLUDES MILL TEST REPORTS, COUPON TESTS, ECT.

REVISED: SEPT 1993

STEEL I-BEAM RATING DETERIORATION

Date _____

County _____

Route _____

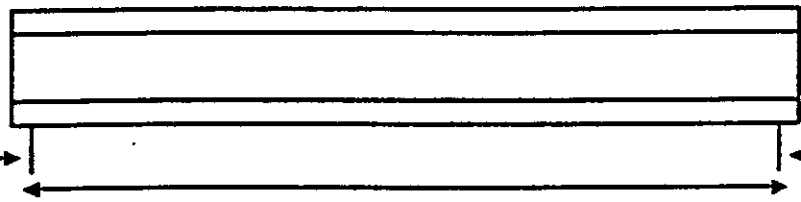
Bridge No. _____

OVERALL SECTION LOSS: _____ Percent

For localized deterioration, record the location of the hole or corroded area below.

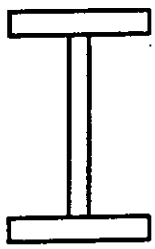
GENERAL ELEVATION:

Show dimension from CL bearing to bolt, hole, or heavily corroded area and show a sketch of the deterioration. Also show limits of cover plates.



TYPICAL SECTION

Show sketch of bolt, hole, or heavily corroded area and dimension from top or bottom of beam. Also show cover plate size and location.



DETERIORATION OF DECK:

Deck deterioration is not included in strength computations of Simple Steel I-Beams.

TIMBER RECTANGULAR BEAM RATING PROCEDURE

NOTE: ALL DIMENSIONS ARE INCHES UNLESS OTHERWISE NOTED

USE BACK OF THIS SHEET TO INDICATE DETERIORATION. ☐

PAGE NO. _____

DATE _____

COUNTY _____

ROUTE _____

BRIDGE NO. _____

_____
SPAN LENGTH(FT)

_____
ROADWAY WIDTH(FT)

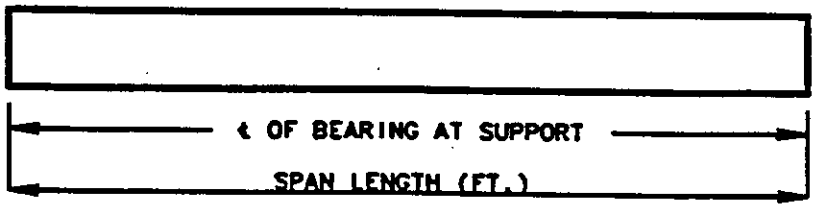
_____
STRINGER SPACING(FT.)

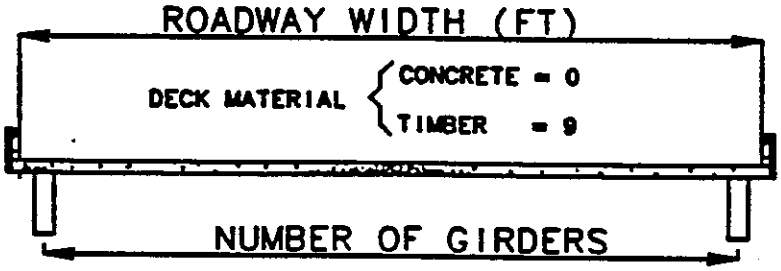
_____
DECK THICKNESS(IN)

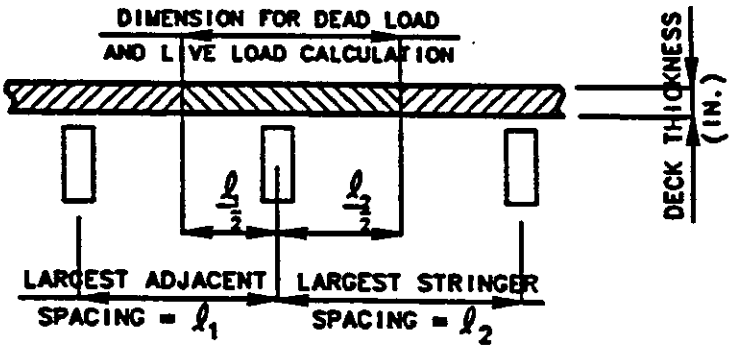
_____
STRINGER DEPTH(IN)

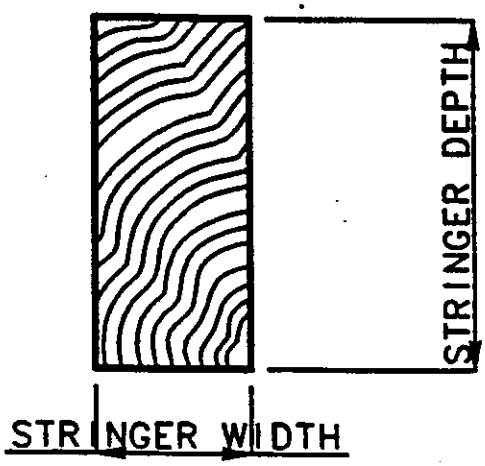
_____
STRINGER WIDTH(IN)

_____
OVERLAY ON DECK









REVISED: AUG. 1993

TIMBER RECTANGULAR BEAM RATING DETERIORATION

PAGE NO. _____

DATE _____

COUNTY _____

ROUTE _____

BRIDGE NO. _____

BEAM DETERIORATION:

Deterioration of a Timber Beam normally is indicated by Failure thru Cracking or Shear Failure. A Rating cannot be made under this circumstance. Parallel cracking not crossing beam cross-section is not considered as failure. Sketch number of beams failed and position by section view.

DECK DETERIORATION:

Deterioration of a Timber Deck on a Simple Span Bridge is not included in the Strength Rating.

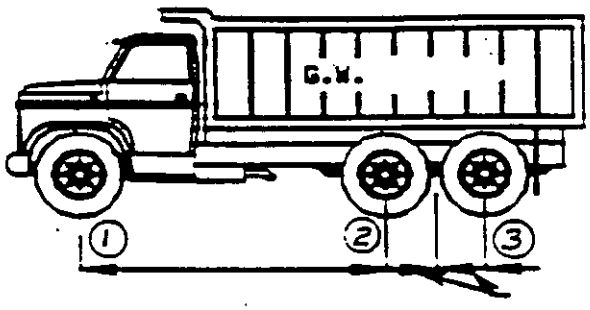
LOAD TEST REPORT

Bridge No. _____ County _____

[illegible]: _____

[illegible]neer: _____

P.E. Registration No.: _____



Test	Gross Weight (Pounds)	Axle Loads (Pounds) 1	2	3	Max. Defl.	Remarks
A						
B						
C						
D						
E						

Comments: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

[illegible]ng Recommendation: _____

( ) **Supporting Calculations Attached**

REQUEST FOR STRUCTURE CLOSED MORE THAN THREE YEARS TO REMAIN ON THE INVENTORY

BRIDGE NO. _____ **COUNTY** _____ **ROUTE** _____

Today's Date: _____ Date Physically Closed _____

Reason for Closure: _____

Priority of Route: (Check One) ( ) Low ( ) Medium ( ) High

Projected ADT _____ Detour Length _____

Planned Action: (Check One) ( ) Replacement ( ) Rehabilitation

Describe significant project action which has been taken to date to schedule the repair or permanent replacement of the closed structure (Attach copies of correspondence, etc., if applicable).

Additional information as to importance of this structure and its essentiality for public use (This is a secondary consideration to the significant project action which has been taken to schedule the permanent replacement or repair of the bridge, but the local agency may provide this additional information if desired):

Signatures: _____ _____ _____

Title: _____ _____ _____

Attachments:
- ( ) List showing priority of this bridge relative to other bridges in this jurisdiction with anticipated date of planned action for these bridges
- ( ) Latest inspection report
- ( ) Current photograph of structure
- ( ) Copies of correspondence supporting above statements
- ( ) For bridges destroyed prior to 1965, attach documentation explaining how the bridge was destroyed

SCOUR EVALUATION
NON-STATE SYSTEM
Item 113

SCOUR CRITICAL BRIDGE: A bridge with one abutment or pier foundation which is rated as unstable due to:

1) Observed scour at bridge

2) A scour potential as determined from a scour evaluation study

SCOUR EVALUATION STUDY

1) Required as part of design on all federally funded projects

2) Requires knowledge of depth of substructure footings and/or piles

3) Expense

TYPE OF SCOUR EVALUATIONS

113 Scour Critical Bridges 5

Type of Scour Evaluation 0

C = Calculated
O = Observed
N = None

C = Calculated

- Code on all projects where a scour evaluation has been performed
- Required on federally funded projects
- Cannot be changed by the inspector

O = Observed

- Code on all projects not previously coded as a "C"

N = Not applicable

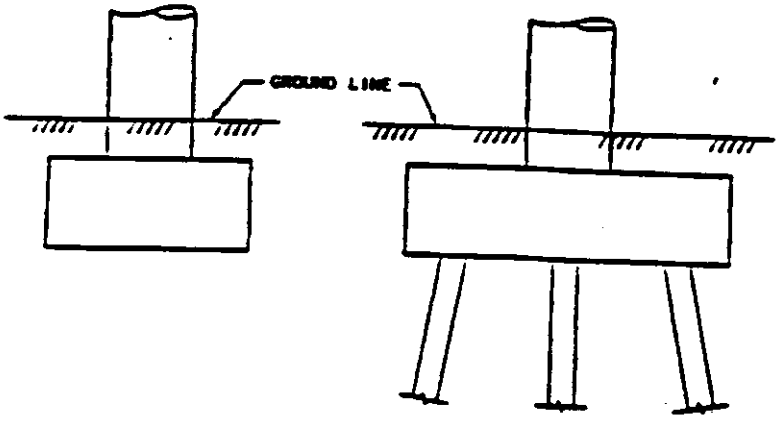
- Applies only to a coding of a "6"
- 6 = Scour calculation/evaluation not made
- Do not code 6

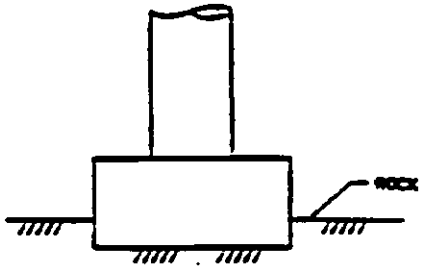
OBSERVED SCOUR EVALUATION

N Bridge not over waterway

9 Bridge foundations (including piles) well above flood water elevation

8 Bridge foundation stable
Scour is above top of footings
Pile cap bents - no significant increase in exposed length of piles



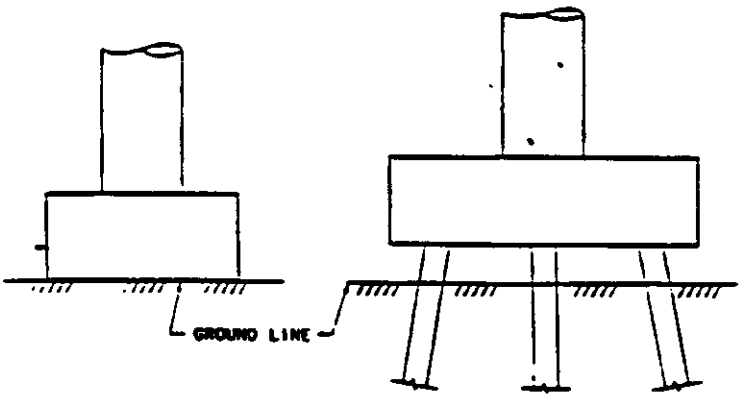


7 Countermeasures installed. Bridge is no longer scour critical.
Will occur infrequently.
Placing rock around abutment or pier does not eliminate scour critical condition
Will occur infrequently.

6 Scour evaluation not made
Do not use!

5 Scour within limits of footing or piles

Pile cap bents - noticeable increase in exposed length of piles



4 Bridge foundation is stable

Action is required to protect exposed foundation from additional erosion

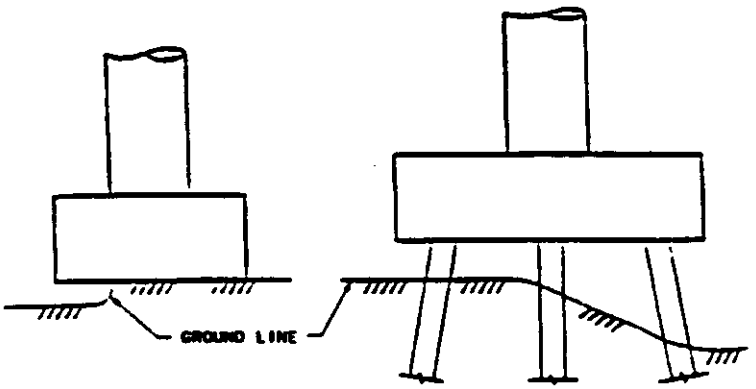
Significant increase in exposed length of piles

3 Bridge is scour critical

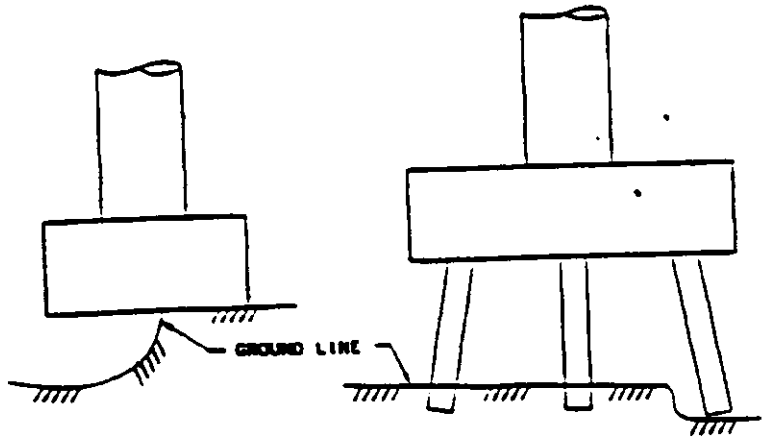
Scour is below a small portion of a spread footing

Extreme increase in exposed length of piles

Consider decrease in load posting



2 Bridge is scour critical
Extensive scour has occurred
Immediate action required
Initiate CIF



1 Bridge is scour critical
Failure imminent
Bridge is closed