

BRIDGE INSPECTION MANUAL

APPENDICES: BRIDGE INSPECTION

APPENDIX 2A:

How to complete a Delinquent Inspection Form

1. Download this document and open on local format (download is located on far right of this page)
2. Once document is open proceed to editable pdf Delinquent Inspection form and fill in the blanks required for your situation and save document.
3. Open BIAS and bring up the asset that is going to be late

4. Click on the FILES tab

Asset Details: Test Asset 4

Quick View	Asset Info	Files	Maintenance
------------	------------	--------------	-------------

Attach Picture/File

5. Select Delinquent Inspection from the drop-down box
6. Select the reason for the delinquency

File Type **Delinquent Inspectic**

- Act of God / Nature
- Contract Issues
- Notice to Proceed Late
- Other

7. Select the date of notice

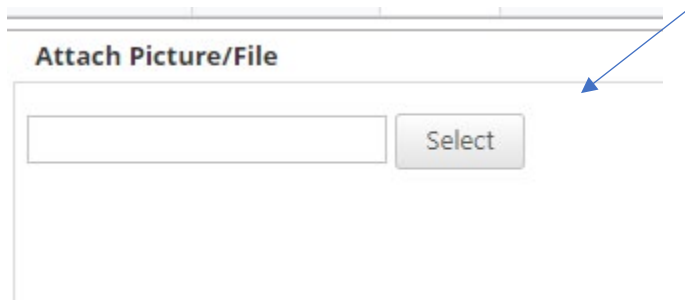
File Date (i.e. Date Picture Taken): 08/14/2020

Set description to file name on Attach

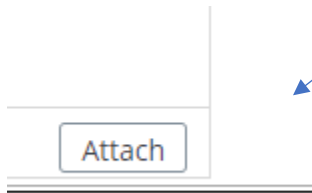
8. Select saved Delinquent Inspection Form

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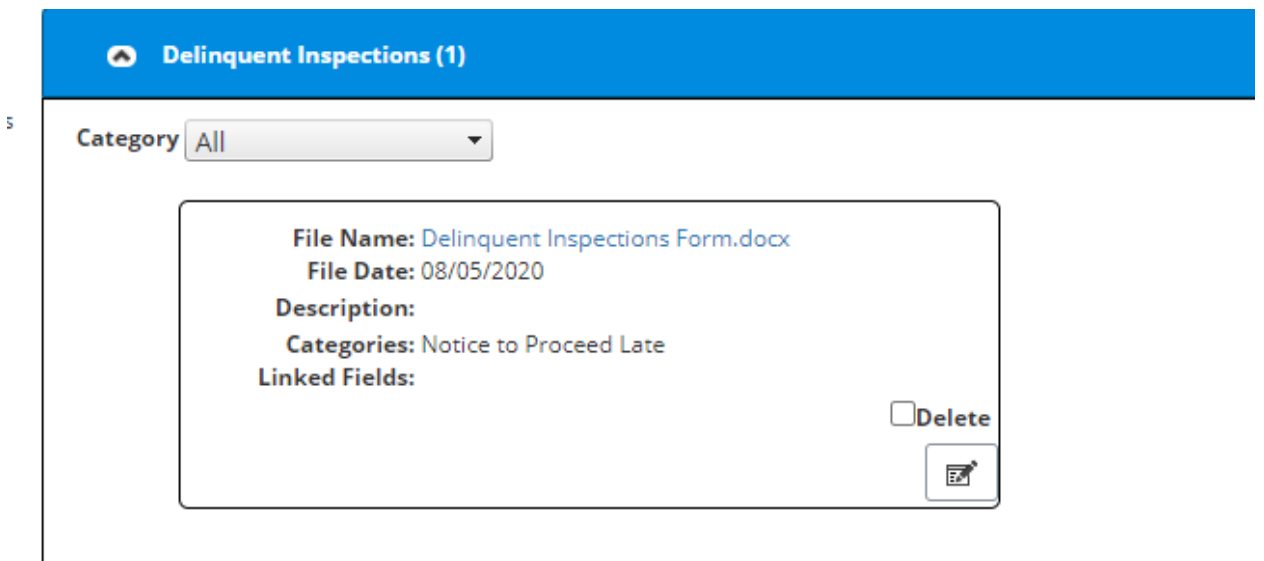
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- 9. Save attachment
- 10.



- 11. It should show up in the file for Delinquent Inspection



You are done.

*****If multiple bridges (10 or more) or an entire county are going to be delinquent the County Consultant BIAS admin or the Lead Team Leader needs to contact INDOT for mass upload of all delinquent bridges.**

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APPENDIX 4A:**

Appendix A: NBIP File Review Checklist

Structure No.:

Review Date: _____

Item 1 - State:

Review Performed by: _____

Item 7 - Feature Carried:

Item 6A - Feature Crossed:

Item 27 - Year Built:

Item 90 - Most Recent NBIS Insp. Date:

Metrics assessed in file review:

M12 M13 M14 M15 M16 M17 M18 M22 M23

Metric 12 – Inspection Procedures – Quality Inspections

NBI Data

Item 58:

Risk Category:

Item 59:

Item 65 – Inventory Rating Method:

Item 60:

Does the narrative justify given ratings?

Item 62:

Review Observations

Metric 12 Notes:

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Part 2: QA / QC

Metric 18 – Inspection Procedures, Scour Critical Bridges			
NBI Data			
Item 113:			
Review Observations			
Scour evaluation in bridge record (Y/N):		Event Response	
Scour POA Developed (Y/N):		Has there been a triggering event (Y/N):	
Scour POA Implemented (Y/N):		Was POA executed (Y/N):	
Trigger Events and Tracking Methodology Identified in POA (Y/N)			
Metric 18 Notes:			

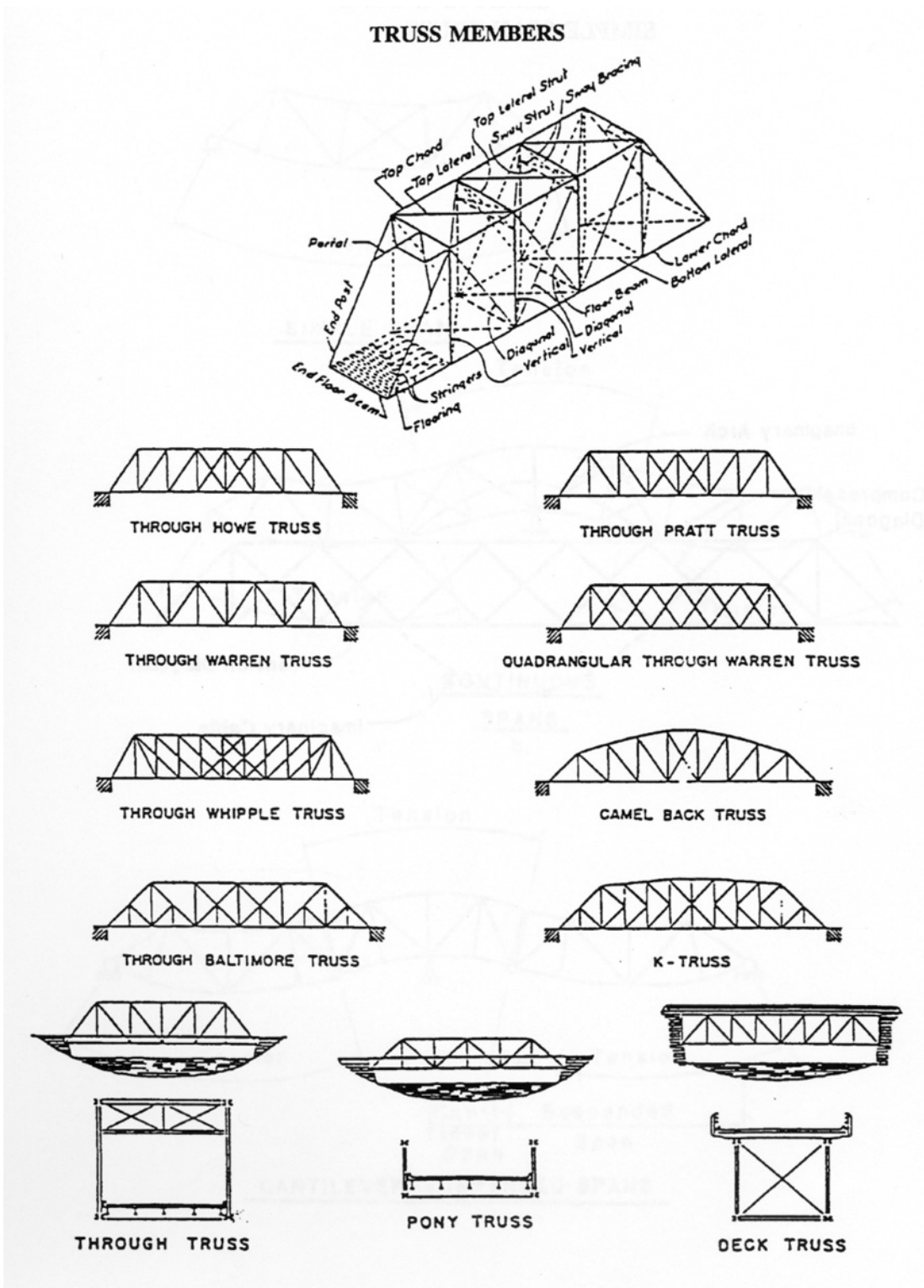
Metric 22 – Inventory – Prepare and Maintain			
Directions: Selected NBI items to be reviewed for accuracy			
NBI Data			
Review Observations			
1.	Verify inspection dates for items 90, 93A, 93B, 93C		
2.	Verify inspection frequencies in items 91, 92A, 92B, and 92C updated and correct based on condition		
3.	Verify items 94, 95, 96, and 97 updated		
4.	Verify element level data and quantity computations on NHS bridges		
Metric 22 Notes:			

Metric 23 - Inventory – Timely Updating of Data	
NBI Data	
60 Day requirement:	
Metric 23 Notes:	

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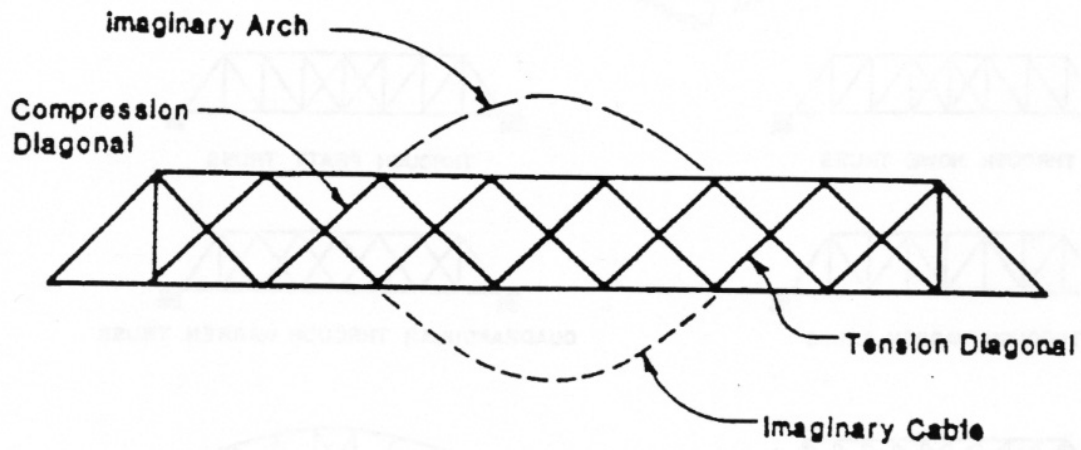
APPENDIX 5A:FRACTURE CRITICAL EXAMPLES



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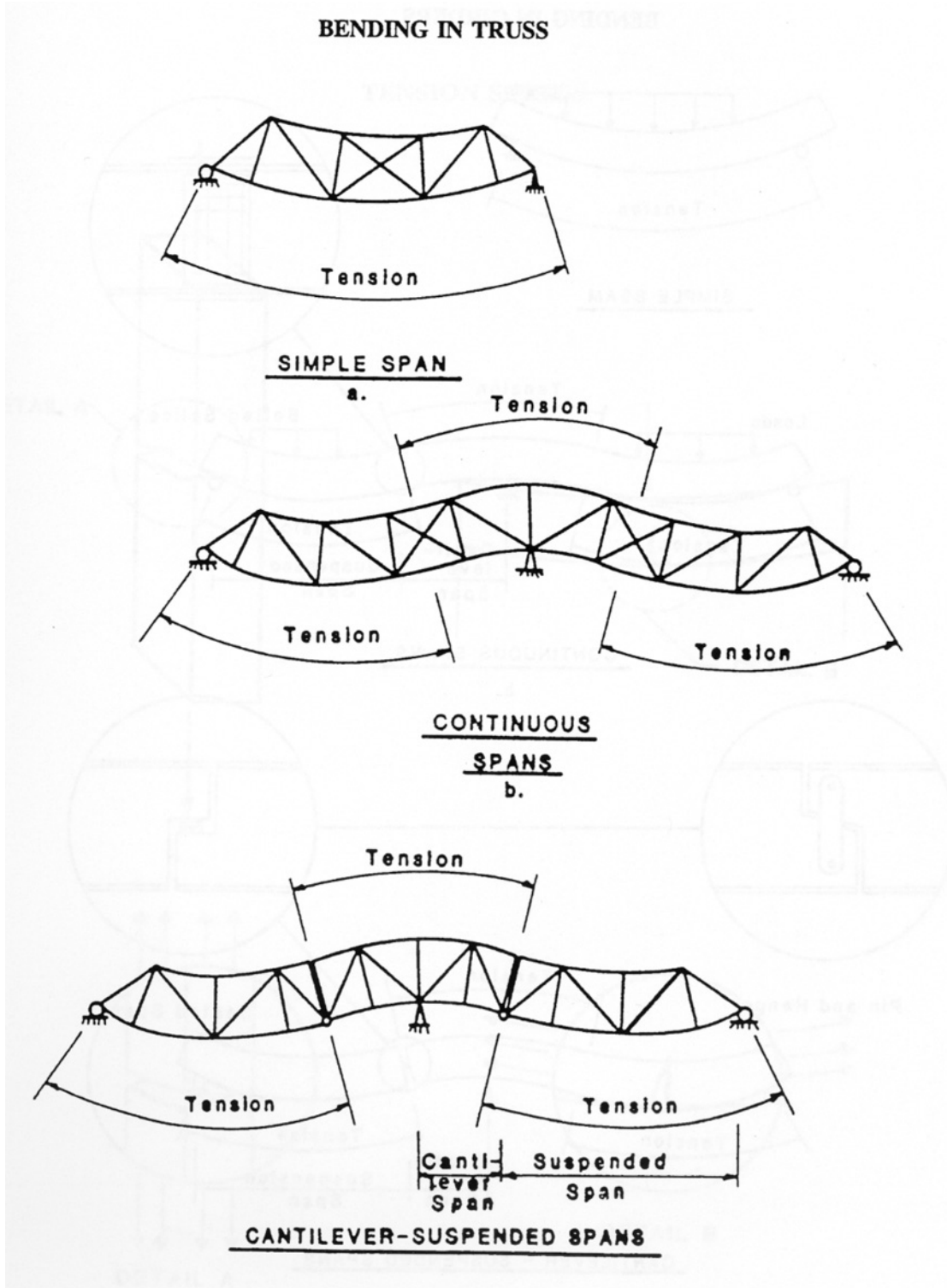
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SIMPLE SPAN TRUSS



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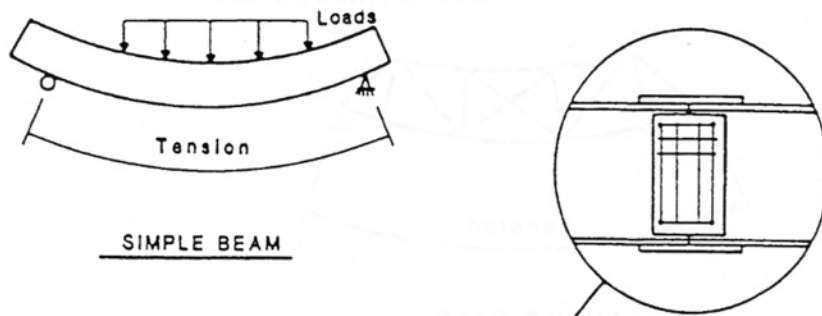
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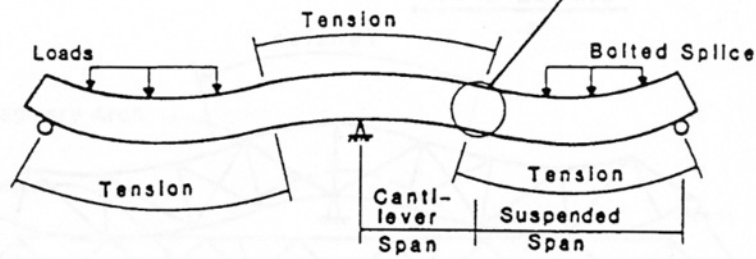
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BENDING IN GIRDERS

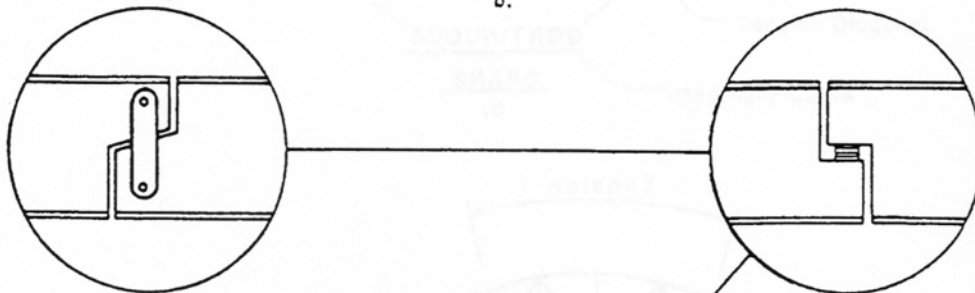


SIMPLE BEAM

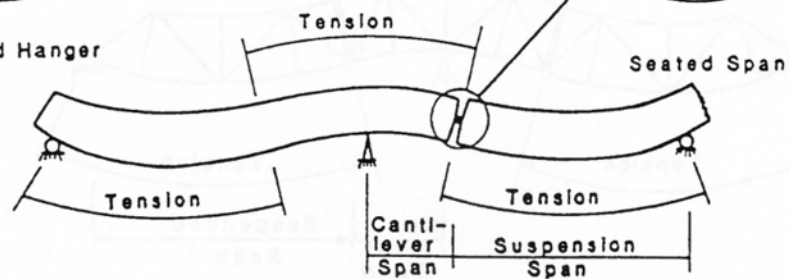


CONTINUOUS SPANS

b.



Pin and Hanger



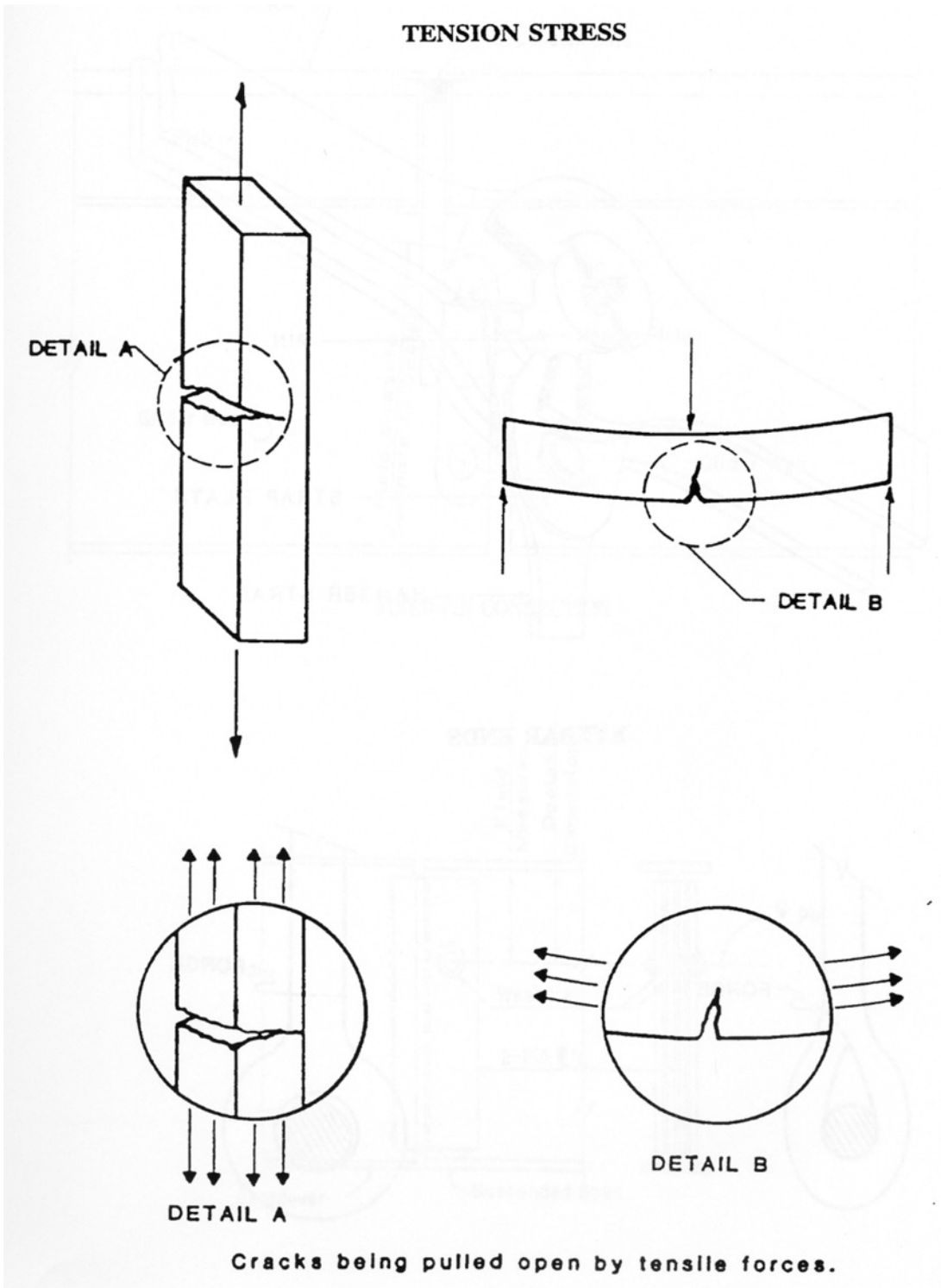
c.

CANTILEVER - SUSPENDED SPANS

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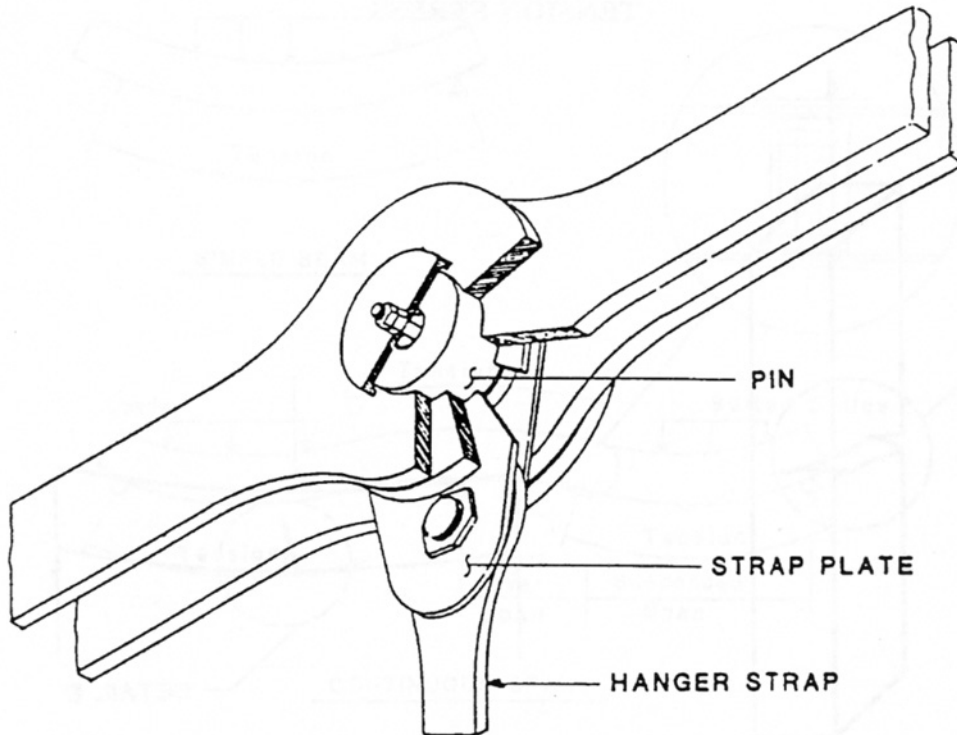
TENSION STRESS



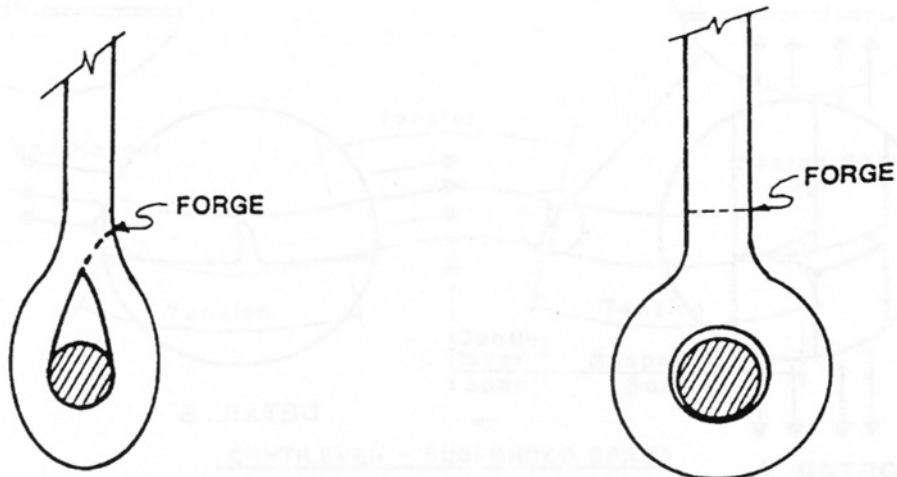
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EYEBAR HANGER CONNECTION



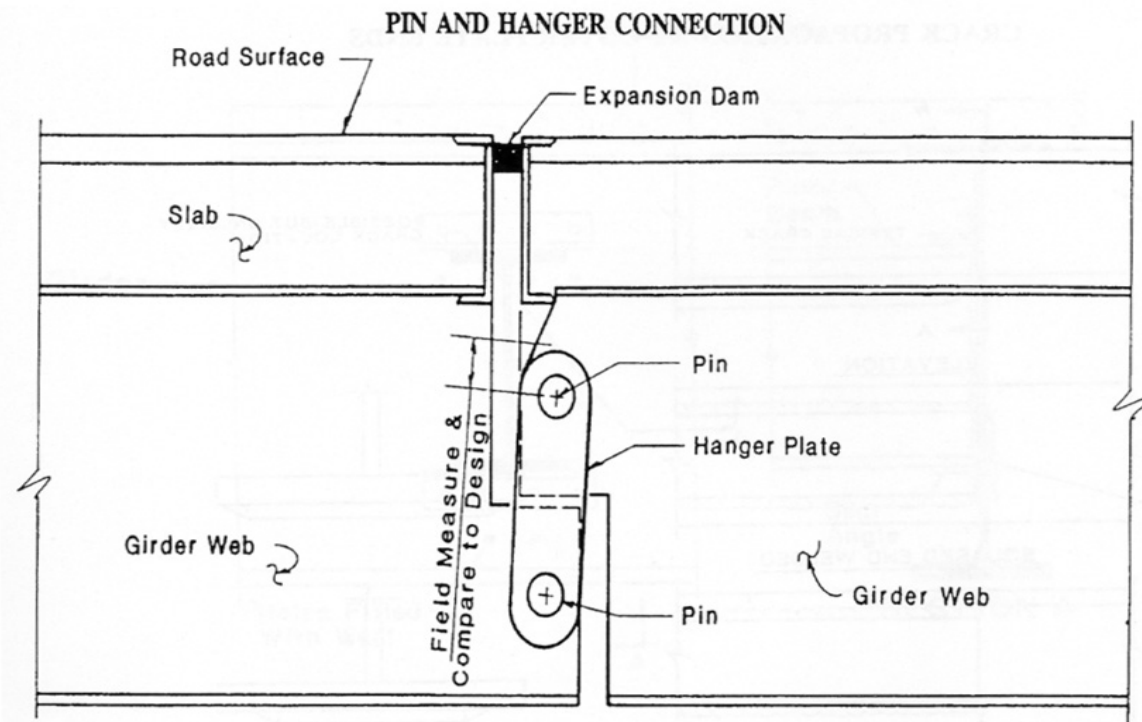
EYEBAR ENDS



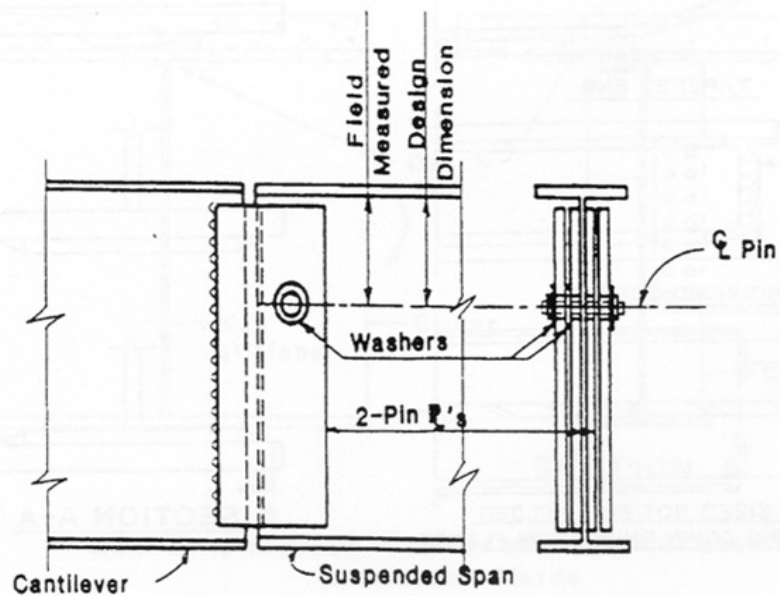
Fatigue Categories A, B (on eyebar body), or E (on net section of eyebar head)

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FIXED PIN CONNECTION

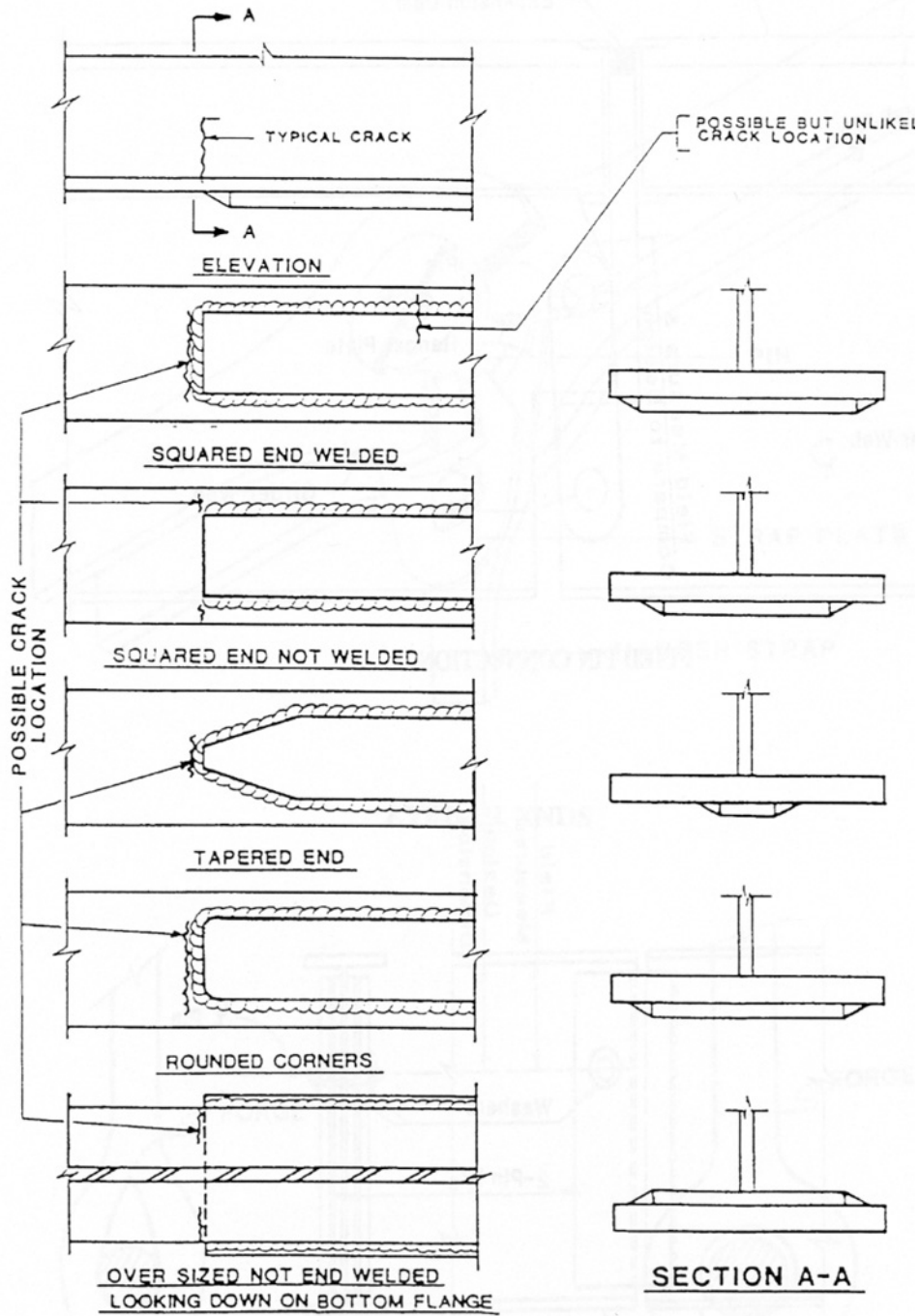


Fatigue Category A, B (on hanger plate body), or E (on net section of hanger or pin plate)

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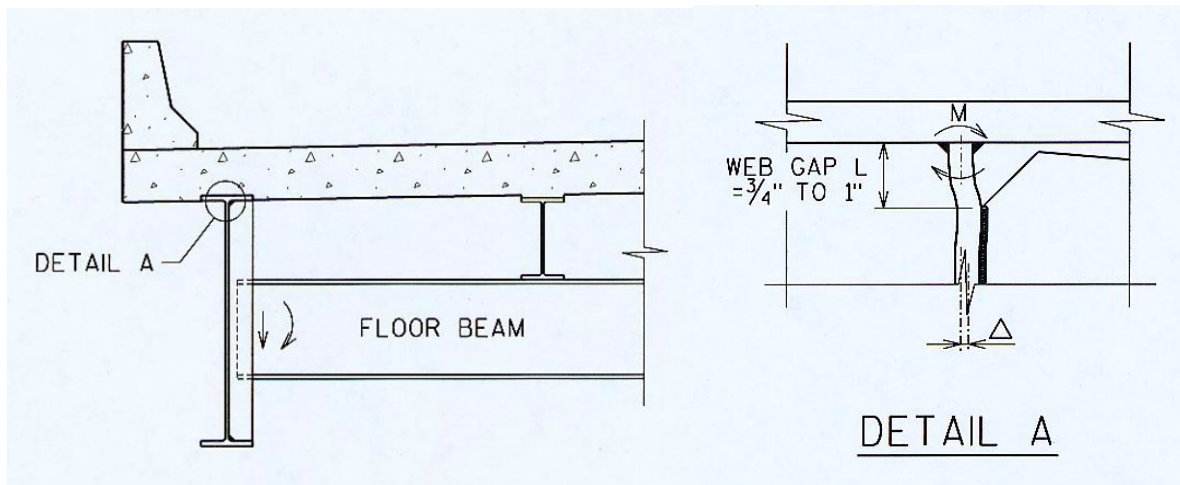
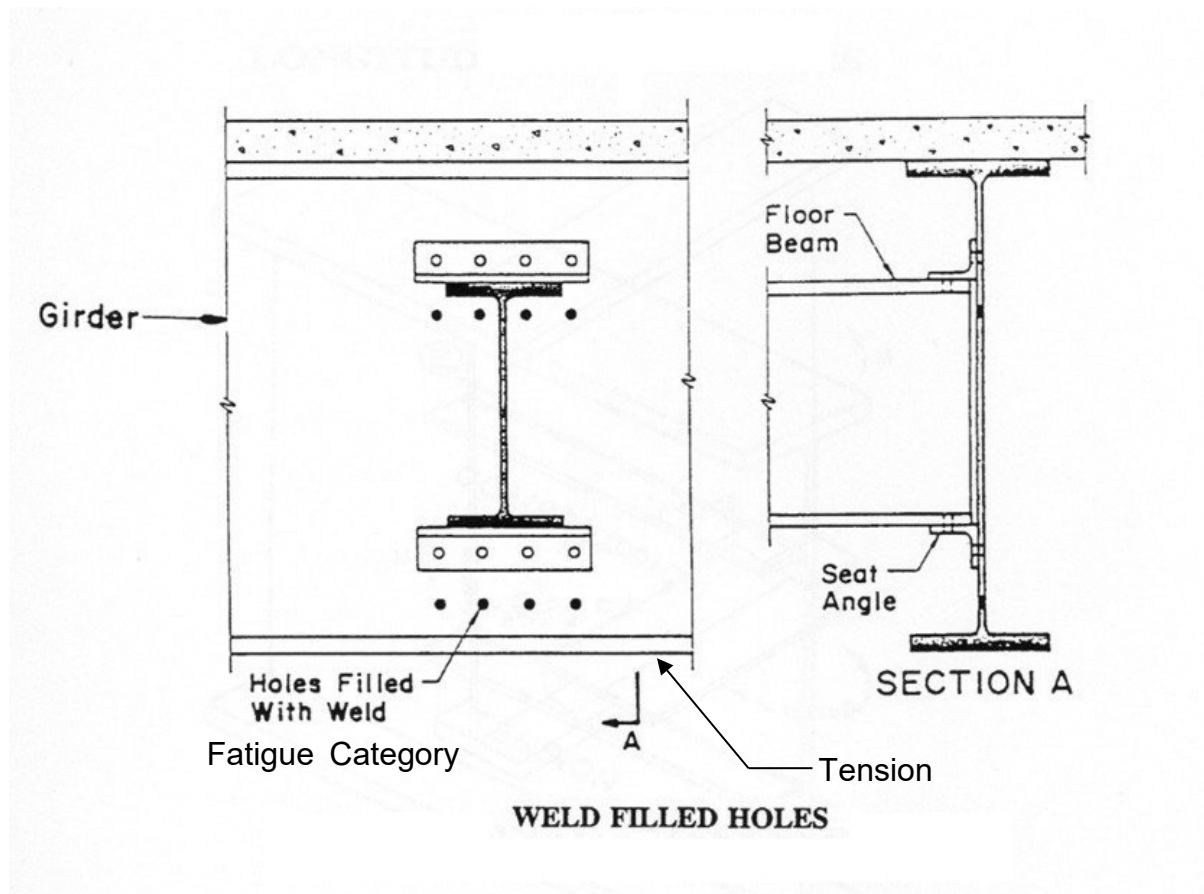
CRACK PROPAGATION AT COVER PLATE ENDS



Fatigue Categories E and E'

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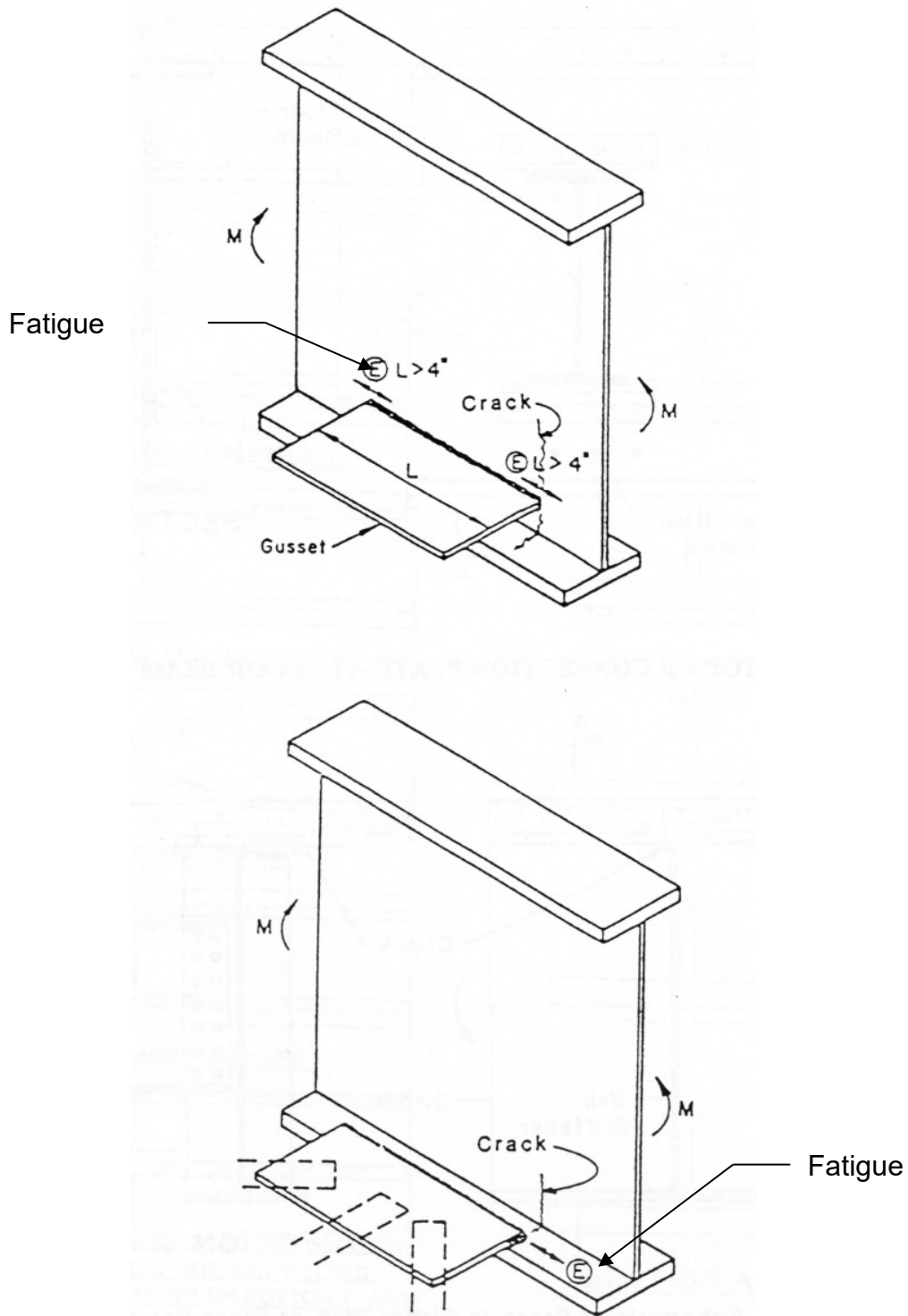


Web Out-of-Plane Bending at Floor Beam Connection Plate

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FLANGE AND WEB ATTACHMENTS



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APPENDIX 5B: FRACTURE CRITICAL REPORT NARRATIVE TEMPLATE

Indiana Department of Transportation

FRACTURE CRITICAL REPORT

Structure No.:	XXXXXXXXXX [NBI XXXXXX]	Date
of Inspection:	XX/XX/XXXX	
Road:	XXXXXXXXXX	Stream: XXXXXXXXXXXX

This report template shall be prepared as a written report narrative that shall be titled "FRACTURE CRITICAL INSPECTION NOTES AND REPORT" and uploaded as a PDF to the BIAS inspection report sections for inclusion in the compiled BIAS inspection report. This report narrative shall contain the following:

1. Introduction discussing the following information:
 - Location and Description
 - Structure History
2. Field Inspection Operations
 - Members to be Inspected
 - Inspection Procedures
 - Equipment Required for Inspection
 - Bridge Cleaning Requirements
 - Traffic Maintenance Requirements
 - Other Items
3. Summary of inspection findings
4. Summary of recommendations: Summary shall include a discussion of rationale if a recommendation includes changing the inspection frequency.
5. Table of Fracture Critical Elements Inspection Findings (layout shown below)
6. Photographs (either attached to BIAS or part of the inspection report narrative) of select fracture critical members and connections including at least those:
 - rated '4' or less
 - not included in previous reports up to 10 years old
 - with cracks or other visible signs of structural distress

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TABLE OF FRACTURE CRITICAL ELEMENTS INSPECTION FINDINGS

SPAN	MEMBER	CONDITION RATING	FATIGUE CATEGORY	INSPECTION NOTES
Span identified	Each FC member and connection shall have an individual row	NBI 58, 59, 60 rating scale	AASHTO fatigue category letter	Describe condition, defects, cracks, section remaining, or other noteworthy issues.

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APPENDIX 5C: FRACTURE CRITICAL WORK PLAN AND HAZARD ANALYSIS TEMPLATE

Note: The work plan and hazard analysis detailed in this Manual is intended for the fracture critical inspections of large multi-span bridges over major waterways. For state roads carried by smaller, single span bridges, or for county and local roads also carried by smaller, single span bridges, the work plan and hazard analysis is not required.

Indiana Department of Transportation

FRACTURE CRITICAL WORK PLAN AND HAZARD ANALYSIS

Structure No.: XXXXXXXXXXXX [NBI XXXXXXXX] **Date of Inspection:** XX/XX/XXXX

Road: XXXXXXXXXXXX **Stream:** XXXXXXXXXXXX

This report template shall be prepared as a written report narrative that shall be titled “FRACTURE CRITICAL WORK PLAN AND HAZARD ANALYSIS” and uploaded as a PDF to the BIAS inspection report sections for inclusion in the compiled BIAS inspection report. This work plan shall include the following:

1. Name, address, and phone number of all emergency services (hospitals, fire department, etc.) and include approximate mileage and driving time from the bridge site.
2. On site bridge inspection personnel: names, employer, and mobile numbers.
Recommend identify members with special training certifications (CPP, SPRAT certification, etc.)
3. General Information regarding bridge to be inspected, speed limit on bridge and daily traffic counts (if known), and an inspection operations summary to include access equipment and traffic control/lane restrictions that will be used.
4. Safety equipment provided on site, to include PPE, communication tools, fall protection and fall restraint equipment, and first-aid kits.
5. Anticipated Hazards, including (but not limited to) the following.
 - Inspection vehicle hazards and planned means of rescue, including (but not limited to) man lift stuck in the up position, UB vehicle stuck in the down

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deployed position, inspection vehicle dropping either a conscious or unconscious victim.

- Traffic hazards and planned mitigation (ie. Traffic control, work zones, flaggers, advanced notification to public via media).
 - Weather and Environmental hazards.
6. Planned daily inspection operations.

APPENDICES 6: FORMS

6A – Form - INITIAL SCOUR SCREENING PROCEDURE FOR LOCAL PUBLIC AGENCIES

6B – Form - SCOUR ASSESSMENT PROCEDURE FOR LOCAL PUBLIC AGENCIES

6C – Form - SCOUR ANALYSIS SUMMARY (HEC-18) FOR LOCAL PUBLIC AGENCIES

6D - MAP OF MODERATE RISK BRIDGES FOR USE WITH SCOUR EVALUATION PROCESS FOR LOCAL PUBLIC AGENCIES

6E – Form – BRIDGE SCOUR PLAN OF ACTION and BRIDGE SCOUR MONITORING LOG

APPENDIX 6A: INDIANA DEPARTMENT OF TRANSPORTATION INITIAL SCOUR SCREENING PROCEDURE FOR LOCAL PUBLIC AGENCIES

1. Is the bridge over a waterway? Yes/No
 - If No, complete the information at the bottom of this form and code Item 113 = “N”
 - If Yes, go to 2
2. Are all of the foundations on dry land well above flood water elevations or floodway? Yes/No
 - If Yes, complete the information at the bottom of this form and code Item 113 = “9”
 - If No **OR** Unknown, go to 3

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3. Was the bridge designed and constructed to resist scour; and do plans show depth of foundation to be below the depth of Q100 scour (with sufficient length for friction piles)?
Yes/No or Unknown
 - If Yes, complete the information at the bottom of this form and code 113 = “8”
 - If Unknown, **OR** the foundations are not below the Q100, go to 4

4. Are spread footings on erosion resistant rock or pile foundations of sufficient depth (20') below scour with no signs or history of scour**? Yes/No
 - If Yes, complete the information at the bottom of this form and code Item 113 = “8”
 - If No **OR** Unknown, go to 5

5. Is the bridge a single span bridge that meets all following criteria? Yes/No
 - i. Appropriately sized scour countermeasures in place**, AND
 - ii. Elevation of stream bottom above bottom of footing/pile cap, AND
 - iii. Does not have any signs or history of scour
 - If Yes, complete the information at the bottom of this form and code Item 113 = “8”
 - If No, go to 6

6. Is the bridge a 4-Sided Box Culvert or a Pipe Culvert with no signs or history of scour?
Yes/No
 - If Yes, complete the information at the bottom of this form and code Item 113 = “8”
 - If No, go to 7

7. Is the bridge a single span concrete arch bridge with no signs or history of scour? Yes/No
 - If Yes, complete the information at the bottom of this form and code Item 113 = “8”
 - If No, complete the information at the bottom of this form, code “NA” on this form, and go to SCOUR ASSESSMENT PROCEDURES (Appendix B)

** See the “Definitions” section

To Be Completed by Scour Evaluator

Coding from INITIAL SCOUR SCREENING PROCEDURE: NA OR Item 113 = N, 9, 8

Coding by Scour Evaluator: NA OR Item 113 = N, 9, 8

Justification if different:

County:

County Bridge#:

NBI

Bridge # Screening performed by:

Signed:

Date:

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APPENDIX 6B: INDIANA DEPARTMENT OF TRANSPORTATION SCOUR ASSESSMENT PROCEDURE FOR LOCAL PUBLIC AGENCIES

1. CULVERTS: Is the bridge a 4-sided box culvert or a pipe culvert?
 - If Yes, go to 9.
 - If No, go to 2.a

2. HISTORICAL SCOUR PERFORMANCE:
 - a. Has the bridge experienced a flood with a documented 100 yr. return interval which did not result in significant scour?
 - Yes, assign a rating of "8" to Scour Critical Evaluation Rating (Item 113)
 - No, go to 2.b
 - Unknown, go to 2.b

 - b. Is the bridge >50 years old with no signs or history of scour and not on granular or soft soil?
 - Yes, assign a rating of "8" to Scour Critical Evaluation Rating (Item 113)
 - No, go to 3
 - Unknown, go to 3

3. SCOUR COUNTERMEASURES:
 - a. Are scour countermeasures in place, functioning properly, and have minor to no damage?
 - Yes, go to 3.b
 - No, go to 4
 - Unknown, go to 4

 - b. Are the scour countermeasures appropriately sized?
 - Yes, go to 3.c
 - No, go to 4
 - Unknown, go to 4

 - c. Has the bridge experienced a flood with a documented 50-year return interval with no damage to the installed countermeasures?
 - Yes, go to 3.d

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- No, go to 4
 - Unknown, go to 3.d
- d. If scour countermeasures are present, were they installed to correct a previously existing problem with scour?
- Yes, assign a rating of "7" to Scour Critical Evaluation Rating (Item 113)
 - No, assign a rating of "8" to Scour Critical Evaluation Rating (Item 113)
 - Unknown, assign a rating of "8" to Scour Critical Evaluation Rating (Item 113)
4. GEOMORPHIC CONDITIONS AFFECTING SCOUR RESISTANCE:
- a. Is the stream bed degrading?
- Yes, go to 7
 - No, go to 4.b
 - Unknown, go to 7
- b. Is the channel meandering?
- Yes, go to 7
 - No, go to 4.c
 - Unknown, go to 7
- c. For natural streams, are there channel bends of greater than 30 degrees within 100 feet upstream of the bridge?
- Yes, go to 7
 - No, go to 4.d
 - Unknown, go to 7
- d. Are the stream banks unstable?
- Yes, go to 7
 - No, go to 4.e
 - Unknown, go to 7
- e. Are bridge substructure units skewed from the direction of flow?
- Yes, go to 7
 - No, go to 4.f
 - Unknown, go to 7
- f. Do ice jams or debris block more than 10% of the flow cross section?
- Yes, go to 7
 - No, go to 5
 - Unknown, go to 7
5. SINGLE SPAN BRIDGE CONSIDERATIONS:
- a. Is the bridge is multiple-span?

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- Yes, go to 6
 - No, go to 5.b
- b. Is the bridge a single span and the Waterway Adequacy (NBI Item 71) is greater than 5
- Yes, go to 5.c
 - No, go to 6
- c. Is the bridge supported by concrete abutments on piles?
- Yes, assign a rating of “8” to Scour Critical Evaluation Rating (Item 113)
 - No, go to 5.d
 - Unknown, go to 5.d
- d. Is the bridge supported by timber abutment on piles?
- Yes, assign a rating of “8” to Scour Critical Evaluation Rating (Item 113)
 - No, go to 5.e
 - Unknown, go to 5.e
- e. Is the bridge supported by end bent on piles with a spillslope at each end bent?
- Yes, assign a rating of “8” to Scour Critical Evaluation Rating (Item 113)
 - No, go to 5.f
 - Unknown, go to 5.f
- f. Is the bridge on concrete abutments?
- Yes, go to 5.g
 - No, go to 5.h
 - Unknown, go to 6
- g. Is the bridge over a waterway labeled as a “Ditch”?
- Yes, assign a rating of “8”
 - No, go to 5.h
 - Unknown, go to 5.h
- h. Does the waterway have a slope of less than 0.5 feet per mile?
- Yes, assign a rating of “8” to Scour Critical Evaluation Rating (Item 113)
 - No, go to 6
 - Unknown, go to 6

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6. REDUCED RISK BRIDGES:

- a. Is the bridge programmed for replacement or rehabilitation within 5 years
 - Yes, go to 6.c
 - No, go to 6.b
 - Unknown, go to 6.b

- b. Is the bridge programmed to receive an installation of scour countermeasures within 2 years?
 - Yes, go to 6.c
 - No, go to 6.d
 - Unknown, go to 6.d

- c. Does the bridge have any signs or significant history of scour?
 - Yes, go to 7
 - No, assign a rating of “5” to Scour Critical Evaluation Rating (Item 113).
 - Unknown, go to 7

- d. Is the road classified as a "Rural Minor Collector or Local Road" (Item 26 - Functional Classification of Rural Minor Collector or Local)
 - Yes, go to 6.e
 - No, go to 7
 - Unknown, go to 7

- e. Is the estimated average daily traffic (ADT) over the bridge less than 200?
 - Yes, assign a rating of “5” to Scour Critical Evaluation Rating (Item 113).
 - No, go to 7
 - Unknown, go to 7

7. FOUNDATIONS ON SPREAD FOOTINGS SCOUR RESISTANCE ASSESSEMENT: If the foundation is unknown, and the pile length cannot be reasonably assured, then treat the bridge as if it is supported on spread footing

- a. Is the bridge supported on spread footings?
 - Yes, go to 7.b
 - No, go to 8
 - Unknown, treat it as spread footing and go to 7.b

- b. Is the spread footing on rock?
 - Yes, go to 7.c
 - No, go to 7.j

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- Unknown, treat as granular or soft soil, go to 7.q

All of the following questions (7.c through 7.i) assume that the spread footing is on ROCK

- c. ...and footing socketed into rock, regardless of exposure?
 - Yes, assign a rating of "8"
 - No, go to 7.d
- d. ...and top of footing is not exposed?
 - Yes, assign a rating of "8"
 - No, go to 7.e
- e. ...and the top of footing is exposed?
 - Yes, assign a rating of "5"
 - No, go to 7.f
- f. ...and the footing is fully exposed with no rock degradation?
 - Yes, assign a rating of "4"
 - No, go to 7.g
- g. ... and the footing is fully exposed with rock degradation and less than 10% undermining?
 - Yes, assign a rating of "3"
 - No, go to 7.h
- h. ...and the footing is fully exposed with rock degradation and more than 10% undermining?
 - Yes, go to 7.i
- i. ...and failure is eminent?
 - Yes, assign a rating of "1" – Close the Bridge
 - No, assign a rating of "2" – Create Critical Finding
- j. Is the spread footing on stiff clays/clay till ($Q_u > 1.5$ tsf)
 - Yes, go to 7.k
 - No, go to 7.q
 - Unknown, treat as granular or soft soil, go to 7.q

All of the following questions (7.k through 7.p) assume that the spread footing is on stiff clays/clay till ($Q_u > 1.5$ tsf).

- k. ...and no observed scour?
 - Yes, assign to rating of, "5"

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- No, go to 7.l
- l. ...and scour present and the footing not exposed?
 - Yes, assign a rating of "5"
 - No, go to 7.m
- m. ...and scour present, $< \frac{1}{2}$ of the top of the footing exposed and determined to be stable?
 - Yes, assign a rating of "4"
 - No, go to 7.n
- n. ...and scour present, $> \frac{1}{2}$ of the top of the footing exposed?
 - Yes, less than 10% of footing undermined, assign a rating of "3"
 - Yes, scour is adjacent to less than 25% of the face of the footing (below footing), assign a rating of "3"
 - No, go to 7.o
- o. ...and scour present and $> \frac{1}{2}$ of footing exposed and determined unstable?
 - Yes, 10% or more of the footing is undermined, go to 7.p
 - Yes, Scour is adjacent to more than 25% of the face of footing, go to 7.p
- p. ...and failure is eminent?
 - Yes, assign a rating of "1" – Close the Bridge
 - No, assign a rating of "2" – Create Critical Finding

All of the following questions (7.q through 7.u) assume that the spread footing on granular or soft soils ($Q_u < 1.5$ tsf).

- q. Is there any observed scour on the spread footing?
 - Yes, go to 7.r
 - No, assign a rating of "5"
- r. Scour present, however the footing is not exposed?
 - Yes, assign a rating of "4"
 - No, go to 7.s
- s. Scour present and the footing exposed with less than 10% scour to the face of the footing?
 - Yes, assign a rating of "3"
 - No, go to 7.t
- t. Scour present and the footing exposed with more than 10% scour to the face of the footing (below footing) or otherwise considered unstable?

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- Yes, go to 7.u
- u. Is failure of the spread footing eminent?
 - Yes, assign a rating of "1" – Close the Bridge
 - No, assign a rating of "2" – Create Critical Finding
- 8. FOUNDATIONS ON PILES SCOUR RESISTANCE ASSESSEMENT: If the foundation is unknown, and the pile length cannot be reasonably assured, then treat the bridge as if it is supported on spread footing.
 - a. Is the bridge supported on Pile Foundations?
 - Yes, go to 8.b
 - No, go to 7.a
 - Unknown, go to 7.a

All of the following questions (8.b through 8.p) assume that the bridge has a pile foundation.

- b. For any soil type, are the pile tips $\geq 40'$ below ground surface and piles not exposed by significant scour?
 - Yes, assign a rating of "8".
 - No, go to 8.c
- c. Are the piles socketed or driven into rock not exposed by "significant" scour?
 - Yes, assign a rating of "8"
 - No, go to 8.d
- d. Are the piles socketed or driven into rock and exposed by "significant" scour?
 - Yes, assign a rating of "5"
 - No, go to 8.e
- e. Are the bridge pile tips on rock but not socketed or driven into rock?
 - Yes, go to 8.f
 - No, go to 8.j

All of the following questions (8.f through 8.j) assume that the bridge has a pile foundation where the tips are on rock but not socketed or driven into rock.

- f. ...and has minor/no existing scour present or has occurred previously with a 3-foot minimum thickness of cohesive soil in upper $\frac{1}{2}$ of embedded pile length?
 - Yes, assign a rating of "8"
 - No, go to 8.g
- g. ...and has minor/no existing scour present or has occurred previously with no layers of cohesive soil in upper $\frac{1}{2}$ of embedded pile length?
 - Yes, assign a rating of "5"
 - No, go to 8.h
- h. ...and has observed scour or erosion with a 3-foot minimum thickness of cohesive soil in upper $\frac{1}{2}$ of embedded pile length?

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- Yes, assign a rating of "4"
- No, go to 8.i
- i. ... and has no observed scour but a history of significant scour or erosion with no layers of cohesive soil in upper $\frac{1}{2}$ of embedded pile length?
 - Yes, assign a rating of "3"
 - No, go to 8.j
- j. and has observed significant scour with no layers of cohesive soil in upper $\frac{1}{2}$ of embedded pile length?
 - Yes, assign a rating of "2"
 - No, go to 8.k
- k. Are the bridge piles, friction piles in cohesive soils?
 - Yes, go to 8.l
 - No, assign a rating of "2"

All of the following questions (8.k through 8.r) assume that the bridge has a pile foundation are friction piles in cohesive soils.

- l. ... and a minimum 3-ft layer w/ $Q_u > 1.5$ tsf in upper $\frac{1}{2}$ of embedded pile length required, where minor/no existing scour is present or has occurred previously with Pile tips $\geq 15'$ deep?
 - Yes, assign a rating of "8"
 - No, go to 8.m
- m. ...and a minimum 3-ft layer w/ $Q_u > 1.5$ tsf in upper $\frac{1}{2}$ of embedded pile length required, where minor/no existing scour is present or has occurred previously with Pile tips $< 15'$ deep?
 - Yes, assign a rating of "5"
 - No go to 8.n
- n. ...and a minimum 3-ft layer w/ $Q_u > 1.5$ tsf in upper $\frac{1}{2}$ of embedded pile length required with a history of significant scour/erosion with Pile tips $\geq 35'$ deep?
 - Yes, assign a rating of "8"
 - No, go to 8.o
- o. ...and a minimum 3-ft layer w/ $Q_u > 1.5$ tsf in upper $\frac{1}{2}$ of embedded pile length required with a history of significant scour/erosion with Pile tips $< 35'$ and $\geq 20'$ deep
 - Yes, assign a rating of "5"
 - No, go to 8.p
- p. ...and a minimum 3-ft layer w/ $Q_u > 1.5$ tsf in upper $\frac{1}{2}$ of embedded pile length required with a history of significant scour/erosion with Pile tips $< 20'$ deep without significant scour present
 - Yes, assign a rating of "4"
 - No, go to 8.q
- q. ...and a minimum 3-ft layer w/ $Q_u > 1.5$ tsf in upper $\frac{1}{2}$ of embedded pile length required with a history of significant scour/erosion with Pile tips $< 20'$ deep with significant scour present but determined stable?

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- Yes, assign a rating of “3”
 - No, go to 8.r
 - r. ...and a minimum 3-ft layer w/ $Q_u > 1.5$ tsf in upper $\frac{1}{2}$ of embedded pile length required with a history of significant scour/erosion with pile tips $< 20'$ deep with significant scour present or piles otherwise determined unstable?
 - Yes, go to 8.s
 - s. Is failure of the pile eminent?
 - Yes, assign a rating of "1" – Close the Bridge
 - No, assign a rating of "2" – Create Critical Finding
9. CULVERT (STRUCTURES UNDER FILL)
- a. What is the shape of the culvert?
 - Box
 - Pipe
 - b. Does the culvert have significant scour behind the ends of the box and the cut-off walls due to undermining of the wingwalls?
 - Yes, go to 9.b.i
 - No, go to 9.c
 - Unknown, go to 9.c
 - i. Is the stream bed degrading?
 - Yes, assign rating of “4”
 - No, go to 9.b.ii
 - Unknown, assign rating of “4”
 - ii. Is the channel meandering?
 - Yes, assign rating of “4”
 - No, go to 9.b.iii
 - Unknown, assign rating of “4”
 - iii. For natural streams, are there channel bends of greater than 30 degrees within 100 feet upstream of the bridge?
 - Yes, assign rating of “4”
 - No, go to 9.b.iv
 - Unknown, assign rating of “4”

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- iv. Are the stream banks unstable?
 - Yes, assign rating of “4”
 - No, assign rating of “5”
 - Unknown, assign rating of “4”
- c. Does the culvert have scour adjacent to the cut-off walls?
 - Yes, go to 9.c.i
 - No, assign rating of “5”
 - Unknown, go to 9.c.i
- i. Is the stream bed degrading?
 - Yes, assign rating of “2”
 - No, go to 9.c.ii
 - Unknown, assign rating of “2”
- ii. Is the channel meandering?
 - Yes, assign rating of “2”
 - No, go to 9.c.iii
 - Unknown, assign rating of “2”
- iii. For natural streams, are there channel bends of greater than 30 degrees within 100 feet upstream of the bridge?
 - Yes, assign rating of “2”
 - No, go to 9.c.iv
 - Unknown, assign rating of “2”
- iv. Are the stream banks unstable?
 - Yes, assign rating of “2”
 - No, assign rating of “3”
 - Unknown, assign rating of “2”

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To Be Completed by Scour Evaluator

**Scour Critical Evaluation Rating (Item 113) from SCOUR ASSESSMENT PROCEDURE:
8, 7, 5, 4, 3, 2, 1**

Scour Critical Evaluation Rating (Item 113) by Scour Evaluator: 8, 7, 5, 4, 3, 2, 1

Justification if different:

County: _____ **County Bridge#:** _____ **NBI**

Bridge # Foundation type:

Assessment performed by:

Signed:

Date:

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APPENDIX 6C: INDIANA DEPARTMENT OF TRANSPORTATION SCOUR ANALYSIS SUMMARY (HEC-18) FOR LOCAL PUBLIC AGENCIES

The scour analysis will be completed using HEC-RAS in accordance with HEC-18 and the INDOT Design Manual. Only Q100 will be used for the analysis. A summary of the scour parameters from the HEC-18 analysis will be uploaded to the bridge file (see below). A determination of the proper Coding for Item 113 will be made following the FHWA coding guide.

Scour Parameters

Q100 Discharge	=	cfs.
Elevation @ Q100	=	MSL
Velocity @ Q100	=	ft./sec.
Contraction Scour Depth	=	ft.
Total Scour Depth	=	ft.
Low Scour Elevation	=	MSL

To Be Completed by Scour Evaluator

**Scour Critical Evaluation Rating (Item 113) from SCOUR ASSESSMENT PROCEDURE:
8, 7, 5, 4, 3, 2, 1**

**Scour Critical Evaluation Rating (Item 113) by Scour Evaluator: 8, 7, 5, 4, 3, 2,
1 Justification if different:**

County: _____ **County Bridge#:** _____ **NBI**

Bridge # Foundation type:

Assessment performed by:

Signed:

Date:

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APPENDIX 6D: INDIANA DEPARTMENT OF TRANSPORTATION MAP OF MODERATE RISK BRIDGES FOR USE WITH SCOUR EVALUATION PROCESS FOR LOCAL PUBLIC AGENCIES



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APPENDIX 6E: BRIDGE SCOUR PLAN OF ACTION

Indiana Department of Transportation

Bridge Scour Plan of Action

Structure No.:

Date:

Triggering Event for Monitoring and Frequency:

Monitoring Plan:

Closure Plan:

Closure Notification:

Emergency Management Director: XXX (District Deputy Commissioner) XXX-XXX-XXXX

Highway Engineer/Supervisor: XXX (Highway Maintenance Director) XXX-XXX-XXXX

Bridge Inspection: XXX (District Bridge Inspection Engineer) XXX-XXX-XXXX
or XXX (Bridge Inspection Area Engineer) XXX-XXX-XXXX

Reopening Inspection Requirements:

Written by: XXX, District Bridge Inspection Engineer

Signed: _____

Date: _____

Approved By: _____

Date: _____

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APPENDIX 6F: POA MONITORING LOG BOOK

Indiana Department of Transportation
BRIDGE SCOUR MONITORING/CLOSING REPORT FORM
POA MONITORING LOG BOOK

Structure Number: XXX-XX-XXXXX [XXXXXX]

Road: XXXXXXXX

Stream Name: XXXXXXXXXXXX

Date & Time	Type of Monitoring	Initials	Condition of Bridge Due to Scour	Action