

**NEW JERSEY DEPARTMENT OF TRANSPORTATION**  
**DESIGN MANUAL FOR BRIDGES AND STRUCTURES**

**DIVISION 4**

**HIGHWAY BRIDGE EVALUATION PROGRAM**  
**AND**  
**RAILROAD CARRYING BRIDGE EVALUATION PROGRAM**

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## SECTION 1

### HIGHWAY BRIDGE EVALUATION PROGRAM

#### 1.1.1 GENERAL

For a comprehensive treatment of this Section's criteria, reference is directed to the Bridge Inspector's Training Manual published by the U.S. Department of Transportation, Federal Highway Administration.

#### 1.1.2 EVALUATION CRITERIA

The Current AASHTO Manual for Condition Evaluation of Bridges shall govern inspection and rating of existing bridges with the following amendments and modifications:

1. (Page 69) 6.7.2 Rating Live Load:

In addition to the HS20 truck, ratings shall be determined for the Type 3, NJDOT 3S2 and Type 3-3 legal load trucks.

2. (Page 71) 6.7.3 Distribution of Loads:

In rating the fascia or curb stringers, the distribution of truck loads to these members shall be based on a simple beam action instead of the AASHTO formula. For the above members taking no truck loads, give only the dead load and sidewalk live load stresses (no vehicle ratings).

3. (Page 74) Figure 7.4.3.1 Typical Legal Loads Used for Posting:

Substitute the loadings for the NJDOT Type 3S2 truck shown on Page 1.1-3 herein for the values shown for the Type 3S2 truck.

4. (Page 53) Table 6.6.2.1-1 Inventory Rating Allowable Stresses:

Substitute the values shown below for the allowable stresses shown in the subject table.

Steel-Unknown	<u>Allowable Inventory Rating Stress</u>
Prior to 1905	14,500 psi instead of 14,000 psi
1905 to 1936	16,500 psi instead of 16,000 psi

5. (Page 66) 6.6.2.4 Concrete:

Under Section 6.6.2.4.1 Bending, the allowable stresses for compression due to bending should be  $0.40 f'_c$  for inventory and  $0.55 f'_c$  for operating ratings provided that the field investigation indicates that the concrete is sound and that contract plans and controls specified and furnished compressive strengths of 2,400 psi or more.

6. (Page 67) 6.6.2.5 Prestressed Concrete:

The allowable stress in the precompressed tensile zone of prestressed concrete members is specified in the AASHTO Design Specifications (Article 9.15.2.2). For calculating inventory rating by the working stress or load factor (serviceability) methods, an allowable tension stress of  $3\sqrt{f'_c}$  shall be utilized for members with bonded reinforcement.

7. (Page 80) Appendix A3 Live Load Moments on Longitudinal Stringers or Girders:

Substitute the values shown for the Type 3S2 truck with the values for the NJDOT Type 3S2 truck shown in the table on Page 1.1-3.

It should be noted that the values shown for the Type 3S2 truck in Appendices A4, A5, A6, A7 and A9 require revisions to conform to the NJDOT Type 3S2 truck.

8. General Comments:

The allowable stresses listed in Tables 6.6.2.1-2 and 6.6.2.1-1 (for Operating and Inventory Ratings respectively) are not absolutes. They are intended to provide general guidance. These allowable stresses may be modified if other values can be justified by test results, more detailed information of the materials, more refined structural analysis, consideration of traffic types and volumes, frequency of interim inspection and other related factors.

These given allowable stresses do not necessarily include all the allowable stresses required for a bridge rating. Values not given in these instructions should be obtained from appropriate sources (e.g. original design plans and specifications; current and past editions of the Standard Specifications for Highway Bridges, AASHTO and AASHTO; historical records; ASTM Specifications; etc.).

The Designer of a new or replacement highway carrying bridge is advised that an initial (1<sup>st</sup> cycle) inspection and rating analysis shall be performed by him within 90 days of the bridge being opened to traffic. The inspection shall be performed according to the provisions of this Section.

REVISIONS TO APPENDIX A3  
 Live Load Moments on Longitudinal Stringers or Girders  
 Live Load Moments per Wheel line

NJDOT Type 3S2 Truck

Span C/C	Without Impact	With Impact	Span C/C	Without Impact	With Impact
Feet	ft. kips	ft. kips	Feet	ft. kips	ft. kips
5	10.6	13.8	32	134.3	174.7
6	12.8	16.6	34	145.9	189.7
7	15.2	19.7	36	157.3	204.5
8	19.1	24.9	38	168.8	219.5
9	23.1	30.1	40	180.4	234.5
10	27.2	35.4	42	191.6	249.3
11	31.3	40.7	44	203.3	263.5
12	35.4	46.0	46	214.8	277.6
13	39.6	51.4	48	226.2	291.6
14	43.7	56.8	50	244.1	313.8
15	47.9	62.3	52	263.8	338.2
16	52.1	67.7	54	283.3	362.5
17	56.3	73.1	56	303.0	386.7
18	60.4	78.6	58	322.8	411.0
19	64.6	84.0	60	342.2	434.9
20	68.9	89.5	70	441.2	554.3
21	73.1	95.0	80	540.3	672.1
22	77.3	100.5	90	639.6	788.3
23	82.8	107.6	100	739.1	903.3
24	88.5	115.0	120	938.2	1129.7
25	94.2	122.5	140	1137.6	1352.3
26	100.0	129.9	160	1337.2	1571.8
27	105.7	137.4	180	1536.7	1788.6
28	111.4	144.9	200	1736.5	2003.6
29	117.2	152.4	250	2236.0	2534.2
30	122.9	159.8	300	2736.2	3057.9



- Photographs.....
- 10. Appendix 4 - Field Notes with CADD  
Sketches .....
- 11. Appendix 5 - Underwater Inspection Report/  
Other Special Report if  
applicable .....

1. **Maps:** Two maps, are required: one "General Location Map" and the other, a more detailed and specific "Local Map". Each map shall be on a separate 8½ by 11 inch sheet.

a. **General Location Map:** For State owned bridges a map of the entire state of New Jersey, scale approximately 1: 1 000 000 "pin pointing" the location of the structure being reported on (by bridge number, name and route number). This map should show county boundaries and names, principal cities, main roads (Interstate, U.S., State and Toll Roads) and the roads or the road and waterway involved in the structure being reported.

For reports on **County** or **Municipality** owned bridges, the general location map shall be of those territories and of a suitable scale.

b. **Local Map:** A current U.S.G.S map of the immediate vicinity of the "reported" structure; scaling 1: 20 000 with the structure centered on the page. Include roads, railroads, waterways, county and township names and a north arrow. Features intersecting the bridge should be clearly labeled.

2. **Structural Data:** A summary of findings shall be included as per the attached format. The items in this format are self-explanatory, however, further explanation for some items is provided as follows:

a. **Component/Material:** The components shall be as listed in Format "A" only. Type of material used for majority of construction shall be given below the component in the same vertical column. Delete the components which are not applicable.

b. **Condition Rating:** The condition rating of various components shall be the overall rating of the component as per the current Recording and Coding Guides for the Structural Inventory and Appraisal of Bridges by FHWA & NJDOT and should be consistent with the ratings given on field notes and the SI&A sheet.

c. **General Remarks:** Summarize the significant defects and give a brief account of what was found during the bridge survey, as it relates to the structural integrity of the bridge. Defects for which repairs are recommended must be mentioned. Photos of these defects should be referenced in this section.

The Deck section should include the condition of the top and underside of the deck, sidewalks, deck joints, bridge railing, etc. For reinforced concrete decks give the percentage of spalled area (open or concrete/asphalt patched) and estimated contaminated area (underdeck).

The Superstructure section should include the condition of main load carrying members and diaphragms (include percent loss of section if any) and the

bearings.

The Substructure section should include the condition of the abutments, pier(s), retaining walls, etc., and information on scour or undermining.

The Safety Features section should include the adequacy of bridge railing and approach guide rails.

The Deck Geometry section should comment on the adequacy of the traffic lanes and shoulder widths on the bridge. Also, comment on the continuity of the approach roadway (lanes and shoulders) across the bridge.

Field measured minimum clearances and where they occur should be provided (minimum vertical clearance above and below, and lateral underclearance left and right as per SI&A coding requirements). For bridges over waterways, horizontal and vertical clearances of the major waterway opening should also be given as per field measurements.

3. **Controlling Ratings:** The ratings should include the controlling member and controlling Inventory and Operating Ratings of the bridge. Also, comment on why the ratings are low, if it is the case and give the maximum calculated percent overstress for the operating or inventory ratings of the critical live load only (for prestressed beams overstressed in tension, give tensile stress in concrete). If the bridge is load posted, state so, giving the posted weight limit (this should be referenced to photos clearly showing the posted weight limits). Also, when applicable, if the inventory ratings are below the weight of the legal trucks, state that load posting is not required if the operating ratings are high.
4. **Conclusions and Recommendations:** Conclusions resulting from the bridge evaluation survey regarding the adequacy (structural, alignment, clearances, etc.) of the bridge should be given here. Also, include possible explanation of the causes of any inadequacies found. If the bridge is speed posted, state so, giving the posted speed limit and refer to photos included to clearly show the posted speed limit.

For bridges over waterways, include a statement relative to the scour potential of the bridge based on the Bridge Scour Evaluation. The statement should specify if the bridge is scour critical or not based on the Bridge Scour Evaluation. If the bridge has not yet been evaluated, the Priority Category as determined in the Bridge Scour Evaluation should be specified. If the Prioritization Category is 2 or less, the statement should include which low ratings (2 or less) led to this rating. Where the bridge has not yet been evaluated for scour potential, include a statement that the bridge is or is not potentially scour critical based on engineering judgment along with the reasons for this determination.

Make specific recommendations for safety improvements, major repair work (i.e. structure rehabilitation and/or replacement, raising superstructure, bridge widening, etc. to correct Structurally Deficient/ Functionally Obsolete conditions) and other repair work to correct significant defects, deterioration and inadequacies found during this bridge survey. The recommendations should be specific about the location of defects and the methods of repair. The recommendations for other repair work should be listed in the order of priority. Each recommendation should be referenced to the photos. For major repair/ rehabilitation work, provide cost estimates, however, for other repair work, provide quantities only.

In addition, list all areas of deterioration or structural members which should be inspected at frequencies of less than two years and indicate the inspection cycle in months for each area or member. Be very specific about locations to be inspected.

5. **Historical Information:** If available, this information should include when and under what agency the structure was built; when and by whom any subsequent alterations were made, their nature and extent, etc. Historical significance of the structure, if applicable, should be indicated.
6. **Bridge Description:** Furnish a brief description of the structure. Include the type of construction, materials in the deck, superstructure and substructure components, and important dimensions. Also, comment on the substructure foundation design if based on FHWA Hydraulic Engineering Circular (HEC-18). A more detailed description should be given if plans are not available.
7. **Appendix 1 - Structure Inventory & Appraisal Sheet/PONTIS/Seismic Data:** This section should contain a 8½ by 11 inch computer print out of the "Structure Inventory and Appraisal Sheet" (two or more sheets for structures carrying highways over highways). This sheet will be developed by the Department from the Computer Input sheets submitted with the preliminary report and coded in accordance with the current FHWA Recording and Coding Guide for the Inventory and Appraisal of the Nations Bridges and Recording and Coding Guide for the Structure Inventory and Appraisal of New Jersey bridges.

Also, include a computer print out of the Elemental Inspection and Seismic data developed from the computer input sheets submitted with the preliminary report and coded in accordance with the current PONTIS Manual. For the final report, include only the computer printout (supplied by the State).

Examples of SI&A/Pontis/Seismic data forms are included in Format A.

8. **Appendix 2 - Computations:** In this section, include computations of ratings for various major bridge components. The ratings shall be computed in accordance with the current AASHTO "Manual for Condition Evaluation of Bridges" (as modified in this Manual) and all current AASHTO interims. Include a summary as the first page of the computations listing all ratings with references and the allowable stresses used (see attached samples). Also, include the name of any rating computer program used and indicate any noteworthy assumptions made (such as section loss location(s), top or bottom flange in tension or compression controls, etc.). Include a CADD drawing, 8½ by 11 inches, showing the location of the controlling member and other members rated in the summary.
9. **Appendix 3 - Drawings, Soundings & Photographs:** A plan sketch indicating the direction and location of the photographs should be included. Bridge drawings (plan, elevation and cross section) etc. and color photographs (35mm print) plus color slides of unique defects should be included in this section of the report. Also, sounding sketches done in accordance with the current edition of the "Underwater Inspection and Evaluation of New Jersey Bridges Guidelines Manual" should be included.

Photographs of both full elevations and plan views, upstream and downstream views (if applicable), all significant defects, any repairs made and any special equipment used (Snooper, cherry picker, maintenance and protection of traffic, special ladders, etc.) should be included in the report. The photographs should be placed in the report in the following order: Elevations, Plan Views, Stream Views, Deck, Approaches, Superstructure, Substructure, Channel, Safety Features and Special Equipment.

10. **Appendix 4 - Field Notes:** Detailed clear hand written field notes using the Department's current Field Note Format for the type of structure being surveyed and/or CADD field sketches should be included as back-up data for the report. Include an 11 by 17 inch CADD drawing showing the deck and approach plan and elevation showing lateral and vertical clearances, span lengths, highway safety, lane, shoulder and sidewalk widths, curb to curb widths, median barrier, etc. Field notes should include measurements taken during the bridge survey and Pontis Core element condition evaluation data. A sample of the current Field Note forms and CADD sketches can be obtained from the Structural Evaluation and Bridge Management Unit.
11. **Appendix 5 - Underwater Inspection:** In this section, include the diver's inspection report (if applicable) done in accordance with the current edition of the "Underwater Inspection and Evaluation of New Jersey Bridges Guidelines Manual". Also, include as additional appendices any special reports such as fatigue analysis, ultrasonic testing, chemical analysis, coupon testing, hydraulic analysis, geotechnical streambed analysis, etc. Provide photographs showing the equipment used.

Sample Letter of Transmittal  
(Preliminary/Final Report)

\_\_\_\_\_, Manager  
Structural Evaluation  
New Jersey Department of Transportation  
Engineering and Operations Building  
1035 Parkway Avenue  
PO Box 615 - 5th Floor  
Trenton, New Jersey 08625-0600

Attn: Mr. \_\_\_\_\_, Project Manager

Evaluation Bridge  
Survey & Rating of  
Structure No.  
Route No.  
Structure Name  
BR-NBIS ( )

Gentlemen:

In accordance with our Agreement No. BI with the New Jersey Department of Transportation, dated \_\_\_\_\_, we are pleased to submit this PRELIMINARY REPORT/ FINAL REPORT for the above referenced bridge. A scanned and indexed report will be submitted on CD by a separate transmittal.

The report covers the results of a field inspection of the structure and recommendations for repair or replacement of major defects found. The inspection was made according to generally recognized standards and procedures, but it is not implied that all defects were or could have been disclosed by this inspection.

The inspection findings and recommendations in this report were reviewed to ensure a proper level of quality and uniformity. The report adheres to State practices for inspections and current NJDOT standards.

Very truly yours,

Consultant XYZ

Sample - For State Bridges  
(Consultant Report Cover Sheet)

# NEW JERSEY DEPARTMENT OF TRANSPORTATION

## BRIDGE EVALUATION SURVEY REPORT OF THE

**Structure No. 0226-152**  
**Route I-80**  
South Summit Avenue over I-80  
Hackensack Township  
Bergen County

CYCLE NO. 1  
AUGUST, 1996

**XYZ ENGINEERS, INC.**  
**100 Lincoln Place**  
**East Orange, New Jersey 07018**

(FORMAT "A")

NEW JERSEY DEPARTMENT OF TRANSPORTATION  
STRUCTURAL EVALUATION AND BRIDGE MANAGEMENT  
EVALUATION BRIDGE SURVEY REPORT

CYCLE NO. 1

STRUCTURAL DATA

Bridge No. \_\_\_\_\_ Year Built: \_\_\_\_\_ Reconstr/Widening: \_\_\_\_\_

Route No. \_\_\_\_\_ Mile Post \_\_\_\_\_ Length: \_\_\_\_\_ Width : \_\_\_\_\_

Name: \_\_\_\_\_ Date of This Eval.: \_\_\_\_\_

By: \_\_\_\_\_

Date of FCM/Pin Hanger Insp.: \_\_\_\_\_

By: \_\_\_\_\_  
(Only When Special Inspections are applicable)

Municipality: \_\_\_\_\_

Structure Type: \_\_\_\_\_ County: \_\_\_\_\_

Special Equipment Used: \_\_\_\_\_  
(Include Photo)

Date of Underwater  
Insp: \_\_\_\_\_

Date of Special Testing: \_\_\_\_\_  
Date of Electr./Mech. Insp.: \_\_\_\_\_  
(Movable Bridges Only)

Overall Condition: \_\_\_\_\_

Scour Critical: yes/no  
(If yes give reasons in Conclusions Section)

Component/ Material	Cond. Rating	General Remarks
------------------------	-----------------	-----------------

DECK/TOP OF  
ROADWAY

APPROACHES

Component/ Material	Cond. Rating	General Remarks
SUPERSTRUCTURE		
SUBSTRUCTURE		
CHANNEL/ WATERWAY/ COUNTERMEASURES		
SAFETY FEATURES		
DECK GEOMETRY		
UTILITIES		

The minimum vertical underclearance is \_\_\_\_\_ under \_\_\_\_\_.

The lateral clearance are: Left: \_\_\_\_\_ Right: \_\_\_\_\_

For waterways include horizontal and vertical clearances of the main channel span.

**CONTROLLING RATINGS**

Computer Program Used: \_\_\_\_\_

Based on the \*load factor method of analysis, the following load ratings have been computed:

		Truck Type Tons			
		<u>HS20</u>	<u>3</u>	<u>3S2</u>	<u>3-3</u>
Controlling Member		36	25	40	40
End Floorbeam	Inventory Ratings	XX	XX	XX	XX
Interior Stringer	Operating Ratings	XX	XX	XX	XX

The inventory/operating ratings are low due to (give explanation/reasons).

\*Working Stress or load factor/working stress could also be substituted depending on the method used to calculate the ratings.

## **CONCLUSIONS AND RECOMMENDATIONS:**

The overall condition of the structure is \_\_\_\_\_ due to \_\_\_\_\_.

((Provide a brief description and location of the fracture critical members or pin hanger details (specify when FCM's are internally redundant - i.e., riveted)).

### **A. If the bridge is Structurally Deficient or Functionally Obsolete - Major work required:**

Due to the condition of the \_\_\_\_\_ and/or inadequate \_\_\_\_\_, we recommend the following repairs and/or remedial action:

(List recommendations for major repair work with quantities and cost estimates)

In the interim, until the structure is replaced/widened/lengthened/raised/etc., the following repairs/rehabilitation should be made to retard further deterioration, preserve the structural integrity of the bridge, improve safety and extend its useful life:

(List recommendations for interim repair work with quantities only)

### **Or if the primary recommendation [major work] is for rehabilitation only:**

We also recommend that the following interim repairs be made, until the rehabilitation is implemented, to retard further deterioration, preserve the structural integrity of the bridge, improve safety and extend its useful life:

(List recommendations for interim repair work with quantities only)

If the bridge is Scour Critical - Include recommendations for providing countermeasures if not already provided or if monitoring devices are required or installed.

### **B. If the bridge is not Structurally Deficient or Functionally Obsolete - No major work required:**

We recommend that the following repairs be made to retard further deterioration, preserve the structural integrity of the bridge, improve safety and extend its useful life:

(List recommendations for other repair work with quantities only)

For **Major Work** (to correct Structurally Deficient/Functionally Obsolete Conditions) include repairs with quantities and cost estimate.

For **Other Repairs** include quantities only.

Note: The following area(s) or structural member(s) should be inspected on an interim basis at the frequency indicated:

A.

B.

C.

**FORMAT A - When ratings are calculated by both load factor and working stress**

Structure No.: \_\_\_\_\_ Project: \_\_\_\_\_

Name: \_\_\_\_\_

Rated By: \_\_\_\_\_ Date: \_\_\_\_\_ Checked By: \_\_\_\_\_ Date: \_\_\_\_\_

**SUMMARY OF RATING**

The Load Factor and Working Stress ratings, computed in the \_\_\_\_\_ and updated in the \_\_\_\_\_ cycle report in accordance with the FHWA directive dated November 1993 and AASHTO Manual for Condition Evaluation of Bridges, 1994, are as follows:

**Note:**

Include details of the analysis such as section losses, any assumptions made and the computer program used, etc.

**Computer Program Used:** \_\_\_\_\_

**Allowable Stresses MPa (psi)**

<b><u>Material</u></b>	<b><u>Yield</u></b>	<b><u>Inventory</u></b>	<b><u>Operating</u></b>
Concrete	XX ( $f_c$ )	XX	XX
Reinforcing Steel	XX	XX	XX
Structural Steel	XX	XX	XX

**Rating - Tons**

<b>Member</b>	<b><u>Truck Type</u></b>	<b><u>Load Factor</u></b>		<b><u>Working Stress</u></b>	
	<b><u>Tons</u></b>	<b><u>Inventory</u></b>	<b><u>Operating</u></b>	<b><u>Inventory</u></b>	<b><u>Operating</u></b>
	Type HS20 – 36T	XX	XX	XX	XX
	Type 3 – 25T	XX	XX	XX	XX
	Type 3S2 – 40T	XX	XX	XX	XX
	Type 3-3 – 40T	XX	XX	XX	XX

**FORMAT B - When ratings are calculated by load factor only**

Structure No.: \_\_\_\_\_ Project: \_\_\_\_\_

Name: \_\_\_\_\_

Rated By: \_\_\_\_\_ Date: \_\_\_\_\_ Checked By: \_\_\_\_\_ Date: \_\_\_\_\_

**SUMMARY OF RATING**

The Load Factor ratings, computed in the \_\_\_\_\_ and updated in the \_\_\_\_\_ cycle report in accordance with the FHWA directive dated November 1993 and AASHTO Manual for Condition Evaluation of Bridges, 1994, are as follows:

**Note:**

Include details of the analysis such as section losses, any assumptions made and the computer program used, etc.

**Computer Program Used:** \_\_\_\_\_

**Allowable Stresses - psi**

<b><u>Material</u></b>	<b><u>Yield</u></b>
Concrete	XX ( $f_c$ )
Reinforcing Steel	XX
Structural Steel	XX

**Rating - Tons**

<b><u>Member</u></b>	<b><u>Truck Type</u></b>	<b><u>Load Factor</u></b>	
	<b><u>Tons</u></b>	<b><u>Inventory</u></b>	<b><u>Operating</u></b>
	Type HS 20 - 36T	XX	XX
	Type 3 - 25T	XX	XX
	Type 3S2 - 40T	XX	XX
	Type 3-3 - 40T	XX	XX

**FORMAT C - When ratings are calculated by working stress only**

Structure No.: \_\_\_\_\_ Project: \_\_\_\_\_

Name: \_\_\_\_\_

Rated By: \_\_\_\_\_ Date: \_\_\_\_\_ Checked By: \_\_\_\_\_ Date: \_\_\_\_\_

**SUMMARY OF RATING**

The Working Stress ratings, computed in the \_\_\_\_\_ and updated in the \_\_\_\_\_ cycle report in accordance with the FHWA directive dated November 1993 and AASHTO Manual for Condition Evaluation of Bridges, 1994, are as follows:

**Note:**

Include details of the analysis such as section losses, any assumptions made and the computer program used, etc.

**Computer Program Used :** \_\_\_\_\_

**Allowable Stresses - psi**

<u>Material</u>	<u>Yield</u>	<u>Inventory</u>	<u>Operating</u>
Concrete	XX (f <sub>c</sub> )	XX	XX
Reinforcing Steel	XX	XX	XX
Structural Steel	XX	XX	XX

**Rating - Tons**

<u>Member</u>	<u>Truck Type</u>	<u>Working Stress</u>	
	<u>(Tons)</u>	<u>Inventory</u>	<u>Operating</u>
	Type HS 20 - 36T	XX	XX
	Type 3 - 25T	XX	XX
	Type 3S2 - 40T	XX	XX
	Type 3-3 - 40T	XX	XX

**SAMPLE S I & A SHEET**

**StructNum:** 1212150

**NJDOT SI and A Sheet**

**Name:** NJ 18 / SOUTH RIVER, CONRAIL, MAIN ST.(CR 615) **S.R.:**89.8 **SD/FO:** 0 - Not Deficient

**IDENTIFICATION**

1 State: 34 New Jersey 3 State Name: 1212150  
 7 Facility Code: NJ 18 8 Location: 04 M N OF CR 615  
 5A No./Of/Label: 1- State Cr Structure 5B No. Signing Post: 3- State Hwy  
 6C Level of Service: 1- Mainline 6D No. Number: C079A  
 6E Directional Traffic: 0- Not Applicable 6F Responsibility: NA  
 2 SHD District: 00- Central 3 County Code: Middlesex  
 4 Place Code: East Brunswick Township 11 Mile Post: 04820 mi  
 8 Feature/Intersected: BRNER/CONRAIL, MAIN ST  
 16 Latitude: 40.047 49.55° 17 Longitude: 074.021 28.54°  
 20 Endor Bridge Code: 4 Unknown (P)  
 22 Endor Bridge Number: NA

**INSPECTION**

91 Frequency: 24 months 92 Inspect Date: 12/01/2008 Next Inspect: 12/01/2010  
 93A FC Frequency: NA 93A FC Inspection Date: NA Next FC Inspection: NA  
 93B IW Frequency: NA 93B IW Inspection Date: NA Next IW Inspection: NA  
 93C SI Frequency: NA 93C SI Date: NA Next SI: NA  
 Element Frequency: 24 months Element Inspection Date: 12/01/2008 Next Elem. Insp. Due: 12/01/2010

**CLASSIFICATION**

100 STRAIGHT Highway: 0- ST RW-NET CONNECT 101 Parallel Structure: N- No/I bridge with  
 102 Directional Traffic: 0- 2-way traffic 103 Temporary Structure: Blank  
 104 Highway System: 1- On the NHS 112 NBIS Length: Y- Long Enough  
 20 Toll Facility: 0- On Inroad 25 Functional Class: 14- Urban Other Prime  
 27 Historical Significance: 0- Not eligible for NRHP  
 28 Owner: 01 NJDOT  
 29 Custodian: 01 NJDOT

**STRUCTURE TYPE AND MATERIALS**

43 Number of Approach Span: 0 45 Number of Span Main Unit: 4  
 43A/B Main Span Material/Design:  
 4- Steel Concrete 43- Stringer/Girder  
 107 Deck Type: 1- Concrete Cast-in-Place  
 108A Wearing Surface: 1- Metal/Asphalt Concrete  
 108B Surface: 0- None  
 108C Deck Protection: 1- Epoxy Coated Rebar

**CONDITION**

50 Deck: 7- Good 50 Super: 7- Good 50 Sub: 7- Good  
 52 Deck: 0- Not Applicable 51 Class of Class on Protection: 0- No Reference

**LOAD RATING AND POSTING**

62 Inventory Rating Method: 1- LF Load Factor 63 Opening Rating Method: 1- LF Load Factor  
 65 Inventory Rating: HS20.0 64 Opening Rating: HS20.0  
 61 Design Load: 0- MS 22.5 (MS 20) 70 Posting: 0- A/R above legal load  
 48 Posting Status: A- Quiet, no restriction

**AGE AND SERVICE**

27 Year Bld: 1989 108 Year Reconstructed: 0  
 42A Type of Service Cr: 0- Highway Suburban  
 42B Type of Service Under: 0- Highway Urban/RR  
 28A Lane no: 0 28B Lane Under: 4 19 Date Length: 2.0 mi  
 29 ABT: 41,000 109 Trac A/BT: 4% 30 Year of A/BT: 2005

**APPRAISAL**

28A Bridge Rail: 0- Substandard 28C Approach Rail: 0- Substandard  
 28E Transition: 0- Substandard 28D Approach Rail Ends: 1- Meet Standards  
 67 Site Evaluation: 7 68 Deck Geometry: 0- Equal Min/Chassis  
 69 Underclearance, Vertical and Horizontal: 0- Equal Minimum  
 71W Waterway Adequacy: 0- Above Desirable 72 Approach Alignment: 0- Equal Desirable C/I  
 113 Bover Critical: 0- Babb Above Footing

**GEOMETRIC DATA**

48 Length Main Span: 150.0 ft 49 Structure Length: 480.0 ft  
 50A Curb/Edge Width: 5.0 ft 50B Curb/Edge Width R: 5.0 ft  
 Width Curb to Curb SI: 108.0 ft 52 Width C/I to C/I: 128.0 ft  
 52 Approach Rampway Width: 112 ft 55 Median: 0- Closed/Med or Chassis  
 Deck Area: 60,371.4 sq ft  
 26 Elevation: 14.00' 26 Structure Flood: 0- No Flow  
 63 Minimum Vertical Clearance Over Bridge: 20.0 ft  
 64A Minimum Vertical Underclearance No. lanes: 0- Hwy beneath struct  
 64B Minimum Vertical Underclearance: 25.42 ft  
 65A Minimum Lateral Underclearance Reference R: 0- Hwy beneath struct  
 65B Minimum Lateral Underclearance R: 2000 ft  
 65C Minimum Lateral Underclearance L: 600 ft

**PROPOSED IMPROVEMENTS**

84 Bridge Cost: 0(\$)  
 85 Rampway Cost: 0(\$)  
 86 Total Cost: 0(\$)  
 87 Year of Cost Estimate: 0  
 75 Type of Work: -1  
 76 Length of Improvement: -3 ft  
 114 Future A/BT: 00,000  
 115 Year of Future A/BT: 2028

**NAVIGATION DATA**

88 Navigation Control: 0- 0- None Not Required  
 89 Vertical Clearance: 00 ft 40 Horizontal Clearance: 00 ft  
 111 Pier Protection: Not Applicable 115 Lateral Bridge Vertical Clearance

**ELEMENT CONDITION STATE DATA**

Elr Unit	Elr/Ew	Description	Units	Total Qty	% In 1	Qty. Bl. 1	% In 2	Qty. Bl. 2	% In 3	Qty. Bl. 3	% In 4	Qty. Bl. 4	% In 5	Qty. Bl. 5
0	26/3	Conc Deck/Conc Bars	(SF)	60,994	100%	60,994	0%	0	0%	0	0%	0	0%	0
0	107/3	Paint/Sl Opr/Glde	(LF)	5,775	99%	5,728	0%	24	0%	23	0%	0	0%	0
0	205/3	RY Conc Column	(EA)	24	100%	24	0%	0	0%	0	0%	0	0%	0

New Jersey Department of Transportation

**SAMPLE - SUPPLEMENTAL BRIDGE INSPECTION FORM: ITEMS 58-62**

Bridge No.	Bridge Name	Inspection Date
118-154	Rt. I-280 EB over Passaic River	05/17/96

ELE #	ELEMENT DESCRIPTION	ENV	TOTAL QUANTITY	UNITS	QUANT CONDITION STATE 1	QUANT CONDITION STATE 2	QUANT CONDITION STATE 3	QUANT CONDITION STATE 4	QUANT CONDITION STATE 5
012	CONCRETE DECK	3		(SF)	000000	000000	000000	000000	00915
107	OPEN GIRDER STEEL	3		(LF)	000000	000000	000000	000000	000000
210	PIER WALL REINFORCED	3		(LF)	000028	000001	000000	000000	000000
215	ABUTMENT REINFORCED	3		(LF)	000074	000005	000003	000000	000000
234	PIER CAP REINFORCED	3		(LF)	000042	000000	000000	000000	000000
302	COMPRESSION JOINT SEAL	3		(LF)	000040	000030	000060	000000	000000
334	BRIDGE RAILING - METAL	3		(LF)	000426	000000	000000	000000	000000
359	SOFFIT (UNDERSUR) OF	3		EA	000000	000001	000000	000000	000000
361	SCOUR (SUBSTRUCTURE)	3		EA	000001	000000	000000	000000	000000
374	STEEL ROCKERS MOVEABLE	3		EA	000000	000008	000002	000000	000000
375	PINNED BEARING - FIXED	3		EA	000007	000003	000000	000000	000000
503	CURBS/SIDE-WALKS	3		(LF)	00011	000015	000000	000000	000000
506	WINGWALLS ABUTMENT	3		(LF)	000072	000000	000000	000000	000000

Traffic Accidents	On Structure	Under Structure
Avg Bypass Detour Speed	MPH	MPH
Avg Travel Speed	MPH	MPH
Avg Annual Accident Count		
School Bus Route		
Public Transit Route		
Critical Travel Facility		

CoRe Element Remarks

## SEISMIC STRUCTURE REPORT (SAMPLE)

### Structure Identification

Route: _____	Structure Number: _____	Mile Post: _____
Structure Name: _____		

### Seismic

### Deck

### Information

### Seismic Superstructure Information

Deck Thickness:
Abutment Joint Width:
Pier Joint Width:

# Beams Main Span:
Structure Type:

### Seismic Bearing Information

Bearing Height:
Number of Anchor Bolts:
Anchor Bolt dimensions:
Pin Diameter:
Shoulder Dimensions:
Alignment Bearing:
Transverse Restraint:

### Seismic Substructure Information

Abutment Seat Width:
Pier Seat Width:
Column Reinforcement:
Column Cross Section:
Column Height:
Column F <sub>c</sub> :
Longitudinal Reinforcement:
Pile Embedment:
Type of Pier:
Type of Abutment:

### PONTIS ELEMENTS CODED FOR STRUCTURE

Element Number	Category	Material	Description
012	DECK	CONCRETE	CONCRETE
359	SMART FLAGS	OTHER	SOFFIT (UNDERSUR) OF DECKS & SLABS (DECK ELEMENTS)
334	DECK	METAL	BRIDGE RAILING - METAL COATED
503	DECK	CONCRETE	CURBS/SIDEWALKS CONCRETE
302	JOINTS	OTHER	COMPRESSION JOINT SEAL
107	SUPERSTRUCTURE	STEEL	OPEN GIRDER STEEL PAINTED
374	BEARINGS	STEEL	STEEL ROCKERS MOVEABLE - EXPANSION
375	BEARINGS	STEEL	PINNED BEARING - FIXED
234	SUBSTRUCTURE	CONCRETE	PIER CAP REINFORCED CONCRETE
210	SUBSTRUCTURE	CONCRETE	PIER WALL REINFORCED CONCRETE
215	SUBSTRUCTURE	CONCRETE	ABUTMENT REINFORCED CONCRETE
506	SUBSTRUCTURE	OTHER	WINGWALLS ABUTMENT (CONC MASONRY TIMBER)
361	SMART FLAGS	OTHER	SCOUR (SUBSTRUCTURE ELEMENTS)

**1.1.4 RE-EVALUATION SURVEY REPORT FORMAT - B -**

The report of the results of a re-evaluation bridge survey and rating of an existing bridge, performed by or for the Department, shall adhere to the following format:

- (A). **REPORT COVER SHEET:** The report's cover sheet shall utilize the same form as indicated in Format A (see attached sample in Format B).

The cover sheet colors shall be the same as specified under Format A.

The report shall be bound using a standard 3-hole punch type binding.

- (B). **LETTER OF TRANSMITTAL (CONSULTANT PROJECTS ONLY):** The letter of transmittal shall be addressed as shown in Format A (see sample in Format A).

- (C). **TABLE OF CONTENTS:** One page indicating items 1 thru 9 in order shown as follows and providing the page number in the report on which each item starts. All pages in the report shall be numbered (i.e. Cycle No.- Page No.) at the bottom and centered.

Page No.

1. Maps .....	
2. Structural Data .....	
3. Controlling Ratings.....	
4. Conclusions and Recommendations .....	
5. Appendix 1 - a. Structure Inventory & Appraisal Sheets.....	
b. Pontis Data.....	
c. Seismic Data.....	
6. Appendix 2 - Computations.....	
7. Appendix 3 - Drawings, Soundings and Photographs.....	
8. Appendix 4 - Field Notes with CADD Sketches .....	
9. Appendix 5 - Underwater Inspection Report/ Other Special Report if applicable.....	

- 1. **Maps:** Two maps, are required as specified in Format A. If the previous bridge survey report contains up-to-date General Location and Local Maps done to the required specifications, no maps are required.
- 2. **Structural Data:** A summary of findings and work done shall be included as indicated in Format A.
- 3. **Controlling Ratings:** The ratings shall be provided as indicated in Format A (give reference to the bridge survey report cycle where the detailed rating computations were made if not calculated in the current cycle report).
- 4. **Conclusions & Recommendations:** Conclusions shall be provided as indicated in Format A. Also, comment on any major changes in the condition

of all components since the previous bridge survey report cycle. If no changes have occurred, include a statement to that effect.

5. **Appendix 1 - Structure Inventory & Appraisal Sheet/PONTIS/Seismic Data:** This section should contain the above listed data forms as indicated in Format A.
6. **Appendix 2 - Computations:** In this section, include computations of ratings for various major bridge components as indicated in Format A.
7. **Appendix 3 - Drawings, Soundings & Photographs:** This section shall contain bridge drawings, sounding sketches, photo location plan sketch and photographs as indicated in Format A.
8. **Appendix 4 - Field Notes:** Provide field notes or CADD sketches as specified in Format A in this section.
9. **Appendix 5 - Underwater Inspection:** In this section, include the diver's inspection report (if applicable) or other additional appendices as specified in Format A.

Sample - For State Bridges  
(Consultant Report Cover Sheet)

## NEW JERSEY DEPARTMENT OF TRANSPORTATION

### BRIDGE RE-EVALUATION SURVEY REPORT OF THE

**Structure No. 0226-152**  
**Route I-80**  
South Summit Avenue over I-80  
Hackensack Township  
Bergen County

CYCLE NO. 2  
AUGUST, 1996

**XYZ ENGINEERS, INC.**  
**100 Lincoln Place**  
**East Orange, New Jersey 07018**

(FORMAT "B")

NEW JERSEY DEPARTMENT OF TRANSPORTATION  
STRUCTURAL EVALUATION AND BRIDGE MANAGEMENT  
RE-EVALUATION BRIDGE SURVEY REPORT

CYCLE NO. \_\_\_\_\_

**STRUCTURAL DATA**

Bridge No. \_\_\_\_\_ Year Built: \_\_\_\_\_ Reconstr/Widening: \_\_\_\_\_

Route No. \_\_\_\_\_ Mile Post \_\_\_\_\_ Length: \_\_\_\_\_  
Width: \_\_\_\_\_

Name: \_\_\_\_\_ Date of This  
Eval.: \_\_\_\_\_  
By: \_\_\_\_\_

\_\_\_\_\_ Date of FCM/Pin Hanger Insp.: \_\_\_\_\_  
By: \_\_\_\_\_  
(Only when Special Inspections are applicable)

\_\_\_\_\_ Date of Prev.  
Eval.: \_\_\_\_\_  
By: \_\_\_\_\_

Structure Type: \_\_\_\_\_  
\_\_\_\_\_ Special Equipment Used: \_\_\_\_\_  
(Include Photo)

\_\_\_\_\_ Date of Underwater Insp: \_\_\_\_\_

\_\_\_\_\_ Date of Special Testing: \_\_\_\_\_

\_\_\_\_\_ Date of Electr./Mech. Insp.: \_\_\_\_\_  
(Movable Bridges Only)

Overall Condition: \_\_\_\_\_ Scour Critical: yes/no

Work Done: \_\_\_\_\_

Component/ Material	Cond. Rating	General Remarks
DECK/TOP OF ROADWAY		

APPROACHES

Component/ Material	Cond. Rating	General Remarks
SUPERSTRUCTURE		
SUBSTRUCTURE		
CHANNEL/ WATERWAY		
SAFETY FEATURES		
DECK GEOMETRY		
UTILITIES		

The minimum vertical underclearance is \_\_\_\_\_ under \_\_\_\_\_

The lateral clearance are: Left: \_\_\_\_\_ Right: \_\_\_\_\_

For waterways include horizontal and vertical clearances of the main channel span.

**CONTROLLING RATINGS** (From \_\_\_\_\_ Cycle Report):

**Computer Program Used:** \_\_\_\_\_

Based on the \*load factor method of analysis, the following load ratings have been computed:

		Truck Type - Tons			
		HS 20	3	3S2	3-3
Controlling Member		36T	25T	40T	40T
End Floorbeam	Inventory Ratings	XX	XX	XX	XX
Interior Stringer	Operating Ratings	XX	XX	XX	XX

The inventory/operating ratings are low due to (give explanation/reasons).

- Working Stress or load factor/working stress could also be substituted depending on the method used to calculate the ratings.

**CONCLUSIONS AND RECOMMENDATIONS:**

For explanation of the requirements for this section, refer to Format A.

**Note:** The following area(s) or structural member(s) should be inspected on an interim basis at the frequency indicated:

- A.
- B.
- C.

### 1.1.5 RE-EVALUATION SURVEY REPORT FORMAT - C -

The report of the results of a re-evaluation bridge survey and rating of an existing bridge, performed by or for the Department, shall adhere to the following format:

- (A). **REPORT COVER SHEET:** The report's cover sheet shall utilize the same form as indicated in Format A (see attached sample in Format B).

The cover sheet colors shall be the same as specified under Format A.

The report shall be bound using a standard 3-hole punch type binding.

- (B). **LETTER OF TRANSMITTAL (CONSULTANT PROJECTS ONLY):** The letter of transmittal shall be addressed as shown in Format A (see sample in Format A).

- (C). **TABLE OF CONTENTS:** The table of contents shall utilize the same form as shown under Format B.

1. **Maps:** Two maps are required as specified in Format A. If the previous bridge survey report contains up-to-date General Location and Local Maps done to the required specifications, no maps are required.
2. **Structural Data:** A summary of the work done since the previous bridge survey shall be included as per the attached format. The remaining items in this format are self-explanatory.
3. **Controlling Ratings:** The ratings shall be provided as indicated in Format A (give reference to the bridge survey report cycle where the detailed rating computations were made).
4. **Conclusions & Recommendations:** State the overall condition of the structure (consistent with SI&A Item 67) and include a paragraph summarizing the conditions of the various components to justify their being coded as they are. For large or complex structures, it may be necessary to include one paragraph for each component rather than one long paragraph. If an underwater inspection has been conducted and no repairable defects were discovered, the underwater inspection should be noted here. If repairable defects were discovered by the diver, appropriate remedial repairs should be included in the report.

Conclusions shall be provided as indicated in Format A. Also, comment on any major changes in the condition of all components since the previous bridge survey report cycle. If no changes have occurred, include a statement to that effect.

5. **Appendix 1 - Structure Inventory & Appraisal Sheet/PONTIS/Seismic Data:** This section should contain the above listed data forms as indicated in Format A.
6. **Appendix 2 - Computations:** In this section, include computations of ratings for various major bridge components as indicated in Format A.

7. **Appendix 3 - Drawings, Soundings & Photographs:** This section shall contain bridge drawings, sounding sketches, photo location plan sketch and photographs as indicated in Format A.
8. **Appendix 4 - Field Notes:** Provide field notes or CADD sketches as specified in Format A in this section.
9. **Appendix 5 - Underwater Inspection:** In this section, include the diver's inspection report (if applicable) or other additional appendices as specified in Format A.

(FORMAT "C")

NEW JERSEY DEPARTMENT OF TRANSPORTATION  
STRUCTURAL EVALUATION AND BRIDGE MANAGEMENT  
RE-EVALUATION BRIDGE SURVEY REPORT

CYCLE NO. \_\_\_\_\_

**STRUCTURAL DATA**

Bridge No. \_\_\_\_\_ Year Built: \_\_\_\_\_ Reconstr/Widening: \_\_\_\_\_  
Route No. \_\_\_\_\_ Mile Post \_\_\_\_\_ Length: \_\_\_\_\_ Width: \_\_\_\_\_  
Name: \_\_\_\_\_ Date of This Eval.: \_\_\_\_\_

By: \_\_\_\_\_

Date of FCM/Pin Hanger Insp.: \_\_\_\_\_

By: \_\_\_\_\_  
(Only when Special Inspections are applicable)

Structure Type: \_\_\_\_\_ Date of Prev. Eval.: \_\_\_\_\_

By: \_\_\_\_\_

Special Equipment Used: \_\_\_\_\_  
(Include Photo)

Date of Underwater Insp.: \_\_\_\_\_

Date of Special Testing: \_\_\_\_\_

Date of Electr./Mech. Insp.: \_\_\_\_\_  
(Movable Bridges Only)

Overall Condition: \_\_\_\_\_ Scour Critical: yes/no

Work Done: \_\_\_\_\_

**CONTROLLING RATINGS** (see Format B for the requirements of this section)

**CONCLUSIONS AND RECOMMENDATIONS:**

The overall condition of the structure is \_\_\_\_\_ due to \_\_\_\_\_.

The deck is in \_\_\_\_\_ condition due to \_\_\_\_\_. The approaches are in \_\_\_\_\_ condition due to \_\_\_\_\_. The superstructure is in \_\_\_\_\_ condition due to \_\_\_\_\_. The substructure is in \_\_\_\_\_ condition due to \_\_\_\_\_. The channel is in \_\_\_\_\_ condition due to \_\_\_\_\_. (List the significant defects which are the main reasons for the condition ratings of the above structural elements. If an element has no significant defects - i.e., coded 6 or higher, it should be deleted from the above).

Since the previous inspection

\_\_\_\_\_  
(Give brief description of significant changes in the condition of the various components. Do not include work done in this section.)

((Give a brief description and location of the fracture critical members or pin hanger details (specify when FCM's are internally redundant - i.e., riveted)). Also, comment if bridge is scour critical and if countermeasures or monitoring devices have been provided/installed.

For an explanation of the remainder of this section, refer to Format A.

**1.1.6 INTERIM SURVEY REPORT FORMAT - D -**

The report of the results of an interim bridge survey and rating of an existing bridge, performed by or for the Department, shall adhere to the following format:

- (A). **REPORT COVER SHEET:** The report's cover sheet shall include the bridge number, name, route number, municipality, county and the month and the year of the bridge survey (see attached sample in Format D).

The report shall be bound using a standard 3-hole punch type binding.

- (B). **LETTER OF TRANSMITTAL (CONSULTANT PROJECTS ONLY):** The letter of transmittal shall be addressed as shown in Format A (see sample in Format A):

- (C). **TABLE OF CONTENTS:** One page indicating items 1 thru 8 in order shown on the following page and providing the page number in the report on which each item starts. All pages in the report shall be numbered at the bottom and centered.

Page No.

1. Structural Data .....	
2. Controlling Ratings .....	
3. Reason for Interim Survey .....	
4. Current Condition .....	
5. Conclusions and Recommendations .....	
6. Appendix 1 - a. Structure Inventory & Appraisal Sheets .....	
b. Pontis Data .....	
7. Appendix 2 - Computations .....	
8. Appendix 3 - Drawings, Soundings and Photographs .....	

- 1. **Structural Data:** A summary of findings and work done shall be included as per the attached format. The items in this format are self-explanatory.
- 2. **Controlling Ratings:** The ratings should include the controlling member and controlling Inventory and Operating Ratings of the bridge.
- 3. **Reasons for Interim Survey:** Indicate specifically the areas or members of the bridge requiring an interim inspection. These areas could be locations of deterioration such as loss of concrete under a bearing or a tilted wingwall. They also could be structure members with low operating ratings (list all members with low operating ratings) or fracture critical members.
- 4. **Current Condition:** Indicate the current condition of the items identified in the previous section. Also, state if any changes have occurred since the last survey (in-depth or interim).
- 5. **Conclusions & Recommendations:** Conclusions resulting from the interim bridge evaluation survey regarding the items inspected should be given here.

Also, include possible explanation of the causes of any inadequacies found. If the bridge is posted, state so, giving the posted limits (load or speed) and should be referenced to photos clearly showing the posted weight or speed limits.

Make specific new recommendations for safety improvements, major repair work (i.e. structure rehabilitation and/or replacement, raising superstructure, bridge widening, etc. to correct Structurally Deficient/Functionally Obsolete conditions) and other repair work to correct significant defects, deterioration and inadequacies found during this interim bridge survey. The intent is to list any new repairs which are needed, not to repeat the recommendations from the latest bridge evaluation survey report. If no new repairs are necessary, this should be stated.

The recommendations should be specific about the location of defects and the methods of repair. The recommendations for other repair work should be listed in the order of priority. Each recommendation should be referenced to the photos. For major repair work, provide cost estimates. For other repair work, provide quantities only.

6. **Appendix 1 - Structure Inventory & Appraisal Sheet/PONTIS/Seismic Data:** This section should contain the above listed data forms as indicated in Format A.
7. **Appendix 2 - Computations:** In this section, include computations of ratings for various major bridge components as indicated in Format A.
8. **Appendix 3 - Drawings, Soundings & Photographs:** This section shall contain bridge drawings, sounding sketches, photo location plan sketch and photographs as indicated in Format A with the following exceptions:

Photographs of one elevation and plan view plus all areas of the bridge inspected during the interim bridge evaluation survey are required.

Sample - For State Bridges  
(Consultant Report Cover Sheet)

## NEW JERSEY DEPARTMENT OF TRANSPORTATION

### INTERIM EVALUATION SURVEY REPORT OF THE

**Structure No. 0226-152**  
**Route I-80**  
South Summit Avenue over I-80  
Hackensack Township  
Bergen County

AUGUST, 1996

**XYZ ENGINEERS, INC.**  
**100 Lincoln Place**  
**East Orange, New Jersey 07018**

(FORMAT "D")

NEW JERSEY DEPARTMENT OF TRANSPORTATION  
STRUCTURAL EVALUATION AND BRIDGE MANAGEMENT  
INTERIM BRIDGE SURVEY REPORT

FREQUENCY: \_\_\_\_\_ MONTHS

**STRUCTURAL DATA**

Bridge No. \_\_\_\_\_ Year Built: \_\_\_\_\_  
Reconstr/Widening: \_\_\_\_\_

Route No. \_\_\_\_\_ Mile Post \_\_\_\_\_ Length: \_\_\_\_\_  
Width: \_\_\_\_\_

Name: \_\_\_\_\_ Date of This Eval.: \_\_\_\_\_  
By: \_\_\_\_\_  
\*Date of Previous Interim Survey: \_\_\_\_\_

Structure Type: \_\_\_\_\_ \*By: \_\_\_\_\_  
(\*Use only if there was another interim survey  
after the last routine survey.)  
Date of Last Routine Eval: \_\_\_\_\_  
By: \_\_\_\_\_

Special  
Equipment: \_\_\_\_\_  
(Include Photos)

Overall Condition: \_\_\_\_\_ Scour Critical: yes/no

Work  
Done: \_\_\_\_\_

**REASONS FOR INTERIM SURVEY:**

**CURRENT CONDITION OR CHANGES IN ITEMS INSPECTED:**

**CONCLUSIONS AND RECOMMENDATIONS:**

We recommend that the following repairs or rehabilitation be made to retard further deterioration, preserve the structural integrity of the bridge, improve safety and extend its useful life: \_\_\_\_\_

In addition to any recommendations noted here, all of the recommendations from the previous reports (routine or interim) are still in effect if not already completed.

Next interim inspection is recommended at \_\_\_\_\_ month intervals.

### 1.1.7 GUIDELINES FOR CADD BRIDGE EVALUATION SURVEY FIELD INSPECTION DRAWINGS

#### A. GENERAL

Recording of the field bridge survey data on computer generated drawings/sketches are intended to essentially replace the existing handwritten field notes and sketches.

The purpose of utilizing CADD drawings in bridge inspection is two fold:

1. To provide a visual representation of the bridge conditions in place of verbal descriptions in the bridge survey report (field notes).
2. To facilitate Electronic Storage and updating of bridge conditions and clearances observed during subsequent bridge survey cycles.

Using the existing bridge plans, base plans for various bridge components will be developed for the purpose of taking notes during the field inspection as well as for final report presentation. All base plans will be prepared on 11 by 17 inch sheets, or for small bridges, on 8½ by 11 inch sheets and made appropriately proportioned taking advantage of CADD flexibilities. For example, varying scales can be used lengthwise and widthwise, etc. North arrows should be oriented vertically or to the left when the CADD drawing is placed in the report.

The Department's CADD system is based on Intergraph Microstation. Therefore, it is required that CADD drawings be developed using Intergraph Microstation or Intergraph Microstation PC software programs. However, it is acceptable to use other CADD software submitted in Intergraph Microstation. All CADD drawing files must be submitted to the Department with the final report and each bridge must be submitted on a separate diskette. The diskette size must be 3½ inches and formatted on DOS. Two (2) copies of each diskette are required.

#### B. TYPICAL DRAWINGS

It is recommended that the same approximate scale be used for the base plan of the following drawing categories 1, 2 and 3:

##### 1. Clearances, Soundings and Photo Locations:

Use one sheet for any bridge up to approximately 492 feet in length. The plan will show the general bridge plan (roadway), elevation view and all features it crosses (highways, waterways, railroad, etc.). All the measurements such as minimum and maximum vertical and lateral underclearances, lane widths, curb-to-curb deck width, span length, sidewalk or median widths, etc. should be field verified and recorded. All clearances and photo locations should be shown on the plan view while the soundings should be shown on the elevation view. The sounding plot

should also include the plot from the initial sounding survey and a statement as to whether or not the channel profile has changed since the previous survey. When the length of the structure makes the scale of the drawing too small for plotting soundings or showing clearances, separate drawings should be provided. NOTE: Soundings must be done in accordance with the current edition of the "Underwater Inspection and Evaluation of New Jersey Bridges Guidelines Manual" and subsequent modifications.

2. Deck:

Approaches, approach guide rails and at least two (2) end spans (deck) should be shown on one sheet. For multi-span bridges (viaducts), use additional sheets for the top of the deck as necessary.

Underdeck CADD sheets should also show the framing (thin or dashed line) when applicable to facilitate the location of defects relative to the stringers, floorbeams, diaphragms, etc.

3. Superstructure:

Layered framing, if applicable, should be used to clearly show the deterioration of a member in each layer (stringer, floorbeams, etc.). The number of sheets required will depend on the length of the structure, number of spans and the complexity of the superstructure. Bearings should be shown on the bridge seat plan.

For movable bridges, CADD drawings for trusses and/or towers should be part of the superstructure.

4. Substructure:

These drawings should show the breastwall, bridge seat with (or without) bearing pedestals, wingwalls (projected), backwall, slope protection or all four faces of a pier to a suitable approximate scale. Any other substructure features (retaining walls, etc.) should be included as a vertical (or horizontal) projection adjacent to wingwalls.

For abutments, 1 (one) sheet per bridge should be used.

For piers, the number of sheets required will depend on the configuration and the number of piers. Normally three (3) piers can be shown on each sheet.

Abutment and pier plans will be prepared individually by taking advantage of similarities, if any.

For bridges with complex framing, bridges over five spans, or structures with severe deterioration, a summary sheet should include the description of the major findings of each component (deck, superstructure, substructure, channel, etc.) to supplement the CADD information. Also, the maximum length of bridge covered per sheet should be in the range of 45 meters or one to three spans as

determined by the Engineer with the approval of the Project Manager.

**Examples of typical CADD drawings which are deemed to be acceptable to the Department are attached following the Standard Defect Codes. These drawings are provided to show a representation of what the Department expects in CADD drawings.**

### C. STANDARD DEFECT CODES

The following guidance is provided to indicate common defects with codes on sketches. Codes used on a sheet should have their description given at the bottom left hand part of the sheet.

Defect codes shall be a three digit code. The first digit shall correspond to the material category based on the following:

C - Concrete	T - Timber
S - Steel	M - Misc.

The second digit describes the type of defect, e.g. scaling, rusting, erosion, etc.

The third digit shall indicate the severity of the defect.

Codes will begin with the letter "A" indicating less severe or minor defects with alphabetically increasing severity, e.g.:

a. Cracks:	A = Fine B = Medium C = Wide
b. Spalls	A = Incipient Spall B = Small Spall C = Large Spall
c. Scaling	A = Light B = Moderate C = Severe

The following is a list of codes developed for each category which by no means should be considered as a complete listing. It only serves as a guide and covers the most common defects and should be supplemented by full descriptions of other defects not easily categorized.

Also, where the bridge inspector believes further elaboration of a defect designated by the code is necessary, an additional sketch of the noted location (i.e. cross section of a beam, measurement of the defect, % loss of bearing area, etc.) should be provided to illustrate the defect observed. Inspectors are encouraged to use additional notes as needed to describe other defects or to further elaborate and locate defects described with codes.

**It is very important to quantify the defects such as indicating the length of medium and wide cracks or areas of spalled and scaled concrete to**

facilitate comparison in future surveys and preparation of estimates. Make sure to include concrete patched spalled areas in the deck separately.

**DEFECT SUMMARY**

**CONCRETE (C)**

Defect Code	Type Defect	A	Severity B	C
1	Cracking	Fine	Medium	Wide
2	Cracking with Efflorescence	Fine	Medium	Wide
3	Efflorescence/ Exudation	Light	Moderate	Heavy
4	Scaling	Light	Moderate	Severe
5	Spalling	Small	Large	Large (+)
6	Spalling with Exposed Steel	Small	Large	Large (+)
7	Encasement Deterioration	Minor spalls	Det. w/ cracks	Det. w/ Exposed Steel

**DEFECT SUMMARY**

**STEEL (S)**

Defect Code	Type Defect	A	Severity B	C	D
1	Paint Failure	Random Peeling	Up to 3%	Up to 10%	>10%
2	Rusting	Spot	Light	Moderate	Severe

3	Corrosion with Up to Section Loss	Up to 10%	Up to 20%	Up to 30%	>30% (Specify %)
4	Collision Damage	Minor Scrapes	Local Buckling	Major Deform. No need for NDT.	Major Deform. NDT required

Please provide location and description of Fatigue Details. Use letters as per AASHTO Details.

### DEFECT SUMMARY

#### TIMBER (T)

Defect Code	Type Defect	Severity			
		A	B	C	
1	Decay/Rotting	Minor	Moderate	Severe	
2	Checks		Fine	Medium	Wide
3	Splits		Minor	Moderate	Severe
4	Section Loss		Up to 10%	Up to 20%	Over 20% (Specify %)
5	Deflection		Minor	Moderate	Severe

### DEFECT SUMMARY

#### MISCELLANEOUS (M)

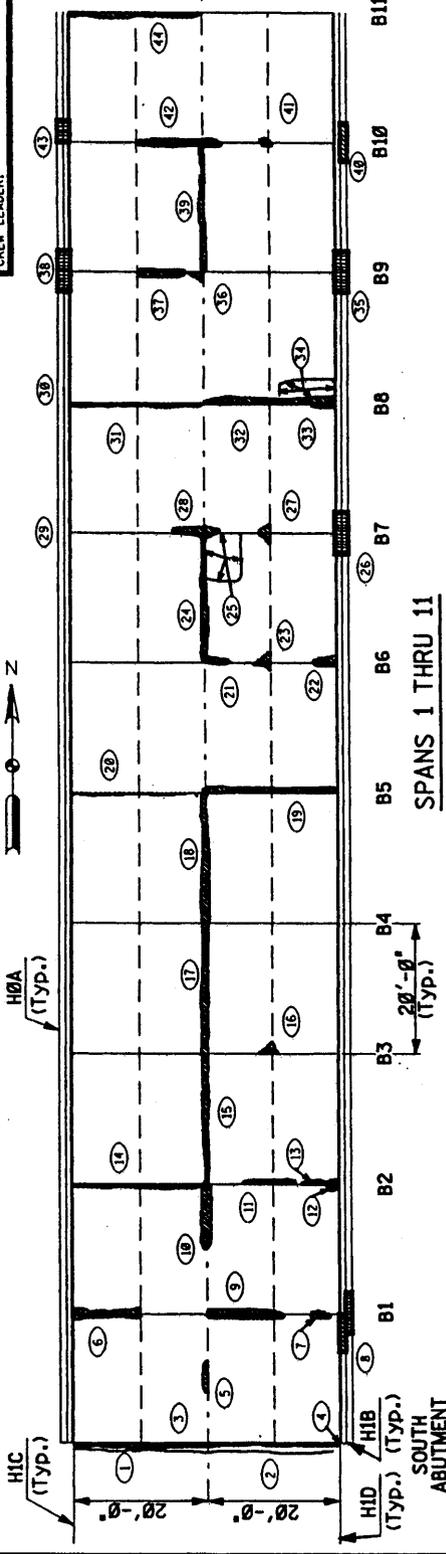
Defect Code	Type Defect	Severity		
		A	B	C
1	Approach Settlement	Up to ½ inch	Up to 1 inch	> 2 inches (Specify Amt.)
2	Appr. Railing Broken/Damaged	Minor	Moderate	Severe
3*	Excessively Expanded Bearing	Minor	Moderate	Severe

4*	Excessively Contracted Bearing	Minor	Moderate	Severe
5	Joint Deterioration	Minor	Moderate	Severe

\*Specify degree of tilt on rocker bearings and temperature of steel



ROUTE: NJ 92 STRUCTURE NO. 0511-152  
 DATE OF INSP. 10/92 CYCLE NO. 7  
 CREW LEADER:



SPANS 1 THRU 11

DEFECT SUMMARY		REMARKS	
NO.	CODE	REMARKS	REMARKS
1	H1C	FULL ROADWAY WIDTH	
2	H1A	1/4" ACROSS FULL ROADWAY	
3	H1A	6"x3" HOLE	
4	H1A	6"x3" HOLE	
5	H1A	6"x3" HOLE	
6	H1A	6"x3" HOLE	
7	H1A	6"x3" HOLE	
8	H1A	6"x3" HOLE	
9	H1A	6"x3" HOLE	
10	H1A	6"x3" HOLE	
11	H1A	6"x3" HOLE	
12	H1A	6"x3" HOLE	
13	H1A	6"x3" HOLE	
14	H1A	6"x3" HOLE	
15	H1A	6"x3" HOLE	
16	H1A	6"x3" HOLE	
17	H1A	6"x3" HOLE	
18	H1A	6"x3" HOLE	
19	H1A	6"x3" HOLE	
20	H1A	6"x3" HOLE	
21	H1A	6"x3" HOLE	
22	H1A	6"x3" HOLE	
23	H1A	6"x3" HOLE	
24	H1A	6"x3" HOLE	
25	H1A	6"x3" HOLE	
26	H1A	6"x3" HOLE	
27	H1A	6"x3" HOLE	
28	H1A	6"x3" HOLE	
29	H1A	6"x3" HOLE	
30	H1A	6"x3" HOLE	
31	H1A	6"x3" HOLE	
32	H1A	6"x3" HOLE	
33	H1A	6"x3" HOLE	
34	H1A	6"x3" HOLE	
35	H1A	6"x3" HOLE	
36	H1A	6"x3" HOLE	
37	H1A	6"x3" HOLE	
38	H1A	6"x3" HOLE	
39	H1A	6"x3" HOLE	
40	H1A	6"x3" HOLE	
41	H1A	6"x3" HOLE	

CRACK SUMMARY					
FINE		MEDIUM		WIDE	
SPAN	GENERAL COMMENTS	NUMBER OF CRACKS	LENGTH	NUMBER OF CRACKS	LENGTH
1	ISOLATED	51	48 FT		
2	ISOLATED				
3	SCATTERED				
4	SCATTERED				
5	ISOLATED				
6	ISOLATED				
7	ISOLATED				
8	ISOLATED				
9	ISOLATED				
10	ISOLATED				
11	SCATTERED				

- LEGEND:
- INDICATES OPEN DRAIN
  - ⊙ INDICATES CLOGGED DRAIN
  - INDICATES ASPHALT PATCH
  - ▨▨▨▨▨ INDICATES SPALL
  - ▨▨▨▨▨ INDICATES SCALING/DISINT.



- NOTES:
- a) All Cracks are Transverse Unless Otherwise Noted.
  - b) Moderate To Heavy Debris (Typical) Through Gutter/Inlee.
  - c) Light Soidal (Typical) Throughout Wheel Lines
  - d) Fine Pattern Cracks Scattered Throughout.
  - e) For Defect Legend and Number Sequence, See "DEFECT CODES" Sheet.

INSPECTED BY: \_\_\_\_\_  
 CADD OPERATOR: \_\_\_\_\_  
 CHECKED BY: \_\_\_\_\_  
 SUPERVISED BY: \_\_\_\_\_

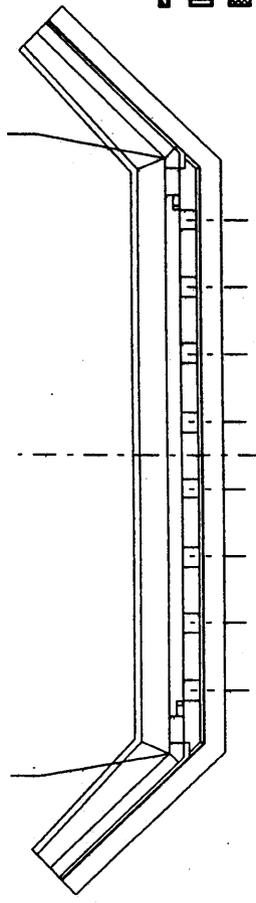
RTE. 52 OVER ELBOW THOROFARE

DECK PLAN - 1

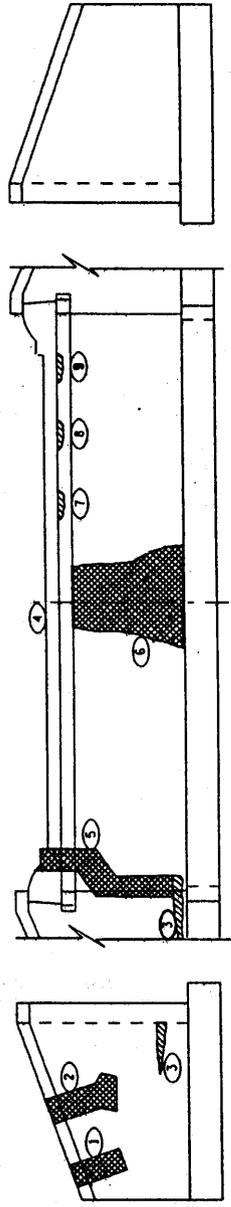


ROUTE NJ 52 STRUCTURE NO. 0511-152  
 DATE OF INSP: 10/92 CYCLE NO. 7  
 CREW LEADER

**LEGEND**  
 [Hatched pattern] INDICATES SPALL  
 [Vertical line pattern] INDICATES SCALING/DISSINT.  
 [Stippled pattern] INDICATES CONCRETE PATCHING



**PLAN**



**ELEVATION**

**NOTES:**  
 1. FOR DEFECT LEGEND AND NUMBER SEQUENCE, SEE "DEFECT CODES" SHEET.  
 2. LIGHT TO MODERATE SCALING BELOW WATER LINE WITH EXPOSED AGGREGATE SCATTERED THROUGHOUT.

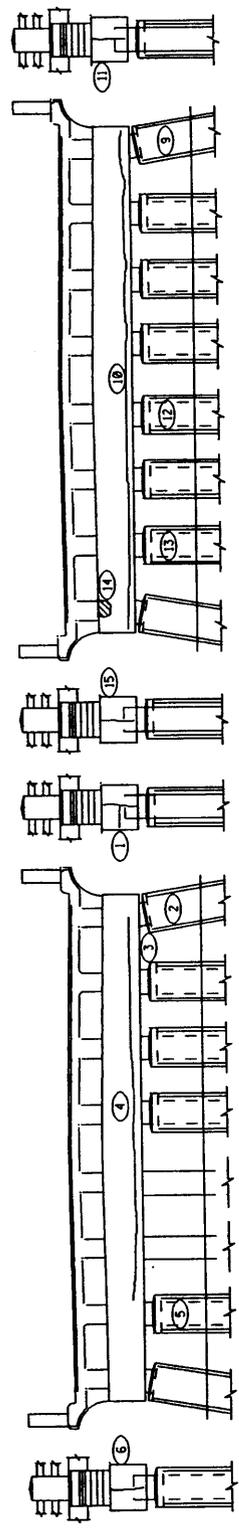


DEFECT SUMMARY			
DEFECT CODE	REMARKS	DEFECT CODE	REMARKS
1	5 S.F.	6	M3A 12 S.F.
2	7.5 S.F.	7	C5B 1 S.F.
3	5 S.F. AT WATERLINE, 4" DEEP	8	C5B 1 S.F.
4	(TYP.) THRU-OUT BACKWALL	9	C5B 1 S.F.
5	15 S.F.		

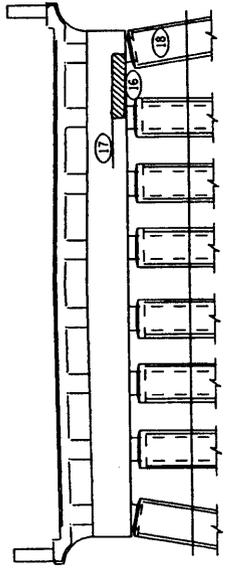
NEW JERSEY DEPARTMENT OF TRANSPORTATION  
 BUREAU OF STRUCTURAL EVALUATION  
 ROUTE 52 OVER ELBOW THORFARE  
 NORTH ABUTMENT

INSPECTED BY: \_\_\_\_\_  
 CAD OPERATOR: \_\_\_\_\_  
 CHECKED BY: \_\_\_\_\_  
 SUPERVISED BY: \_\_\_\_\_

ROUTE: NJ 52 STRUCTURE NO. 051-152  
 DATE OF INSP. 10/92 CYCLE NO. 7  
 CREW LEADER



**SOUTH ELEVATION**



**NORTH ELEVATION**

**BENT 2**

**BENT 1**

**LEGEND**  
 zzzzz INDICATES SPALL  
 1'-0" 4' 8'  
 1/4" = 1'-0"

- NOTES:**
- FOR DEFECT LEGEND AND NUMBER SEQUENCE, SEE "DEFECT CODES" SHEET.
  - FINE MAP CRACKING WITH LIGHT EFFLORESCENCE SCATTERED THROUGHOUT PILE CAPS.

DEFECT/DEFECT CODE	REMARKS	DEFECT/DEFECT CODE	REMARKS
1	CIB	10	CIA
2	CTB	11	CIA
3	C6B	12	C7C
4	C7C	13	C7C
5	C7C	14	C5B
6	CIA	15	CIA
7	CIB	16	C6B
8	CIB	17	CIB
9	CTC	18	CTB

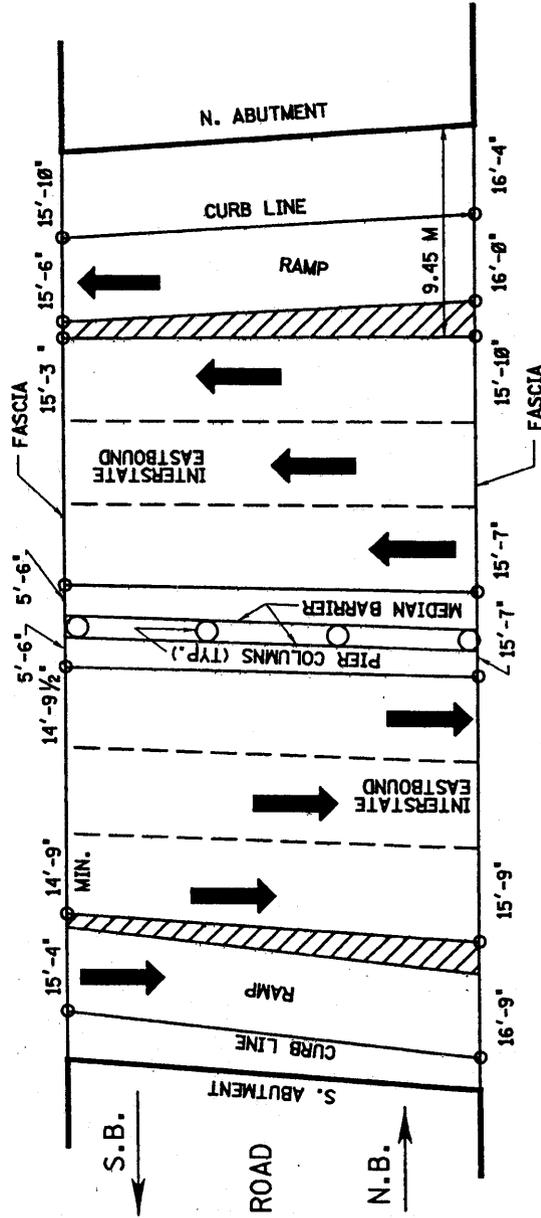
INSPECTED BY: \_\_\_\_\_  
 CADDED OPERATOR: \_\_\_\_\_  
 CHECKED BY: \_\_\_\_\_  
 SUPERVISED BY: \_\_\_\_\_

NEW JERSEY DEPARTMENT OF TRANSPORTATION  
 BUREAU OF STRUCTURAL EVALUATION  
 ROUTE 52 OVER ELBOW THORFARE  
 BENTS 1 AND 2

STRUCTURE NO. :  
DATE :

ROAD OVER INTERSTATE

7th CYCLE



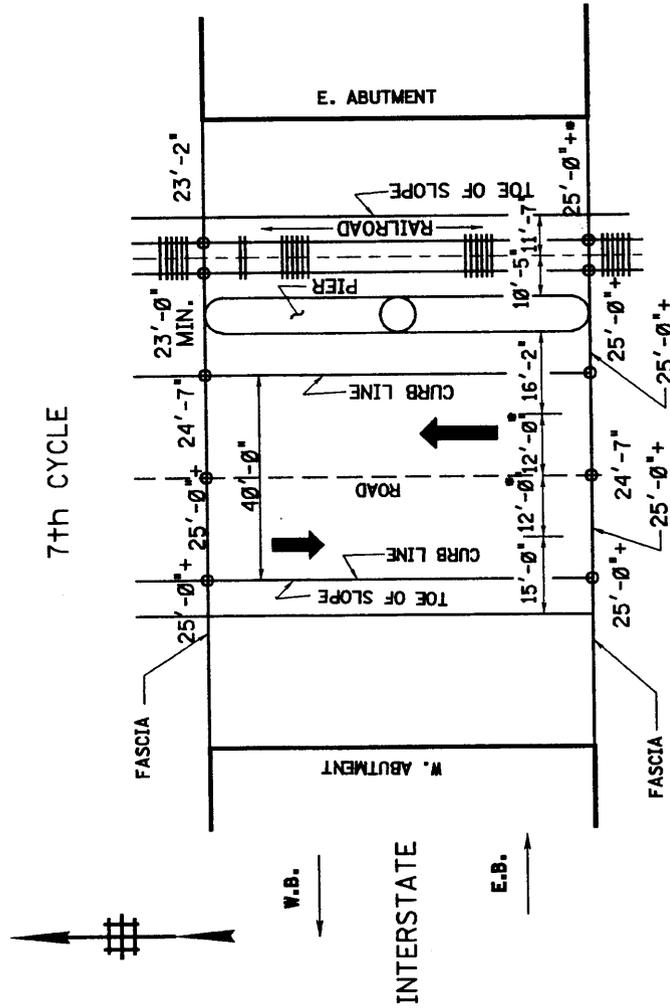
UNDERCLEARANCE

DIAGRAM

STRUCTURE NO.:  
DATE:

ROAD OVER INTERSTATE & RAILROAD

7th CYCLE



UNDERCLEARANCE

DIAGRAM

- ASSUMED 12'-0" LANES.  
NO DEFINED SHOULDERS EXISTED.

**SECTION 2**

**RAILROAD CARRYING BRIDGE EVALUATION PROGRAM**

**1.2.1 EVALUATION SURVEY REPORT FORMAT - AR -  
(FOR RAILROAD CARRYING BRIDGES)**

The report of the results of a Bridge survey and rating of an existing railroad bridge, performed by or for the Department, shall adhere to the following format:

- (A). **REPORT COVER SHEET:** The report's cover sheet shall include the bridge number, name, railroad milepost, route number, USRA. line code, municipality, county, bridge survey cycle number and the month and the year of the bridge survey (see attached sample).

The cover sheet colors for various cycles shall be: First cycle: White; Second cycle: Pink; Third cycle: Green; Fourth cycle: Yellow; Fifth cycle: Orange; Sixth cycle: Red; Seventh cycle: Blue; Eighth cycle: White; Ninth cycle: Pink; Tenth cycle: Green, etc.

The report shall be bound using a standard 3-hole punch type binding.

- (B). **LETTER OF TRANSMITTAL (CONSULTANT PROJECTS ONLY):** The letter of transmittal shall be addressed as follows (see attached sample):

Manager, Structural Evaluation  
New Jersey Department of Transportation  
1035 Parkway Avenue  
PO Box 615  
Trenton, New Jersey 08625-0600  
ATTN: Project Manager (Name)

Re: Bridge Survey and Rating of Bridge Number, Name, Railroad Milepost and Route Number

In addition, the letter should include the date of the agreement with the New Jersey Department of Transportation and any disclaimer and/or restrictions on the information contained in the report and its use and the due date for the submission of the particular report (preliminary or final). Also, include a Quality Assurance Statement for the structure.

- (C). **TABLE OF CONTENTS:** One page indicating items 1 thru 11 in order shown as follows and providing the page number in the report on which each item starts. All pages in the report shall be numbered (i.e. Cycle No.- Page No.) at the bottom and centered.

Page No.

1. Maps .....	
2. Structural Data .....	
3. Controlling Ratings.....	
4. Conclusions and Recommendations .....	
5. Historical Information.....	

- 6. Bridge Description.....
- 7. Appendix 1 - Structure Inventory & Appraisal Sheets .....
- 8. Appendix 2 - Computations .....
- 9. Appendix 3 - Drawings, Soundings and Photographs.....
- 10. Appendix 4 - Field Notes with CADD Sketches .....
- 11. Appendix 5 - Underwater Inspection Report/ Other Special Report if applicable .....

1. **Maps:** Two maps, are required: one "General Location Map" and the other, a more detailed and specific "Local Map". Each map shall be on a separate 8½ by 11 inches sheet and include the structure, name, railroad line, route number, railroad milepost and feature intersected (located in lower right corner).
  - a. **General Location Map:** For State owned bridges a map of the entire state of New Jersey, scale approximately 1: 1 000 000, pin pointing the location of the structure being reported on (by bridge number, name, railroad milepost and route number). This map should show railroad lines, with their USRA Line Code number and principal cities and/or towns along each line.
  - b. **Local Map:** A current map of the immediate vicinity of the reported structure; scaling 1: 20 000 with the structure centered on the page. Include roads, railroads, waterways, county and township names and a north arrow. Features intersecting the bridge should be clearly labeled.
  
2. **Structural Data:** A summary of findings shall be included as per the attached format. The items in this format are self-explanatory, however, further explanation for some items is provided as follows:
  - a. **Component/Material:** The components shall be as listed in Format "AR" only. Type of material used for majority of construction shall be given below the component in the same vertical column. Delete the components which are not applicable.
  - b. **Condition Rating:** The condition rating of various components shall be the overall rating of the component as per the current FHWA Recording and Coding Guide for the Structural Inventory and Appraisal of Bridges along with NJDOT Railroad Coding Instructions and should be consistent with the ratings given on field notes and SI&A sheet.
  - c. **General Remarks:** Summarize the significant defects and give a brief account of what was found during the bridge survey, as it relates to the structural integrity of the bridge. Defects for which repairs are recommended must be mentioned. Photos of these defects should be referenced in this section.

The Deck section should include the condition of the top and underside of the deck (concrete slab, ties and ballast plate), walkways, bridge railing, etc. For reinforced concrete decks give the percentage of spalled area (open or patched) and estimated contaminated area (underdeck).

The Superstructure section should include the condition of main load carrying members and diaphragms (include percent loss of section if any) and the bearings.

The Substructure section should include the condition of the abutments, pier(s), retaining walls, crash walls etc., and information on scour or undermining.

The terminology used throughout the evaluation bridge survey report for various elements shall be in accordance with the following:

Concrete: Describing concrete conditions shall be as defined and illustrated in the ACI Journal, November 1968, Report of ACI Committee 201 "Guide for Making a Condition Survey of Concrete in Service".

Steel: Describing steel conditions shall be as defined and illustrated in "Bridge Inspector's Training Manual 90" as published by the U.S. Department of Transportation, Federal Highway Administration.

Timber: Describing timber conditions shall be as defined in accordance with AREMA Chapter 7, Part 1.

The Safety Features section should include the adequacy of the guard rails, guard members, alignment of approach rail, field measured minimum clearances and where they occur (minimum vertical clearance above and below the bridge, and lateral underclearance left and right as per SI&A coding requirements and AREMA track clearances). For bridges over waterways, horizontal and vertical clearances of the waterway channel should also be given as per field measurements.

3. **Controlling Ratings:** In this section give the "As-Built" and "As-Inspected Ratings" of the controlling member and a speed restriction chart. The rating and chart shall be computed in accordance with the current "American Railway Engineering Association Manual for Railway Engineering", and all subsequent Interim AREMA Manual specifications, and as interpreted and modified in Subsection 1.2.5, "Rating of Existing Railroad Structures". Also, comment on why the ratings are low, if it is the case, and what controlled the ratings (e.g. bending, shear, horizontal shear, etc).
4. **Conclusions & Recommendations:** Conclusions resulting from the bridge evaluation survey regarding the adequacy (structural, clearances, etc.) of the bridge and any unusual or special conditions indicating higher expenditures required to uphold rail service on a given line should be given here. Also, include possible explanations of the causes of any inadequacies found.

Make specific recommendations for safety improvements, major repair work (i.e. structure rehabilitation and/or replacement), and other repair work to correct significant defects, deteriorations and inadequacies found during this bridge survey.

The recommendations should be specific about the location of defects and the methods of repair. The recommendations for other repair work should be listed in the order of priority. Each recommendation should be referenced to the photos. For major repair/ rehabilitation work, provide cost estimates, however, for other repair work, provide quantities only.

All recommendations along with repair and/or replacement shall be based on upgrading all members to a level where inventory ratings are sufficient to sustain the maximum anticipated loading condition (Equivalent Cooper E).

In addition, list all areas of deterioration or structural members which should be inspected at frequencies of less than two years and indicate the inspection cycle in months for each area or member. Be very specific about locations to be inspected.

5. **Historical Information:** If available, this information should include when and under what agency the structure was built; when and by whom any subsequent additions or improvements to the structure, trackline, waterway channels, clearances, track changes, etc. were made. A detailed description with reference to photographs and drawings if possible should be furnished for any of the above changes. Also include, if different from current designations, the railroad and branch in use when the bridge was built.
6. **Bridge Description:** Furnish a brief description of the structure. Include the type of construction, materials in the deck, superstructure and substructure components, and important dimensions. A more detailed description should be given if plans are not available.
7. **Appendix 1 - Structure Inventory & Appraisal Sheet:** This section should contain a 8½ by 11 inches computer print out of the "Structure Inventory and Appraisal Sheet" (two or more sheets for structures carrying railroads over highways). This sheet will be developed by the Department from the Computer Input sheets submitted with the preliminary report and coded in accordance with the current FHWA Recording and Coding Guide for the Inventory and Appraisal of the Nations Bridges and Recording and Coding Guide for the Structure Inventory and Appraisal of New Jersey Bridges and supplemented by the Railroad Coding Instructions. For the final report, include only the computer printout (supplied by the State).
8. **Appendix 2 - Computations:** In this section, include computations made in arriving at the various ratings given in Section 3 of the report. Include a summary as the first page of the computations listing all ratings with page number references and the allowable stresses used (see attached samples).

9. **Appendix 3 - Drawings, Soundings & Photographs:** A plan sketch indicating the direction and location of the photographs should be included. Bridge drawings (plan, elevation and cross section) etc. and color photographs (35mm prints) plus color slides of unique defects should be included in this section of the report. Also, sounding sketches completed in accordance with the current edition of the "Underwater Inspection and Evaluation of New Jersey Bridges Guidelines Manual " should be included.

Photographs of both full elevations and track views, upstream and downstream views (if applicable), all significant defects, any repairs made and any special equipment used (Cherry Picker, maintenance and protection of traffic, special ladders, etc.) should be included in the report. The photographs should be placed in the report in the following order: Elevations, Track Views, Stream Views, Deck, Approaches, Superstructure, Substructure, Channel, Safety Features and Special Equipment.

10. **Appendix 4 - Field Notes:** Detailed clear hand written field notes using the Department's current Field Note Format for the type of structure being surveyed and/or CADD field sketches should be included as back-up data for the report. Field notes should include measurements taken during the bridge survey. A sample of the current Field Note forms and CADD sketches can be obtained from the Structural Evaluation/Bridge Management Unit.
11. **Appendix 5 Underwater Inspection:** In this section, include the diver's inspection report (if applicable) done in accordance with the current edition of the "Underwater Inspection and Evaluation of New Jersey Bridges Guidelines Manual". Also, include as additional appendices any special reports such as fatigue analysis, ultrasonic testing, chemical analysis, coupon testing, hydraulic analysis, geotechnical streambed analysis, etc. Provide photographs showing the equipment used.

Sample - For State Bridges  
(Consultant Report Cover Sheet)

# NEW JERSEY DEPARTMENT OF TRANSPORTATION

## BRIDGE EVALUATION SURVEY REPORT OF THE

**Structure No. 1609-152**  
Boonton Line over Rt. 80  
RR MP 20.18  
Route 5080  
USRA Line Code 6101  
Wayne Township  
Passaic County

**CYCLE NO. 1**  
**AUGUST, 1996**

**XYZ ENGINEERS, INC.**  
100 Lincoln Place  
East Orange, New Jersey 07018

Sample Letter of Transmittal  
(Preliminary/Final Report)

Manager  
Structural Evaluation  
New Jersey Department of Transportation  
Engineering and Operations Building  
1035 Parkway Avenue  
PO Box 615- 5th Floor  
Trenton, New Jersey 08625-0600

Attn: Mr. \_\_\_\_\_, Project Manager

Evaluation Bridge  
Survey & Rating of  
Structure No.  
Route No.  
Structure Name

Gentlemen:

In accordance with our Agreement No. BI with the New Jersey Department of Transportation, dated , we are pleased to submit this PRELIMINARY REPORT/FINAL REPORT for the above referenced bridge. A scanned and indexed report will be submitted on CD by a separate transmittal.

The report covers the results of a field inspection of the structure and recommendations for repair or replacement of major defects found. The inspection was made according to generally recognized standards and procedures, but it is not implied that all defects were or could have been disclosed by this inspection.

The inspection findings and recommendations in this report were reviewed to ensure a proper level of quality and uniformity. The report adheres to State practices for inspections and current NJDOT standards.

Consultant XYZ

(FORMAT "AR")

**NEW JERSEY DEPARTMENT OF TRANSPORTATION  
STRUCTURAL EVALUATION UNIT  
EVALUATION BRIDGE SURVEY REPORT  
FOR RAILROAD CARRYING BRIDGES**

CYCLE NO. \_\_\_\_\_

**STRUCTURAL DATA**

Bridge No. \_\_\_\_\_ Year Built: \_\_\_\_\_  
Reconstr/Widening: \_\_\_\_\_

Route No. \_\_\_\_\_ RR Mile Post \_\_\_\_\_  
Length: \_\_\_\_\_ Width: \_\_\_\_\_

Name: \_\_\_\_\_ Date of This Eval.: \_\_\_\_\_

Line/Branch: \_\_\_\_\_ By: \_\_\_\_\_

USRA Line Code: \_\_\_\_\_ Date of FCM/Pin Hanger Inspection: \_\_\_\_\_

Structure Type: \_\_\_\_\_ By: \_\_\_\_\_  
(Only when special inspections are applicable)

\_\_\_\_\_ Municipality: \_\_\_\_\_

\_\_\_\_\_ County: \_\_\_\_\_

Special Equipment Used: \_\_\_\_\_  
(Include Photo)

Date of Underwater Insp: \_\_\_\_\_

Date of Special Testing: \_\_\_\_\_

Date of Electr./Mech. Insp.: \_\_\_\_\_  
(Movable Bridges Only)

**Overall Condition:** \_\_\_\_\_

Component/ Material	Cond. Rating	General Remarks
DEC		

Component/ Material	Cond. Rating	General Remarks
------------------------	-----------------	-----------------

APPROACHES  
(Condition of Rail & Track Bed)

---

SUPERSTRUCTURE

---

SUBSTRUCTURE

---

CHANNEL/  
WATERWAY

---

RAILROAD  
SAFETY  
FEATURES

---

The minimum vertical underclearance is \_\_\_\_\_ under \_\_\_\_\_.

The lateral clearances are:                      Left \_\_\_\_\_      Right \_\_\_\_\_.

For waterways include horizontal and vertical clearances of the main channel span.

**CONTROLLING RATINGS**

Controlling Member	As Built	As Inspected	Remarks
End Floorbeam	Inventory Ratings		
Interior Stringer	Operating Ratings		

Controlling Live Load

Equivalent Cooper E

**CONCLUSIONS AND RECOMMENDATIONS:**

The overall condition of the structure is \_\_\_\_\_ due to \_\_\_\_\_.

((Give a brief description and location of the fracture members or pin-hanger details (specify when FCM's are internally redundant - i.e., riveted)).

**A. If the bridge does not meet current geometry and/or load standards - Major work required:**

Due to the condition of the \_\_\_\_\_ and/or inadequate \_\_\_\_\_, we recommend the following repairs and/or remedial action:

(List recommendations for major repair work with quantities and cost estimates)  
In the interim, until the structure is replaced/widened/lengthened/raised/etc., the following repairs/rehabilitation should be made to retard further deterioration, preserve the structural integrity of the bridge, improve safety and extend its useful life:

(List recommendations for interim repair work with quantities only)

Or if the primary recommendation (major work) is for rehabilitation only:

We also recommend that the following interim repairs be made, until the rehabilitation is implemented, to retard further deterioration, preserve the structural integrity of the bridge, improve safety and extend its useful life:

(List recommendations for interim repair work with quantities only)

**B. If the bridge meets current geometry and load standards - No major work required.**

We recommend that the following repairs be made to retard further deterioration, preserve the structural integrity of the bridge, improve safety and extend its useful life:

(List recommendations for other repair work with quantities only)

Note: The following area(s) or structural member(s) should be inspected on an interim basis at the frequency indicated:

- A.
- B.
- C.

Route: \_\_\_\_\_ Project: BR/BR-Z-NBIS (XXX)

Made By: \_\_\_\_\_ Date: \_\_\_\_\_ Checked By: \_\_\_\_\_ Date: \_\_\_\_\_

### **SUMMARY OF RATING**

The ratings, computed in the \_\_\_\_\_ and updated in the \_\_\_\_\_ cycle report in accordance with the Current AREMA Manual as modified by the New Jersey Department of Transportation in the current Design Manual for Bridges and Structures:

#### **Allowable Stresses - MPa (psi)**

<b><u>Material</u></b>	<b><u>Yield</u></b>	<b><u>Inventory</u></b>	<b><u>Operating</u></b>
Concrete	XX ( $f'_c$ )	XX	XX
Reinforcing Steel	XX	XX	XX
Structural Steel	XX	XX	XX

(The summary of all ratings shall be listed in accordance with the following charts).









**1.2.2 RE-EVALUATION SURVEY REPORT FORMAT - BR -  
(FOR RAILROAD CARRYING BRIDGES)**

The report of the results of a re-evaluation Bridge survey and rating of an existing railroad bridge, performed by or for the Department, shall adhere to the following format:

- (A). **REPORT COVER SHEET:** The report's cover sheet shall utilize the same form as indicated in Format AR (see attached sample in Format BR).

The cover sheet colors shall be the same as specified under Format AR.

The report shall be bound using a standard 3-hole punch type binding.

- (B). **LETTER OF TRANSMITTAL (CONSULTANT PROJECTS ONLY):** The letter of transmittal shall be addressed as shown in Format AR (see sample in Format AR):

- (C). **TABLE OF CONTENTS:** One page indicating items 1 thru 9 in order shown as follows and providing the page number in the report on which each item starts. All pages in the report shall be numbered (i.e. Cycle No.- Page No.) at the bottom and centered.

Page No.

1. Maps .....	
2. Structural Data .....	
3. Controlling Ratings .....	
4. Conclusions and Recommendations .....	
5. Appendix 1 - Structure Inventory & Appraisal Sheets .....	
6. Appendix 2 - Computations .....	
7. Appendix 3 - Drawings, Soundings and Photographs .....	
8. Appendix 4 - Field Notes with CADD Sketches .....	
9. Appendix 5 - Underwater Inspection Report/ Other Special Report if applicable .....	

1. **Maps:** Two maps, are required as specified in Format AR. If the previous bridge survey report contains up-to-date General Location and Local Maps done to the required specifications, no maps are required.
2. **Structural Data:** A summary of findings and work done shall be included as indicated in Format AR.
3. **Controlling Ratings:** The ratings shall be provided as indicated in Format AR (give reference to the bridge survey report cycle where the detailed rating computations were made if not calculated in the current cycle report).

4. **Conclusions & Recommendations:** Conclusions shall be provided as indicated in Format AR. Also, comment on any major changes in the condition of all components since the previous bridge survey report. If no changes have occurred, include a statement to that effect.
5. **Appendix 1 - Structure Inventory & Appraisal Sheet:** This section should contain the above listed data form as indicated in Format AR.
6. **Appendix 2 - Computations:** In this section, include computations of ratings for various major bridge components as indicated in Format AR (see samples in Format AR).
7. **Appendix 3 - Drawings, Soundings & Photographs:** This section shall contain bridge drawings, sounding sketches, photo location plan sketch and photographs as indicated in Format AR.
8. **Appendix 4 - Field Notes:** Provide field notes or CADD sketches as specified in Format AR in this section.
9. **Appendix 5 - Underwater Inspection:** In this section, include the diver's inspection report (if applicable) or other additional appendices as specified in Format AR.

Sample - For State Bridges  
(Consultant Report Cover Sheet)

## NEW JERSEY DEPARTMENT OF TRANSPORTATION

### BRIDGE RE-EVALUATION SURVEY REPORT OF THE

Structure No. 1609-152  
Boonton Line over Rt. 80  
RR MP 20.18  
Route 5080  
USRA Line Code 6101  
Wayne Township  
Passaic County

CYCLE NO. 2  
AUGUST, 1996

XYZ ENGINEERS, INC.  
100 Lincoln Place  
East Orange, New Jersey 07018

**(FORMAT "BR")**  
**NEW JERSEY DEPARTMENT OF TRANSPORTATION**  
**STRUCTURAL EVALUATION UNIT**  
**RE-EVALUATION BRIDGE SURVEY REPORT**  
**FOR RAILROAD CARRYING BRIDGES**

CYCLE NO. \_\_\_\_\_

**STRUCTURAL DATA**

Bridge No. \_\_\_\_\_ Year Built: \_\_\_\_\_ Reconstr/Widening: \_\_\_\_\_

Route No. \_\_\_\_\_ RR Mile Post \_\_\_\_\_ Length: \_\_\_\_\_ Width: \_\_\_\_\_

Name: \_\_\_\_\_ Date of This Eval.: \_\_\_\_\_

Line/Branch: \_\_\_\_\_ By: \_\_\_\_\_

Date of FCM/Pin Hanger Inspection: \_\_\_\_\_

By: \_\_\_\_\_

(Only when special inspections are applicable)

USRA Line Code: \_\_\_\_\_ Date of Prev. Eval.: \_\_\_\_\_

Structure Type: \_\_\_\_\_ By: \_\_\_\_\_

\_\_\_\_\_ Special Equipment Used: \_\_\_\_\_  
(Include Photo)

\_\_\_\_\_ Date of Underwater Insp: \_\_\_\_\_

\_\_\_\_\_ Date of Special Testing: \_\_\_\_\_

\_\_\_\_\_ Date of Electr./Mech. Insp.: \_\_\_\_\_  
(Movable Bridges Only)

**Overall Condition:** \_\_\_\_\_

**Work Done:** \_\_\_\_\_

Component/ Material	Cond. Rating	General Remarks
DECK/		
APPROACHES (Condition of Rail & Track Bed)		
SUPERSTRUCTURE		
SUBSTRUCTURE		
CHANNEL/ WATERWAY		
RAILROAD SAFETY FEATURES		

The minimum vertical underclearance is \_\_\_\_\_ under \_\_\_\_\_

The lateral clearances are: Left: \_\_\_\_\_ Right: \_\_\_\_\_

For waterways include horizontal and vertical clearances of the main channel span.

**CONTROLLING RATINGS** (From \_\_\_\_\_ Cycle Report):

<u>Controlling Member</u>	<u>As Built</u>	<u>As Inspected</u>	<u>Remarks</u>
End Floorbeam	Inventory Ratings		
Interior Stringer	Operating Ratings		
	<u>Controlling Live Load</u>	<u>Equivalent Cooper E</u>	

**CONCLUSIONS AND RECOMMENDATIONS:**

For an explanation of the requirements for this section, refer to Format AR.

Since the previous inspection, \_\_\_\_\_  
(Give brief description of the significant changes in the condition of the various components. Do not include work done in this section).

((Give a brief description and location of the fracture critical members or pin hanger details (specify when FCM's are internally redundant i.e., riveted)).

Note: The following area(s) or structural member(s) should be inspected on an interim basis at the frequency indicated:

A.

B.

C.

### 1.2.3 RE-EVALUATION SURVEY REPORT FORMAT - CR - (FOR RAILROAD CARRYING BRIDGES)

The report of the results of a re-evaluation bridge survey and rating of an existing railroad bridge, performed by or for the Department, shall adhere to the following format:

- (A). **REPORT COVER SHEET:** The report's cover sheet shall include utilize the same form as indicated in Format AR (see attached sample in Format BR).

The cover sheet colors shall be the same as specified under Format AR.

The report shall be bound using a standard 3-hole punch type binding.

- B). **LETTER OF TRANSMITTAL (CONSULTANT PROJECTS ONLY):** The letter of transmittal shall be addressed as shown in Format AR (see sample in Format AR).

- (C). **TABLE OF CONTENTS:** Provide a table of contents sheet as specified under Format BR.

1. **Maps:** Two maps, are required as specified in Format AR. If the previous bridge survey report contains up-to-date General Location and Local Maps done to the required specifications, no maps are required.

2. **Structural Data:** A summary of findings and work done since the previous bridge survey shall be included as indicated in Format AR.

3. **Controlling Ratings:** The ratings shall be provided as indicated in Format AR (give reference to the bridge survey report cycle where the detailed rating computations were made if not calculated in the current cycle report).

4. **Conclusions & Recommendations:** State the overall condition of the structure (consistent with SI&A Item 67) and include a paragraph summarizing the conditions of the various components to be coded as they are. For large or complex structures, it may be necessary to include one paragraph for each component rather than one long paragraph. If an underwater diver inspection has been conducted and no repairable defects were discovered, the underwater inspection should be noted here. If repairable defects were discovered by the diver, appropriate remedial repairs should be included in the report.

Conclusions shall be provided as indicated in Format AR. Also, comment on any major changes in the condition of all components since the previous bridge survey report cycle. If no changes have occurred, include a statement to that effect.

5. **Appendix 1 - Structure Inventory & Appraisal Sheet:** This section should contain the above listed data form as indicated in Format AR.
6. **Appendix 2 - Computations:** In this section, include computations of ratings for various major bridge components as indicated in Format AR (see samples in Format AR).

7. **Appendix 3 - Drawings, Soundings & Photographs:** This section shall contain bridge drawings, sounding sketches, photo location plan sketch and photographs as indicated in Format AR.
8. **Appendix 4 - Field Notes:** Provide field notes or CADD sketches as specified in Format AR in this section.
9. **Appendix 5 - Underwater Inspection:** In this section, include the diver's inspection report (if applicable) or other additional appendices as specified in Format AR.

(FORMAT "CR")

NEW JERSEY DEPARTMENT OF TRANSPORTATION  
STRUCTURAL EVALUATION UNIT  
RE-EVALUATION BRIDGE SURVEY REPORT  
FOR RAILROAD CARRYING BRIDGES

CYCLE NO. \_\_\_\_\_

**STRUCTURAL DATA**

Bridge No. \_\_\_\_\_ Year Built: \_\_\_\_\_ Reconstr/Widening: \_\_\_\_\_

Route No. \_\_\_\_\_ RR Mile Post \_\_\_\_\_ Length: \_\_\_\_\_ Width: \_\_\_\_\_

Name: \_\_\_\_\_ Date of This Eval.: \_\_\_\_\_

Line/Branch: \_\_\_\_\_ By: \_\_\_\_\_

Date of FCM/Pin Hanger Inspection: \_\_\_\_\_

By: \_\_\_\_\_

(Only when special inspections are applicable)

USRA Line Code: \_\_\_\_\_ Date of Prev. Eval.: \_\_\_\_\_

Structure Type: \_\_\_\_\_ By: \_\_\_\_\_

\_\_\_\_\_ Special Equipment Used: \_\_\_\_\_  
(Include Photo)

\_\_\_\_\_ Date of Underwater Insp: \_\_\_\_\_

\_\_\_\_\_ Date of Special Testing: \_\_\_\_\_

\_\_\_\_\_ Date of Electr./Mech. Insp.: \_\_\_\_\_  
(Movable Bridges Only)

Overall Condition: \_\_\_\_\_

Work Done: \_\_\_\_\_

**CONTROLLING RATINGS** (see Format BR for the requirements of this section)

**CONCLUSIONS AND RECOMMENDATIONS:**

The overall condition of the structure is \_\_\_\_\_ due to \_\_\_\_\_.  
The deck is in \_\_\_\_\_ condition due to \_\_\_\_\_. The approaches are  
in \_\_\_\_\_ condition due to \_\_\_\_\_. The superstructure is in \_\_\_\_\_  
condition due to \_\_\_\_\_. The substructure is in \_\_\_\_\_  
condition due to \_\_\_\_\_. (List the significant defects which are the main reasons for  
the condition ratings of the above structural elements. If an element has no significant defects;  
i.e., coded 6 or higher, it should be deleted from the above).

Since the previous inspection, \_\_\_\_\_  
(Give brief description of significant changes in the condition of the various components.  
Do not include work done in this section.)

((Give a brief description and location of the fracture critical members or pin hanger details  
(specify when FCM's are internally redundant - i.e., riveted)).

For an explanation of the requirements for this section, refer to Format AR.

Note: The following area(s) or structural member(s) should be inspected on an interim basis at  
the frequency indicated:

- A.
- B.
- C.

**1.2.4 INTERIM SURVEY REPORT FORMAT - DR -  
(FOR RAILROAD CARRYING BRIDGES)**

The report of the results of an interim bridge survey and rating of an existing railroad bridge, performed by or for the Department, shall adhere to the following format:

- (A). **REPORT COVER SHEET:** The report's cover sheet shall utilize the same form as indicated in Format AR (see attached sample in Format DR).

The report shall be bound using a standard 3-hole punch type binding.

- (B). **LETTER OF TRANSMITTAL (CONSULTANT PROJECTS ONLY):** The letter of transmittal shall be addressed as shown in Format AR (see sample in Format AR):

- (C). **TABLE OF CONTENTS:** One page indicating items 1 thru 8 in order shown as follows and providing the page number in the report on which each item starts. All pages in the report shall be numbered at the bottom and centered.

Page No.

1. Structural Data .....	
2. Controlling Ratings.....	
3. Reason for Interim Survey.....	
4. Current Condition.....	
5. Conclusions and Recommendations .....	
6. Appendix 1 - Structure Inventory & Appraisal Sheets .....	
7. Appendix 2 - Computations .....	
8. Appendix 3 - Drawings, Soundings and Photographs.....	

1. **Structural Data:** A summary of findings and work done shall be included as per the attached format. The items in this format are self-explanatory.
2. **Controlling Ratings:** The ratings should include the controlling member and controlling Inventory and Operating Ratings of the bridge and include a speed restriction chart (if applicable), as per Subsection 1.2.5, "Rating of Existing Railroad Structures".
3. **Reasons for Interim Survey:** Indicate specifically the areas or members of the bridge requiring an interim inspection. These areas could be locations of deterioration such as loss of concrete under a bearing or a tilted wingwall. They also could be structure members with low operating ratings (List all members with low operating ratings) or fracture critical members.
4. **Current Condition:** Indicate the current condition of the items identified in the previous section. Also, state if any changes have occurred since the last survey (in-depth or interim).

5. **Conclusions & Recommendations:** Conclusions resulting from the interim bridge evaluation survey regarding the items inspected should be given here. Also, include possible explanation of the causes of any inadequacies found.

Make specific new recommendations for safety improvements, major repair work (i.e. structure rehabilitation and/or replacement), and other repair work to correct significant defects, deteriorations and inadequacies found during this interim bridge survey. The intent is to list any new repairs which are needed, not to repeat the recommendations from the latest bridge evaluation survey report. If no new repairs are necessary, this should be stated.

The recommendations should be specific about the location of defects and the methods of repair. The recommendations for other repair work should be listed in the order of priority. Each recommendation should be referenced to the photos. For major repair work, provide cost estimates. For other repair work, provide quantities only.

6. **Appendix 1 - Structure Inventory & Appraisal Sheet:** This section should contain the above listed data form as indicated in Format AR.
7. **Appendix 2 - Computations:** In this section, include computations of ratings for various major bridge components as indicated in Format AR.
8. **Appendix 3 - Drawings, Soundings & Photographs:** This section shall contain bridge drawings, sounding sketches, photo location plan sketch and photographs as indicated in Format AR. If approved by the project manager, only one copy of the interim survey report may be required to have original photographs with the remaining copies black-and-white photocopies.

**Sample - For State Bridges  
(Consultant Report Cover Sheet)**

**NEW JERSEY DEPARTMENT OF  
TRANSPORTATION**

**INTERIM BRIDGE SURVEY REPORT  
OF THE**

**Structure No. 1609-152  
Boonton Line over Rt. 80  
RR MP 20.18  
Route 5080  
USRA Line Code 6101  
Wayne Township  
Passaic County**

**AUGUST, 1996**

**XYZ ENGINEERS, INC.  
100 Lincoln Place  
East Orange, New Jersey 07018**

(FORMAT "DR")

NEW JERSEY DEPARTMENT OF TRANSPORTATION  
STRUCTURAL EVALUATION UNIT  
INTERIM BRIDGE SURVEY REPORT FOR RAILROAD CARRYING  
BRIDGES

FREQUENCY: \_\_\_\_\_ MONTHS

**STRUCTURAL DATA**

Bridge No. \_\_\_\_\_ Year Built: \_\_\_\_\_

Route No. \_\_\_\_\_ RR Mile Post \_\_\_\_\_

Length: \_\_\_\_\_ Width: \_\_\_\_\_

Name: \_\_\_\_\_ Date of This Eval: \_\_\_\_\_

Line/Branch: \_\_\_\_\_ By: \_\_\_\_\_

USRA Line Code: \_\_\_\_\_ \*Date of Previous Interim Survey: \_\_\_\_\_

Structure Type: \_\_\_\_\_ \*By: \_\_\_\_\_

Date of Last Routine Eval: \_\_\_\_\_

By: \_\_\_\_\_

Special Equipment: \_\_\_\_\_  
(Include Photos)

Overall Condition: \_\_\_\_\_

**Work Done:**

**Reason for Interim Survey:**

**Current Condition or changes in items inspected:**

\* Use only if there was another interim survey after the last routine survey.

**CONCLUSIONS AND RECOMMENDATIONS:**

We recommend that the following repairs or rehabilitation be made to retard further deterioration, preserve the structural integrity of the bridge, improve safety and extend its useful life:

In addition to any recommendations noted here, all of the recommendations from the previous reports (routine or interim) are still in effect if not already completed.

Next interim inspection is recommended at \_\_\_\_\_ intervals.

## **1.2.5 RATING OF EXISTING RAILROAD STRUCTURES**

The following instructions shall be incorporated with the current A.R.E.M.A. Manual for the above subject.

### **A. Steel and Concrete Structures**

1. In rating railroad structures use 0.55fy for inventory (design stress) in all types of steel and wrought iron. Use 0.8fy for operating (rating stress) for A36, A7, open hearth steel, and wrought iron according to A.R.E.M.A. 7.3.4.3, Chapter 15; for other steel refer to A.R.E.M.A. 7.3.4.3, Chapter 15, for permissible operating (rating) stresses only.
2. Bridge ratings (inventory and operating) will be in terms of Cooper E loadings.
3. In rating existing concrete structures use the allowable service load stresses for inventory (design stresses) according to A.R.E.M.A. Chapter 8, Section 2.26, Page 8-2-29. Use the permissible unit stresses for operating (rating stresses according to A.R.E.M.A. Chapter 8, Page 8-19-4).
4. Structure members shall be rated for as-built and as-inspected condition using one of the Cooper E series in accordance with A.R.E.M.A.
5. For each controlling member equivalent Cooper E loads shall be computed for each live load shown in the attachment.
6. When any of the NJ Transit loads (1 thru 5) are applied at normal operating speed, and Conrail's anticipated freight load, load 6 applied at 40 mph, is greater in terms of Cooper E loading than a specific member's Cooper E Inventory rating, the speed restrictions must be introduced (see A.R.E.M.A. Chapter 15, 7.3.3.3., for steel; and Chapter 8, Part 19, for concrete).
  - a. When the equivalent Cooper E for specific loading is greater than the Cooper E inventory rating of the structure with impact computed at 10mph, then 93% of the Cooper E operating rating of the structure will control (with impact computed at 10 mph) and no other trains except for the specific loading shall be allowed on the structure at the same time with a maximum speed of 10 mph.
  - b. If the equivalent Cooper E for a specific loading at 10 mph exceeds 93% of the operating rating of the structure, then the loading shall be restricted from the structure until the structure can be rehabilitated to a satisfactory capacity rating.
7. All recommendations for rehabilitating the structure shall be based on upgrading all member's inventory ratings to a level sufficient to sustain the maximum anticipated loading condition (Equivalent Cooper E).
8. When the equivalent Cooper E load for a specific loading is greater than the controlling members equivalent Cooper E load rated for "REGULARLY ASSIGNED LOCOMOTIVES", the loading shall be restricted to 10 mph.

9. When speed restrictions are required, a speed chart shall be made for the controlling member's Cooper E inventory rating. The speed chart shall range as follows:

Steel: from the equivalent Cooper E load at 60 mph for load 1 thru 5, and 40 mph for load 5, to the equivalent Cooper E load at 10 mph.

Concrete: from the equivalent Cooper E load at 40 mph for all loads, to an equivalent Cooper E load 10 mph.

## B. Timber Structures

1. Rating of wood structures shall be done in accordance with A.R.E.M.A. Chapter 7, Page 7-2-23.
2. Structure members shall be rated using one of the Cooper E Series.
3. In accordance with Chapter 7, Page 7-2-24, when the support under a rail consists of three or more stringers assembled as a chord or acting in unison and extending over two spans with staggered joints, a partially continuous beam action may be assumed to exist and the computations may be made for stringers based on the average stress as determined from single beam analysis and that for a fully continuous condition.
4. When analyzing notched beams the average live load and reaction as found from above shall be used and the allowable end reaction shall be computed using the formula in Chapter 7, Section E, Art. 4, Page 7-2-16.
5. The permissible unit stresses for rating shall be in accordance with Chapter 7, Art. 13, Page 7-2-25.
6. Structure members shall be rated for "LOCOMOTIVES NOT REGULARLY ASSIGNED" and for "REGULARLY ASSIGNED LOCOMOTIVES", and shall be in terms of equivalent Cooper E loads.
7. For each controlling member, equivalent Cooper E loads shall be made for each live load shown in the attachment.
8. When the equivalent Cooper E load for a specific loading is greater than the controlling members equivalent Cooper E load rated for "REGULARLY ASSIGNED LOCOMOTIVES", the loading shall be restricted to 10 mph.
9. When the equivalent Cooper E load for a specific loading is greater than the controlling members equivalent Cooper E load rated for "NOT REGULARLY ASSIGNED LOCOMOTIVES", the "K" coefficient shall not be increased to 15% as stated in A.R.E.A. Chapter 7, Art. 13, page 7-2-25 and the loading shall be restricted from the structure until the structure can be rehabilitated to a satisfactory capacity rating.

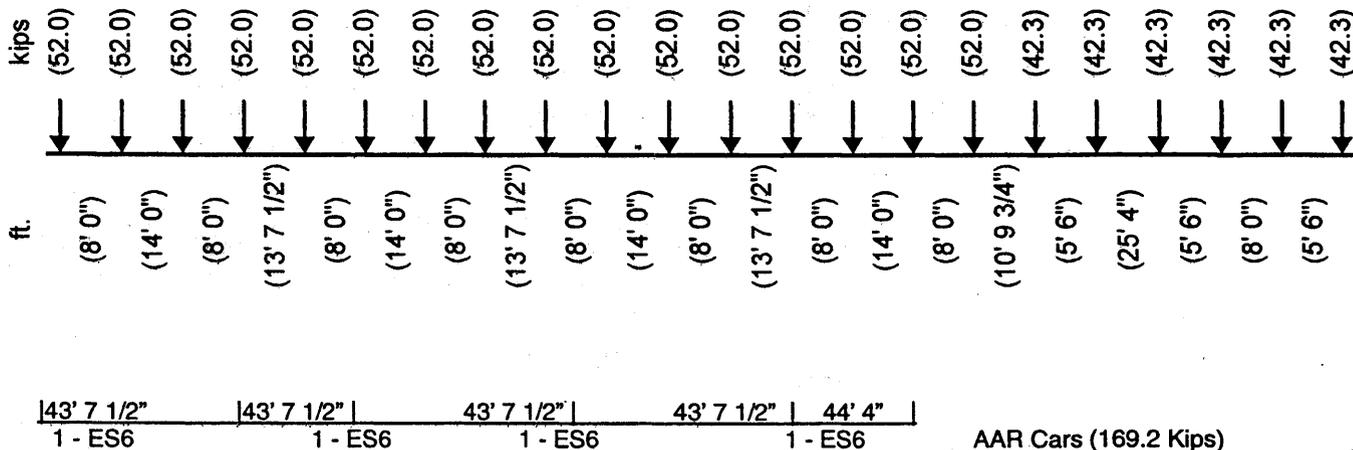
The following Tables are provided in English and Metric units.

**MOMENT AND SHEAR TABLE**

**4 ES6 DIESELS COUPLED TO AAR CARS**

**LOAD 1**

SPAN feet	BENDING ft-kips	END SHEAR kips	FLOOR BEAM REACTION kips
8	104.00	55.52	55.52
10	130.00	62.40	69.80
12	156.00	69.33	79.31
13	170.93	72.00	82.97
14	191.20	74.29	87.62
15	211.59	76.27	93.06
16	234.00	78.00	97.82
18	286.75	82.25	105.75
20	350.08	88.83	112.10
25	513.52	104.90	132.31
30	720.51	115.62	155.53
35	909.45	124.60	175.11
40	1,120.95	132.60	197.55
45	1,353.16	144.22	221.25
50	1,653.91	157.70	245.40
60	2,333.01	180.23	290.30
70	3,064.51	205.24	338.32
80	3,951.05	229.16	384.67
90	4,978.17	252.46	432.62
100	6,134.89	277.27	479.84
120	8,709.13	325.27	561.23
140	11,841.20	372.92	637.47
160	15,386.66	420.60	712.16
180	19,467.94	468.08	785.28
200	23,991.78	512.94	854.94
225	29,753.54	563.29	939.53
250	36,388.54	616.07	1,023.29
275	43,174.78	669.76	1,098.19
300	50,698.08	720.24	1,160.61
350	67,114.30	821.96	1,258.69
400	85,493.60	922.42	1,332.26

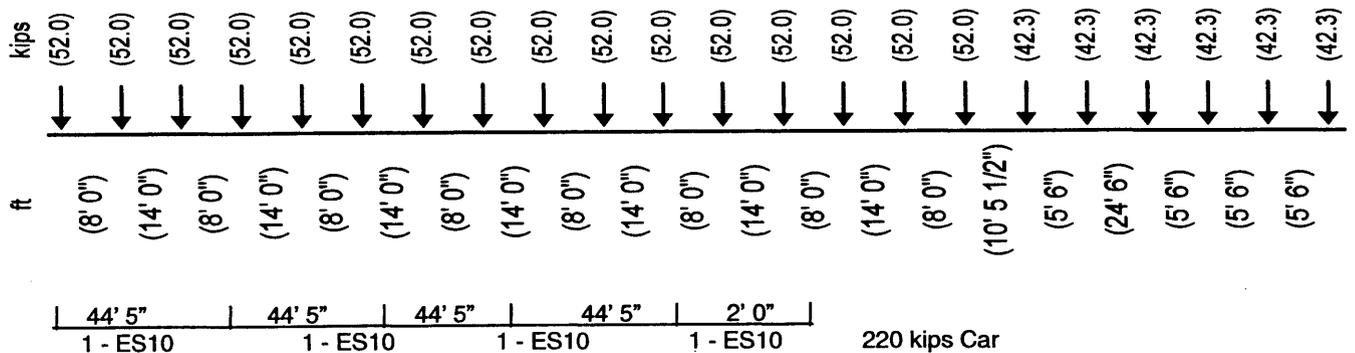


**MOMENT AND SHEAR TABLE**

**LOAD 2**

**4 ES10 DIESELS COUPLED TO 220 KIPS CARS**

SPAN ft.	BENDING ft-kips	END SHEAR kips	FLOOR	BEAM REACTION kips
8	124.20	72.19		82.50
10	155.25	79.75		99.00
12	196.18	84.79		110.00
13	222.25	90.96		118.46
14	248.60	96.25		125.71
15	289.06	100.83		132.00
16	330.29	104.84		137.50
18	412.75	113.06		146.67
20	495.23	123.75		154.00
25	738.24	143.00		167.20
30	1,009.36	155.83		189.55
35	1,265.00	165.00		213.67
40	1,540.00	171.88		237.32
45	1,815.00	182.10		263.69
50	2,090.00	198.54		291.79
60	2,843.25	225.18		344.88
70	3,739.25	254.19		400.08
80	4,746.41	282.74		454.96
90	5,933.08	310.20		509.56
100	7,294.83	339.63		565.85
120	10,346.50	395.75		672.06
140	14,002.66	451.80		775.05
160	18,198.22	507.49		876.32
180	22,930.08	563.22		977.56
200	28,292.49	617.26		1,077.43
225	35,386.55	676.74		1,203.67
250	43,632.59	741.42		1,314.67
275	52,323.96	805.20		1,405.48
300	61,971.46	869.66		1,481.15
350	83,347.80	1,003.79		1,600.07
400	107,743.43	1,137.01		1,689.27

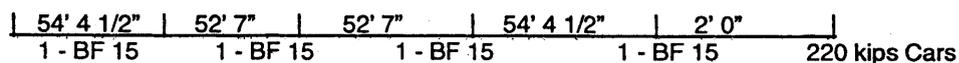
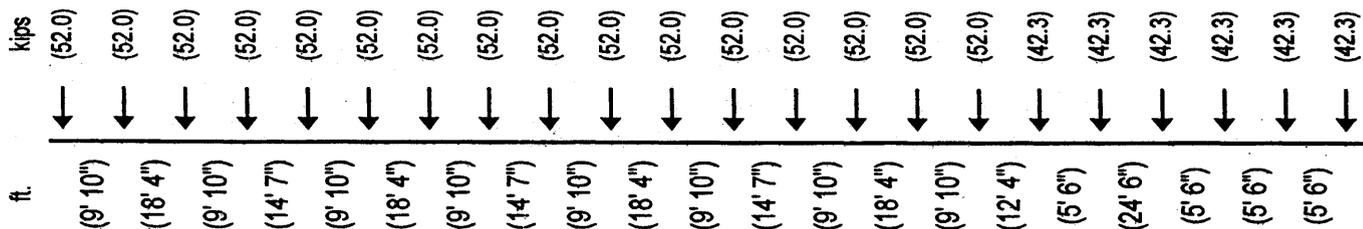


**MOMENT AND SHEAR TABLE**

**LOAD 3**

**4-BF 15 DIESELS COUPLED TO 220 KIPS CARS**

SPAN ft.	BENDING ft-kips	END SHEAR kips	FLOOR BEAM REACTION kips
8	136.00	72.19	82.50
10	170.00	79.75	99.00
12	204.00	84.79	110.00
13	222.25	90.96	118.46
14	248.60	96.25	125.71
15	289.06	100.83	132.00
16	330.29	104.84	137.50
18	412.75	113.06	146.67
20	495.23	123.75	154.00
25	738.24	143.00	167.20
30	1,009.36	155.83	176.00
35	1,265.00	165.00	190.14
40	1,540.00	171.88	212.49
45	1,815.00	180.89	238.33
50	2,090.00	193.05	268.40
60	2,640.00	221.83	330.00
70	3,327.50	253.00	377.14
80	4,249.82	276.38	420.75
90	5,362.50	298.53	473.31
100	6,710.00	325.88	532.40
120	9,900.00	380.87	629.98
140	13,200.00	430.37	731.23
160	16,830.00	485.37	831.63
180	21,298.75	534.87	929.59
200	26,620.00	589.88	1,024.63
225	33,495.00	652.54	1,149.16
250	40,947.50	717.26	1,265.00
275	49,354.27	780.85	1,365.09
300	53,600.16	844.89	1,448.50
350	79,233.59	971.01	1,579.57
400	102,462.96	1,096.34	1,677.87

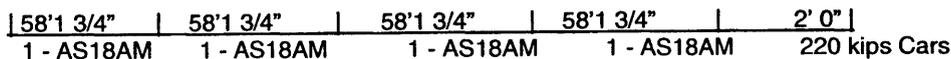
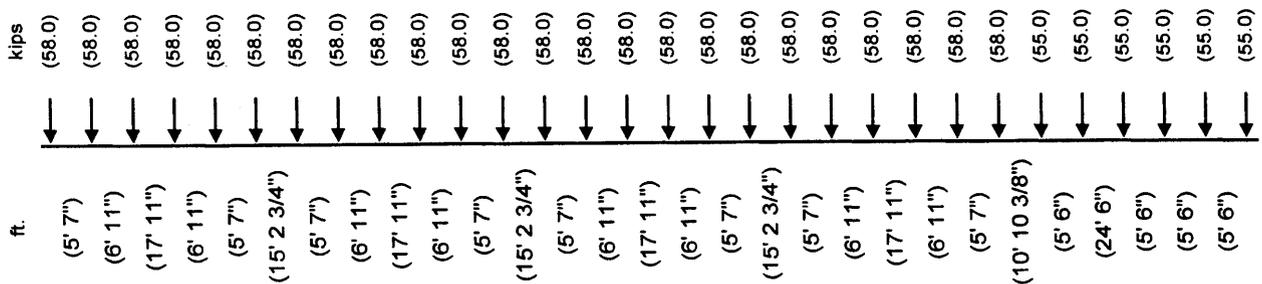


**MOMENT AND SHEAR TABLE**

**LOAD 4**

**4—AS18AM DIESELS COUPLED TO 220 KIPS CARS**

SPAN ft	BENDING ft-kips	END SHEAR kips	FLOOR BEAM REACTION kips
8	116.00	75.55	83.38
10	150.75	83.64	101.50
12	204.99	89.03	113.58
13	232.54	93.34	118.46
14	260.30	99.10	125.71
15	290.58	104.90	132.00
16	334.04	108.46	137.50
18	420.98	115.74	146.67
20	507.93	123.75	156.71
25	738.24	143.00	182.17
30	1,009.36	155.83	199.45
35	1,265.00	169.76	225.18
40	1,567.13	184.04	251.93
45	1,922.13	195.15	281.04
50	2,277.13	208.00	310.24
60	2,991.69	233.60	368.14
70	3,940.65	265.66	428.08
80	5,038.55	293.94	488.79
90	6,323.45	326.70	544.72
100	7,756.12	357.23	603.66
120	11,044.18	415.49	722.97
140	14,982.75	475.05	834.91
160	19,551.73	536.29	942.32
180	24,512.55	595.69	1,051.66
200	30,183.20	655.24	1,154.55
225	38,162.61	730.11	1,279.14
250	47,095.20	804.54	1,396.95
275	56,497.58	867.97	1,496.50
300	66,731.53	939.41	1,579.46
350	89,794.20	1,076.70	1,709.82
400	115,455.43	1,214.54	1,807.59

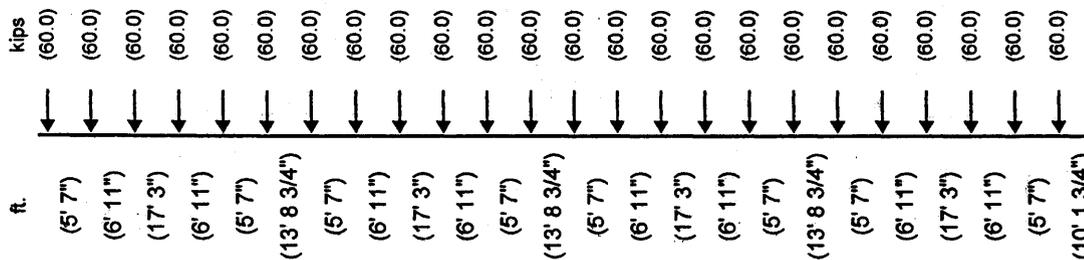


**MOMENT AND SHEAR TABLE**

**LOAD 5**

**4-AS16A DIESELS COUPLED TO 220 KIPS CARS**

SPAN	BENDING ft-kips	END SHEAR kips	FLOOR BEAM REACTION kips
8	120.00	78.15	86.25
10	155.95	86.52	105.00
12	212.06	92.10	117.50
13	240.56	96.55	122.31
14	269.28	102.51	126.43
15	300.60	107.68	132.00
16	345.56	112.20	137.50
18	435.50	119.73	151.14
20	525.45	125.76	165.03
25	750.36	143.00	190.02
30	1,009.36	158.17	209.05
35	1,287.80	177.01	236.40
40	1,650.80	191.13	269.34
45	2,012.80	205.08	299.41
50	2,375.30	220.57	331.43
60	3,135.70	247.83	393.71
70	4,137.00	279.81	457.44
80	5,386.80	313.31	523.92
90	6,736.80	348.22	583.44
100	8,285.65	379.04	647.92
120	11,811.45	440.45	776.41
140	16,010.40	506.32	890.05
160	20,956.80	571.42	1,000.12
180	26,254.80	633.66	1,109.53
200	32,395.80	699.85	1,211.89
225	40,895.24	776.36	1,335.15
250	50,459.45	853.53	1,450.15
275	60,249.39	923.22	1,549.22
300	71,051.85	996.13	1,631.79
350	94,882.88	1,140.10	1,761.53
400	121,189.25	1,281.81	1,858.84



55' 11 3/4" | 55' 11 3/4" | 55' 11 3/4" | 55' 11 3/4" | 12.80(2'0")  
 1 - AS16A | 1 - AS16A | 1 - AS16A | 220 kips Cars

1 - AS16A

**MOMENT AND SHEAR TABLE**

**LOAD 6**

**263 KIP CAR MIN. COUPLED LENGTH 48'-0"**

SPAN ft.	BENDING ft-kips	END SHEAR kips	FLOOR BEAM REACTION kips
8	131.50	86.30	98.63
10	172.80	95.34	118.35
12	234.41	101.36	131.51
13	265.69	108.74	141.62
14	297.20	115.06	150.29
15	345.55	120.54	157.80
16	394.84	125.34	164.37
18	493.43	135.15	175.33
20	592.02	147.94	184.10
25	882.53	170.95	199.83
30	1,206.65	186.29	210.40
35	1,512.25	197.25	217.91
40	1,841.00	205.47	230.12
45	2,169.75	211.86	249.85
50	2,498.50	219.61	276.15
60	3,156.00	244.92	341.99
70	3,813.50	279.91	405.77
80	4,602.50	319.67	453.67
90	5,621.62	334.59	495.68
100	6,903.75	356.37	549.67
120	10,257.00	415.87	673.65
140	14,202.00	469.17	768.34
160	18,147.00	521.69	884.34
180	22,305.69	580.06	990.63
200	27,483.50	630.71	1,098.02
225	35,307.75	702.79	1,237.85
250	43,526.50	767.83	1,372.33
275	51,926.06	839.21	1,510.10
300	61,755.68	904.83	1,646.38
350	84,554.49	1,042.14	1,920.65
400	109,802.49	1,179.31	2,194.73

