

COMMONWEALTH OF MASSACHUSETTS

BRIDGE RATING PROGRAM

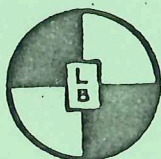
ROUTE 6 OVER WEWEANTIC RIVER

Marion - Wareham

M - 5 - 1 = W - 6 - 13

Maintenance No. 035 - 724 - 000

Dept. Ref. No. 896



**Louis Berger & Associates, Inc.
Wellesley, Massachusetts**

January , 1980

COMMONWEALTH OF MASSACHUSETTS

BRIDGE RATING PROGRAM

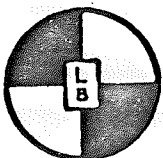
ROUTE 6 OVER WEWEANTIC RIVER

Marion - Wareham

M - 5 - 1 = W - 6 - 13

Maintenance No. 035 - 724 - 000

Dept. Ref. No. 896



**Louis Berger & Associates, Inc.
Wellesley, Massachusetts**

January , 1980

MASSACHUSETTS BRIDGE RATING
ROUTE 6 OVER WEWEANTIC RIVER

MARION - WAREHAM

M-5-1=W-6-13

MAINTENANCE NO. 035-724-000

DEPT. REF. NO. 896

Louis Berger & Associates, Inc.

INDEX

	<u>Page</u>
SUMMARY OF BRIDGE RATING	1
BREAKDOWN OF BRIDGE RATING	2
LOCUS	3
DESCRIPTION OF BRIDGE	4
RATING ANALYSIS ASSUMPTIONS AND CRITERIA	6
RECOMMENDATIONS	8
AVAILABLE PLANS AND FIELD INSPECTION REPORTS	9
TRUCK LOADINGS USED FOR BRIDGE RATINGS	10

APPENDICES

- Appendix A - Department Field Inspection Reports
- Appendix B - Photos
- Appendix C - Computation Sheets

Marion-Wareham
M-5-1=W-6-13

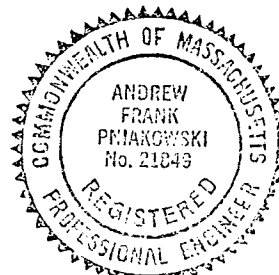
Massachusetts Bridge Rating

SUMMARY SHEET

<u>Town - City</u>	<u>Location</u>	<u>Bridge No.</u>	<u>Maintenance No</u>
Marion-Wareham	Route 6 over Weweantic River	M-5-1=W-6-13	035-724-000

RATING VEHICLE			
	H - TRUCK	TYPE - 3	TYPE - 3S2
INVENTORY RATING	20.7 ^T	22.7 ^T	23.8 ^T
OPERATING RATING	31.5 ^T	53.6 ^T	77.5 ^T

DATE OF RATING January 1980 -----



Marion-Wareham
M-5-1=W-6-13

896

Andrew F. Pniakowski

page 1

BREAKDOWN OF BRIDGE RATING

Town - City

Location

Bridge No

Maintenance No

Marion-Wareham

Route 6 over
Weweantic River

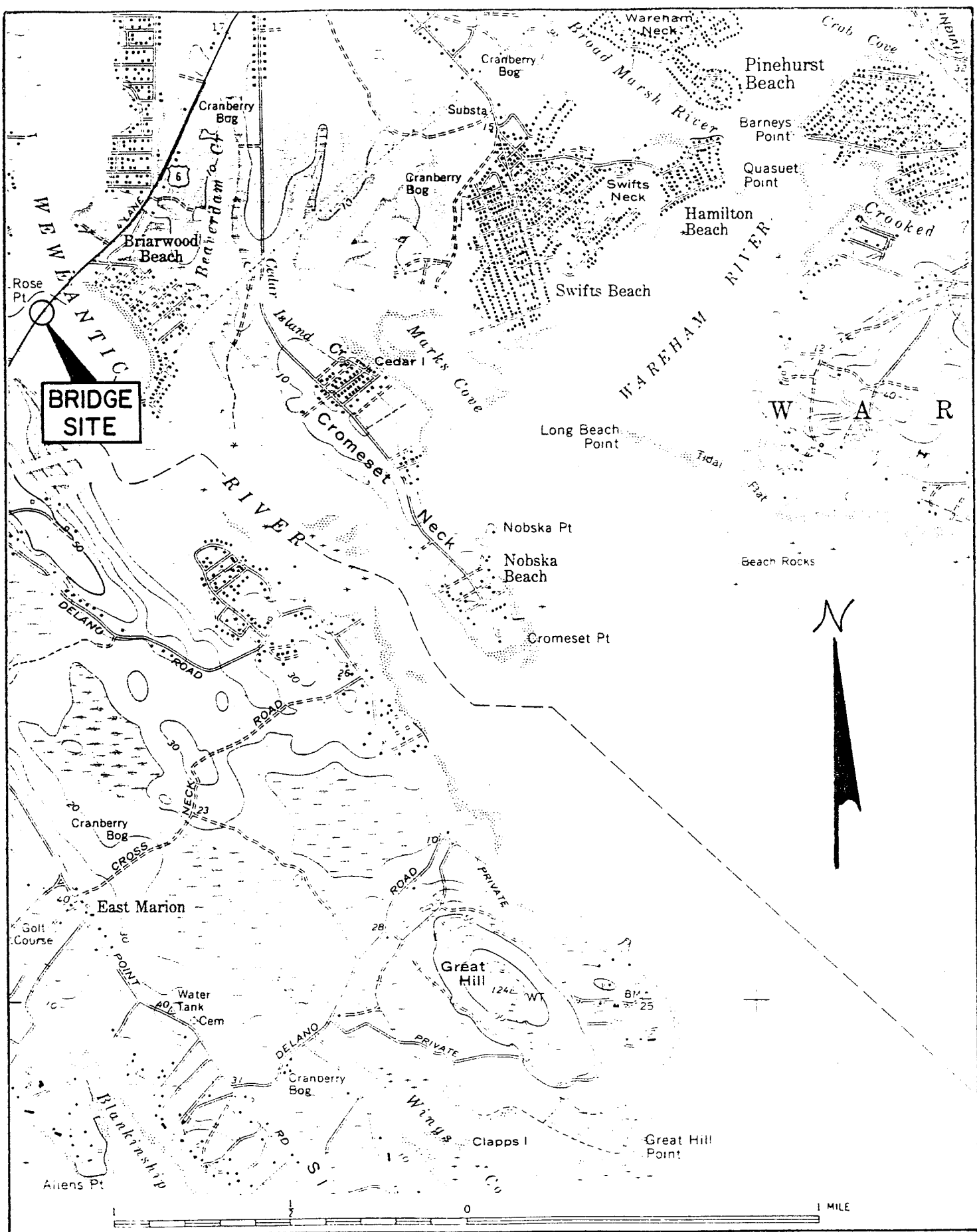
M-5-1=W-6-13

035-724-000

BRIDGE COMPONENT	INVENTORY RATING (TONS)			OPERATING RATING (TONS)		
	H-15	TYPE 3	TYPE 3S2	H-15	TYPE 3	TYPE 3S2
	<u>ORIGINAL BRIDGE (1929)</u>					
Concrete Deck	<u>20.7^T</u>	37.9 ^T	59.3 ^T	36.0 ^T	66.0 ^T	103.3 ^T
	<u>REINFORCED CONCRETE BEAMS - POSITIVE MOMENT</u>					
At Spans	34.6 ^T	40.3 ^T	65.7 ^T	59.6 ^T	69.6 ^T	113.2 ^T
	<u>REINFORCED CONCRETE BEAMS - NEGATIVE MOMENT</u>					
At Pier	21.5 ^T	<u>22.7^T</u>	<u>23.8^T</u>	69.9 ^T	73.9 ^T	<u>77.5^T</u>
	<u>REINFORCED CONCRETE BEAMS - SHEAR</u>					
At Spans	40.9 ^T	44.5 ^T	55.4 ^T	88.6 ^T	96.5 ^T	120.0 ^T
	<u>BRIDGE WIDENING (1957)</u>					
Concrete Deck	21.8 ^T	39.3 ^T	61.6 ^T	<u>31.5^T</u>	56.9 ^T	89.0 ^T
Interior Steel Stringers	29.5 ^T	34.7 ^T	41.6 ^T	48.5 ^T	53.9 ^T	80.2 ^T
Fascia Steel Stringer	40.5 ^T	47.6 ^T	67.1 ^T	45.5 ^T	<u>53.6^T</u>	79.2 ^T

Marion-Wareham

M-5-1=W-6-13



Marion-Wareham
M-5-1=W-6-13

LOCUS

DESCRIPTION OF BRIDGE

<u>Town</u>	<u>Location</u>	<u>Bridge No.</u>
Marion-Wareham	Route 6 over Weweantic River	M-5-1=W-6-13

DATE OF CONSTRUCTION: Original bridge: 1929
Bridge widening: 1957

PRESENT POSTED LOADING: Not posted

SPEED LIMIT ON BRIDGE: Not posted

BRIDGE TYPE: Original bridge: 2 spans, continuous reinforced concrete T-beams
Bridge widening: 2 spans, continuous steel stringer with reinforced concrete deck slab, non composite design

SKEW: None

SPAN: 2 spans (53'-0", 53'-0") center to center of bearings

WIDTH OF BRIDGE DECK: 58'-6" out to out

ROADWAY SURFACE: 2½" Bituminous Concrete pavement

ROADWAY WIDTH: 44 ft. curb to curb

CURBS: 10" reveal

SIDEWALK/WALKWAY: 2 sidewalks 5'-7" wide

BRIDGE RAILING: Steel bridge railing, Type B

APPROACH RAILING: Concrete posts with two steel cables

SUPERSTRUCTURE: Original bridge: reinforced concrete slab over 6 reinforced concrete beams.
Bridge widening: reinforced concrete slab over 4 steel stringers

MODIFICATIONS TO SUPERSTRUCTURE: None

Marion-Wareham
M-5-1=W-6-13

SUBSTRUCTURE:	Concrete Masonry abutments supported on pile foundation. Stone Ashlar Masonry pier, founded on spread footing.
MODIFICATIONS TO SUBSTRUCTURE:	None.
DETERIORATION OF ROADWAY SURFACE:	Transverse contraction cracks and bumps at abutments.
DETERIORATION OF WALKWAYS:	Minor spalling of concrete
DETERIORATION OF BRIDGE RAILINGS:	None.
DETERIORATION OF APPROACH RAILING:	Broken steel cable at northeast end post
DETERIORATION OF SUPERSTRUCTURE:	Local heavy spalling of concrete in original bridge interior beams. Exposed reinforcing steel heavily corroded. Many cracks exist in the reinforced concrete diaphragms of the original bridge. Deposits of roadway chemicals on the north fascia beam indicates leakage from walkway and slab construction joints.
DETERIORATION OF SUBSTRUCTURE:	Crack in concrete of the East Abutment.

RATING ANALYSIS ASSUMPTIONS AND CRITERIA

Based on the review of bridge construction plans, Department inspection reports and site visits by Louis Berger personnel, the following stresses were used for rating purposes:

	<u>INVENTORY</u>	<u>OPERATING</u>
<u>1. Concrete</u>		
Concrete Ultimate Strength		
Ext. 1957	$f'c = 3000 \text{ psi}$	$f'c = 3000 \text{ psi}$
Orig. 1929 (Mix 1:2:4)	$f'c = 2000 \text{ psi}$	$f'c = 2000 \text{ psi}$
Allowable Compr. Stress in Concrete		
Ext.	$fc = .40 \quad f'c = 1200 \text{ psi}$	$fc = .55 \quad f'c = 1650 \text{ psi}$
Orig.	$fc = .40 \quad f'c = 800 \text{ psi}$	$fc = .55 \quad f'c = 1100 \text{ psi}$
Allowable Shear Stress in Concrete		
Ext.	$Vc = .03 \quad f'c = 90 \text{ psi}$	$Vc = .05 \quad f'c = 150 \text{ psi}$
Orig.	$Vc = .03 \quad f'c = 60 \text{ psi}$	$Vc = .05 \quad f'c = 100 \text{ psi}$
<u>2. Reinforcing Steel</u>		
Allowable Tensile Stress in Reinf. Steel		
Ext.)	$fs = 18,000 \text{ psi}$	$fs = 25,000 \text{ psi}$
Orig.)		
<u>3. Structural Steel</u>		
Minimum Yield Point	$Fy = 33,000 \text{ psi}$	$Fy = 33,000 \text{ psi}$
Allowable Tensile Stress	$Fb = 18,150 \text{ psi}$	$Fb = 24,750 \text{ psi}$
Allowable Compressive Stress	$Fb = 18,150 \text{ psi}$	$Fb = 24,750 \text{ psi}$
Allowable Shear Stress in Web of Stringer	$Fv = 11,000 \text{ psi}$	$Fv = 15,000 \text{ psi}$

The bridge substructure was in fair condition and therefore was not considered critical for the rating of this bridge.

The inventory and operating capacities of the bridge were rated in accordance with the provisions of the 1974 edition of the "Manual for Maintenance Inspection of Bridges" by AASHTO and MDPW Rating Guidelines.

Marion-Wareham
M-5-1=W-6-13

The live load used in establishing the ratings was the standard AASHTO H loading and the Type 3 and 3S2 units shown in Plate 15 (page 59) of the above referenced AASHTO manual. As per M.D.P.W. Bridge Rating Guidelines, the Lane Loading effect was not considered in the rating for the standard AASHTO H loading. For both inventory and operating analysis the live load distribution used was according to AASHTO 1977.

Marion-Wareham
M-5-1=W-6-13

RECOMMENDATIONS

In our opinion the bridge will perform well under the rated live load for an indeterminable number of years.

The damaged portions of concrete in original bridge beams should be repaired with epoxy mortar after a thorough cleaning of the exposed reinforcing steel.

The lack of proper corrective repairs could result in a relatively early failure of the original bridge superstructure and ultimate replacement of a major portion of the bridge, which otherwise was found to be in good condition.

AVAILABLE PLANS AND FIELD INSPECTION REPORTS

The following plans and field inspection reports were made available to Louis Berger & Associates, Inc. for use in determining the live load rating of the bridge:

1. The Commonwealth of Massachusetts
Proposed Bridge Marion-Wareham
Station 0+01.00 (Wareham) over Weweantic River
Department of Public Works
State House, Boston, Mass. February 1929

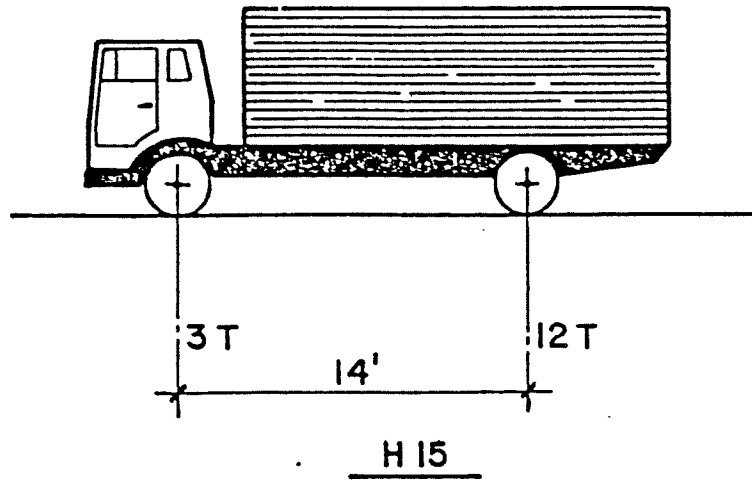
2. The Commonwealth of Massachusetts
Proposed Bridge Widening
Marion-Wareham
Route 6 over Weweantic River
Office of Department of Public Works
100 Nashua Street Boston, Mass. Nov. 1956

3. Massachusetts Department of Public Works
Structure Inventory and Appraisal
Bridge No. M-5-1=W-6-13
Bridge Mnt. No. 035-724-000
(see Appendix A)

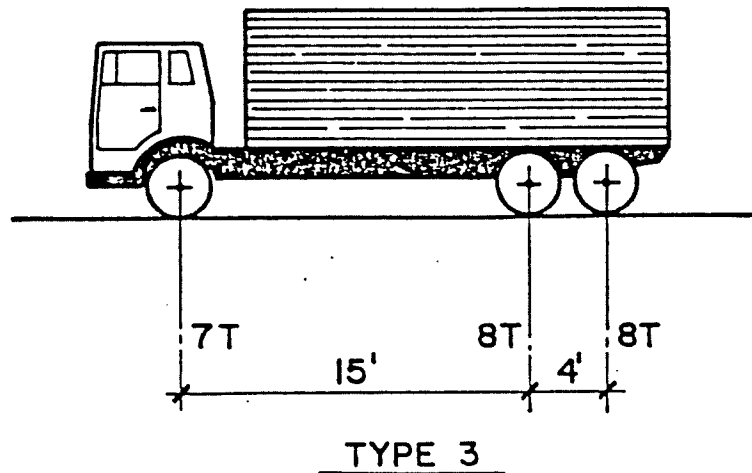
4. Massachusetts Department of Public Works
Structures Inspection Field Report
Plan No. W-6-13, M-5-1
Structures Maint. No. 035-724-000
Dated June 15, 1977
(see Appendix A)

Marion-Wareham
M-5-1=W-6-13

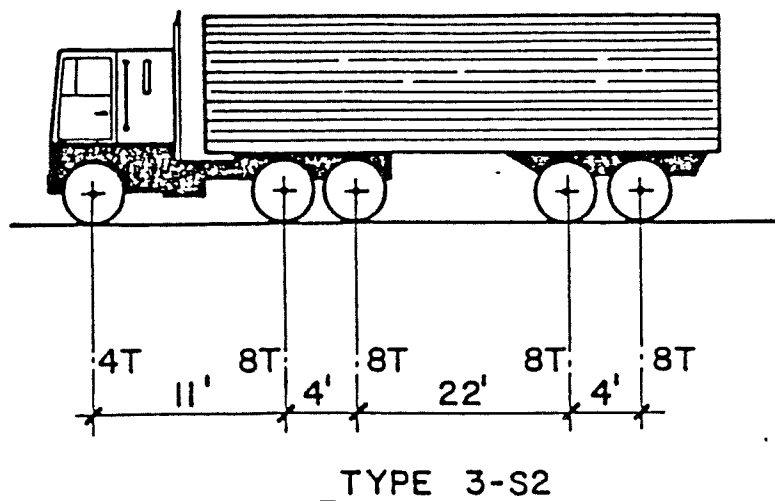
TRUCK LOADINGS



TOTAL WEIGHT
15 TONS



TOTAL WEIGHT
23 TONS



TOTAL WEIGHT
36 TONS

Appendix A

Department Field Inspection Report

STRUCTURE INVENTORY AND APPRAISAL

BRIDGE NO. M-5-1=W-6-13 BRIDGE MNT. NO. 035-724-000 PAGE 1

IDENTIFICATION		CODE	ITEM NO.	CARD CONTROL NUMBER	CAR CO.
1	State <u>Mass.</u>				
2	Highway District <u>7</u>				
3	County <u>Plymouth</u> <u>4</u> City/Town <u>Marion-Wareham</u>				
5	Inventory Route <u>Wareham Street</u> Principal <input type="checkbox"/> Other <input type="checkbox"/>				
6	Features Intersected <u>Weweantic River</u>				
7	Facility Carried by Structure <u>Wareham Street</u>				
8	Structure No. <u>035-724-000</u> <u>1</u> of				
9	Location <u>NA</u>				
10	<u>Unlimited</u>				
11	Milepoint <u>41.35</u>				
12	Road Section No. <u>153</u>				
13	Defense Bridge Letter				
14	Defense Milepoint <u>9.78</u>				
15	Defense Section Length <u>4.3</u>				
16	Latitude <u>41° 44.3'</u>				
17	Longitude <u>70° 44.8'</u>				
18	Physical Vulnerability <u>Concrete Girder</u>				
19	Bypass Detour Length <u>7 miles</u>				
20	Toll Bridge On Toll Road <input type="checkbox"/> On Free Road <input checked="" type="checkbox"/>				
21	Custodian <u>MDPW</u>				
22	Owner <u>MDPW</u>				
23	F.A.P. No.				
CLASSIFICATION		BY	DATE		
24	Fed. Aid System <u>05</u>	<u>Transfer of Data</u>			
		<u>Maintenance Inspection</u>			
25	Administrative <u>1</u>	<u>Condition Analysis</u>			
		<u>Appraisal</u>			
26	Functional <u>04</u>	<u>Cost Estimate</u>			
		<u>General Review</u>			
STRUCTURAL DATA		CODE			
27	Year Built <u>1929</u> Reconst. <u>1957</u>	<u>43</u> Structure Type - Main <u>Conc. T-Beam</u>			
28	Lanes on Str. <u>4</u> Under <u>0</u>	<u>44</u> Approach <u>NA</u>			
29	ADT on Str. <u>5400</u> 30 Year <u>69</u>	<u>45</u> No. of Spans - Main <u>2</u>			
31	Design Load <u>H20</u>	<u>46</u> Approach <u>NA</u>			
32	Appr. Rdwy Width w/Sh'd <u>44'</u>	<u>47</u> <u>NA</u>			
33	Br. Median <input checked="" type="checkbox"/> None <input type="checkbox"/> Open <input type="checkbox"/> Closed	<u>48</u> Max. Span Length <u>49</u> ft.			
34	Skew <u>0°</u>	<u>49</u> Structure Length <u>109</u> ft.			
35	Structure Flared <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<u>50</u> Sidewalk Rt. <u>5.6</u> ft. Lt. <u>5.6</u> ft.			
36		<u>51</u> Br. Roadway (curb-curb) <u>44</u> ft.			
37		<u>52</u> Deck Width (out-out) <u>58.8</u> ft.			
38	Navigation Control <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<u>53</u> Vert. Clearance over Deck <u>Unlimited</u>			
39	Vertical <u>NA</u> ft.	<u>54</u> Under Clearance - Vertical <u>NA</u> ft.			
40	Horizontal <u>NA</u> ft.	<u>55</u> Lateral - Right <u>NA</u> ft.			
41	No posting req'd.	<u>56</u> Left <u>NA</u> ft.			
42	Type Service <u>H-P/WW</u>	<u>57</u> Wearing Surface <u>Asphalt</u>			

MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS
STRUCTURES INSPECTION FIELD REPORT

CITY—TOWN Wareham-Marion		DIST. 7	BRIDGE PLAN NO. W-6-13, M-5-1	STRUCTURES MAINT. NO. 035-724-000	
COUNTY Plymouth		STRUCTURE TYPE R.C. Tee Beam Widening--Steel Stringer		INSPECTOR Guimares Sandonato	
FEDERAL AID SYSTEM F.A.P. 035		AUTO RTE. NO.—STREET NAME U.S.6		CROSSING <input checked="" type="checkbox"/> OVER <input type="checkbox"/> UNDER Weweantic River	
YEAR BUILT 1929	YEAR REBUILT Widened 1957	OWNER State Hwy. Dept.	FLD. BOOK NO.	PHOTOS	TOTAL NO. SHEETS
					DATE INSP. 6/15/77

BRIDGE ELEMENT
RATING

REMARKS

DECK

1. Wearing Surface	7
2. Deck — Structural Condition	7
3. Curbs	7
4. Median	N/A
5. Sidewalks	7
6. Parapet	6
7. Railing	6
8. Drains	7
9. Lighting Standards	N/A
10. Utilities	8
11. Expansion Joints or Devices	8

Note: Same as report 6/15/76
except as noted.

7.) Heavy collision to NE rubble
masonry end post. 50% of
blocks are loose from collision.

CONDITION RATING DECK **58** **7**

SUPERSTRUCTURE

1. Bearing Devices	7	
2. Stringers 2a. Diaphragms	7	6
3. Girder or Beams	6	
4. Floor Beams	N/A	
5. Trusses — General	N/A	
— Portals	N/A	
— Bracing	N/A	
6. Machinery (Movable Spans)	N/A	
7. Rivets or Bolts	7	
8. Weids — Cracks	7	
9. Concrete Cracking	6	
10. Collision Damage	N/A	
11. Deflection Under Load	8	
12. Alignment of Members	8	
13. Vibrations Under Load	8	

CONDITION RATING
SUPERSTRUCTURE **59** **7**

NOTE: Condition Ratings are to be obtained from page 22 "Recording & Coding Guide for the Structure Inventory and Appraisal of the Nations Bridges * July 1972".

M-5-1

BRIDGE ELEMENT
RATING

REMARKS

SUBSTRUCTURE

1. Abutments — Wings	6
— Backwall	7
— Brestwall	6
— Footing	X
— Piles	X
— Erosion	8
— Settlement	7
2. Piers or Bents — Caps	7
— Column	7
— Web	N/A
— Footing	X
— Piles	X
— Scour	8
— Settlement	8
3. Pile Bents	N/A
4. Concrete Cracking or Spalling	6
5. Debris on Seats	6
6. Collision Damage	N/A
7. Adequacy — Hydraulically	8

Condition Rating
SUBSTRUCTURE

60

7

CHANNEL & CHANNEL PROTECTION

1. Channel Scour	8
2. Embankment Erosion	8
3. Drift	8
4. Debris	8
5. Vegetation	8
6. Channel Change	8
7. Fender System	N/A
8. Spur Dikes & Jetties	N/A
9. Rip Rap	8
10. Adequacy	3

Condition Rating
CHANNEL & CHANNEL
PROTECTION

61

8

CULVERT & RETAINING WALLS

1. Barrel — Floor	N/A
— Walls	
— Roof	
2. Headwall	
3. Cutoff Wall	
4. Adequacy	
5. Debris	
6. Drift	N/A

Condition Rating
CULVERT & RETAINING
WALL

62

N/A

M-5-1

63 ESTIMATED REMAINING LIFE (YRS.)

Based on Inspectors Structural Condition of Structure.

yrs.

64 OPERATING RATING

Record if Available (Tons) unknown

65 APPROACH ALIGNMENT

1. Alignment	<input type="text" value="8"/>
2. Approach Slab	<input type="text" value="X"/>
3. Relief Joints	<input type="text" value="N/A"/>
4. Approach — Guardrail	<input type="text" value="7"/>
— Sidewalks	<input type="text" value="7"/>
— Pavement	<input type="text" value="6"/>
— Curbing	<input type="text" value="7"/>
— Embankment	<input type="text" value="7"/>
CONDITION RATING APPROACH ALIGNMENT	<input type="text" value="65"/> <input type="text" value="7"/>

36 TRAFFIC SAFETY FEATURES

BRIDGE RAILING	<input type="text" value="0"/>
TRANSITIONS	<input type="text" value="0"/>
APPROACH GUARDRAIL	<input type="text" value="0"/>
APPROACH GUARDRAIL TERMINAL	<input type="text" value="0"/>

66 INVENTORY RATING

Record if Available (Tons) unknown

POSTED LOADING

1. (A) Posted Loading (Tons)	<input type="text"/>	<input type="text"/>	<input type="text"/>
(B) Single Loading (Tons)	<input type="text" value="N/A"/>	unknown not posted	
2. Legibility	<input type="text" value="N/A"/>		
3. Visibility	<input type="text" value="N/A"/>		

CONVERSION METHOD

- In rating the condition of bridge elements four ratings will be used. These are:
 - o Good — The item is in new or good condition with no repairs necessary.
 - o Fair — The item is still performing the function for which it was intended, but is in need of minor repairs.
 - o Poor — The item is performing the function for which it is intended, at the minimum level. It is in need of major repairs.
 - o Critical — The item is no longer performing the function for which it was intended. Immediate replacement or repair required.

2. Correlation Between Adjectival Condition and Numerical Condition Rating

<u>Adjectival Condition</u>		<u>Numerical Condition Rating</u>
Good	or	None
		8 and 9
Fair	or	Slight
		6 and 7
Poor	or	Moderate
		3, 4 and 5

Appendix B

Photos

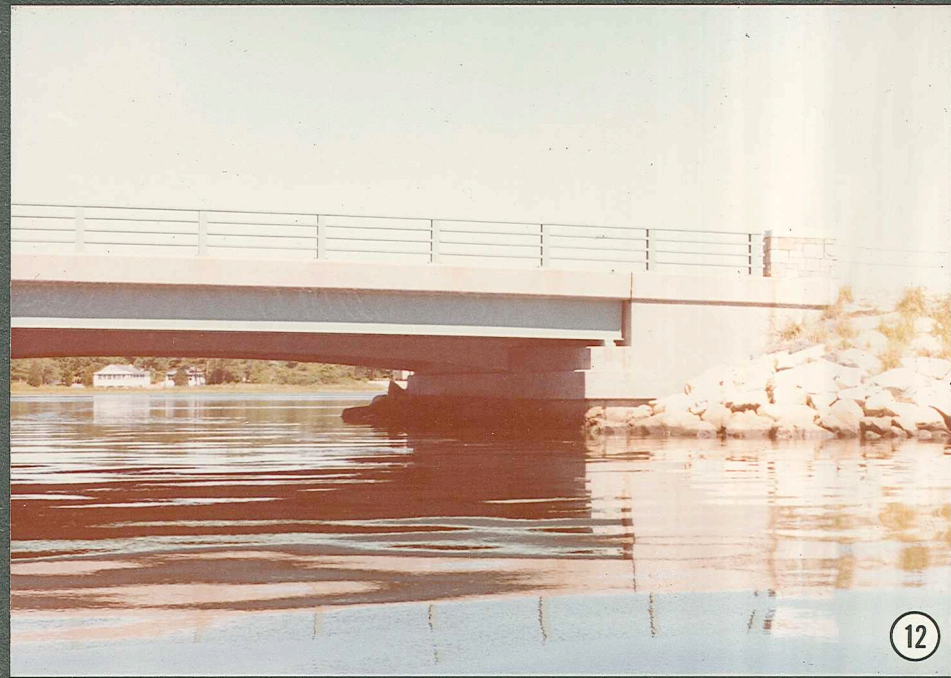
LIST OF PHOTOGRAPHS

1. Westerly Approach
2. Easterly Approach
3. South Bridge Railing
4. North Bridge Railing
5. North Elevation
6. South Elevation
7. West Abutment from South
8. West Abutment from North
9. Bridge Pier from South
10. Bridge Pier from North
11. East Abutment from North
12. East Abutment from South
13. Detail of bridge thermal contraction crack in pavement
at the east abutment

Marion-Wareham
M-5-1=W-6-13









Appendix C
Computation Sheets

COMPUTATION SHEETS

<u>Index</u>	<u>Sheet</u>
Bridge Sketches	1
<u>First Computation - Original Bridge</u>	
Dead Load Moments and Shears	4
Live Load Moments	5
Live Load Shears	8
Moment and Shear Capacities of Interior Beam	10
Rating of Interior Beam for Moment	14
Rating of Interior Beam for Shear	15
Deck Slab Computations	17
Rating of Bridge Deck Slab	19
<u>First Computation - Bridge Widening</u>	
Deck Slab Computations	20
Rating of Bridge Deck Slab	22
<u>Second Computation - Original Bridge</u>	
Deck Slab Computations	23
Rating of Bridge Deck Slab	24
<u>Second Computation - Bridge Widening</u>	
Deck Slab Computations	25
Rating of Bridge Deck Slab	26
<u>Second Computation - Original Bridge</u>	
Moment capacities of Interior Beams	27
Moment Influence Lines and Wheel Live Load Moments	30

Marion-Wareham
M-5-1-W-6-13

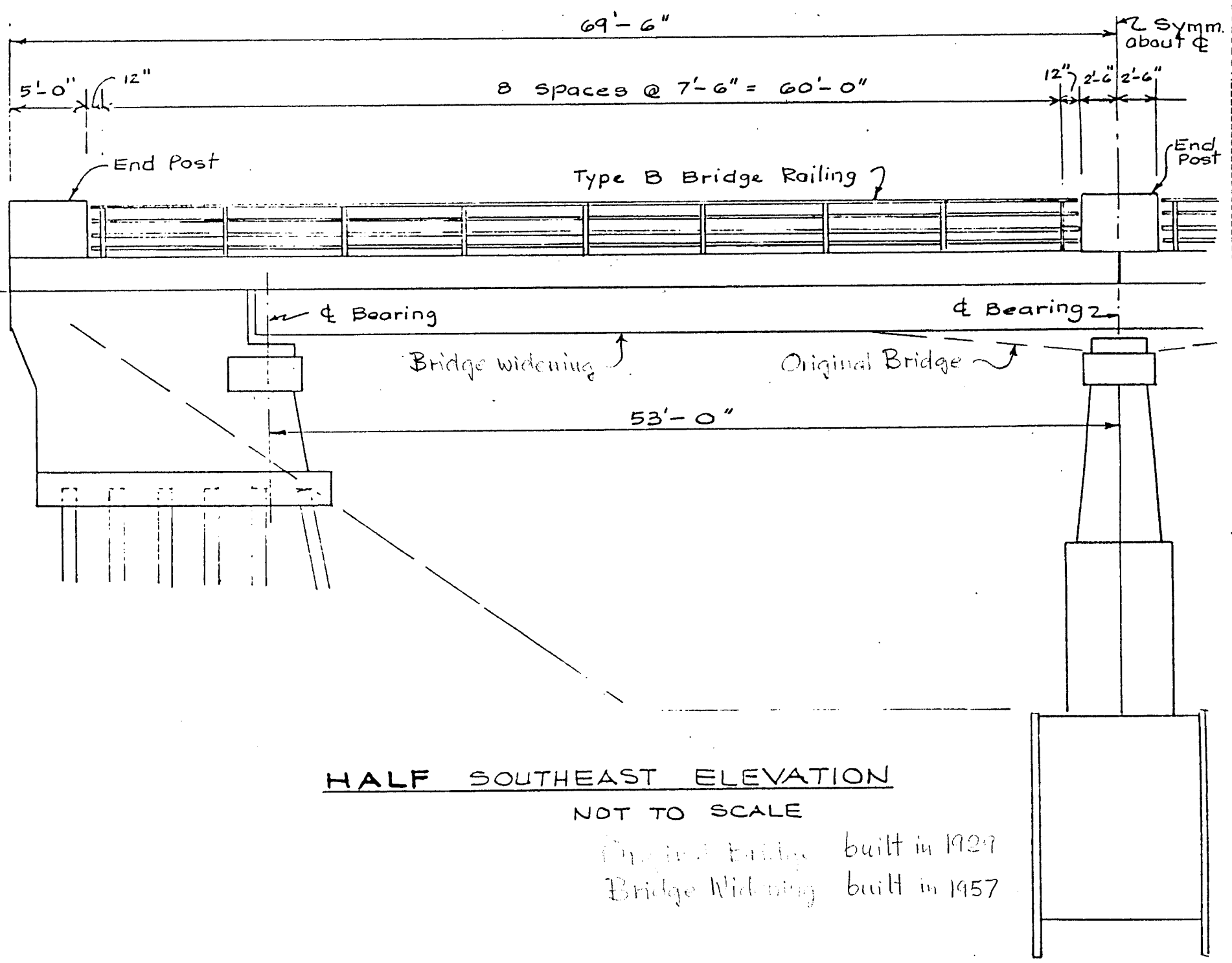
Interior Beam Dead Load and Live Load Moments	32
Interior Beam Dead Load and Live Load Shears	34
Shear Capacities of Interior Beam	36
Rating of Interior Beam for Moment and Shear	37

Bridge Widening

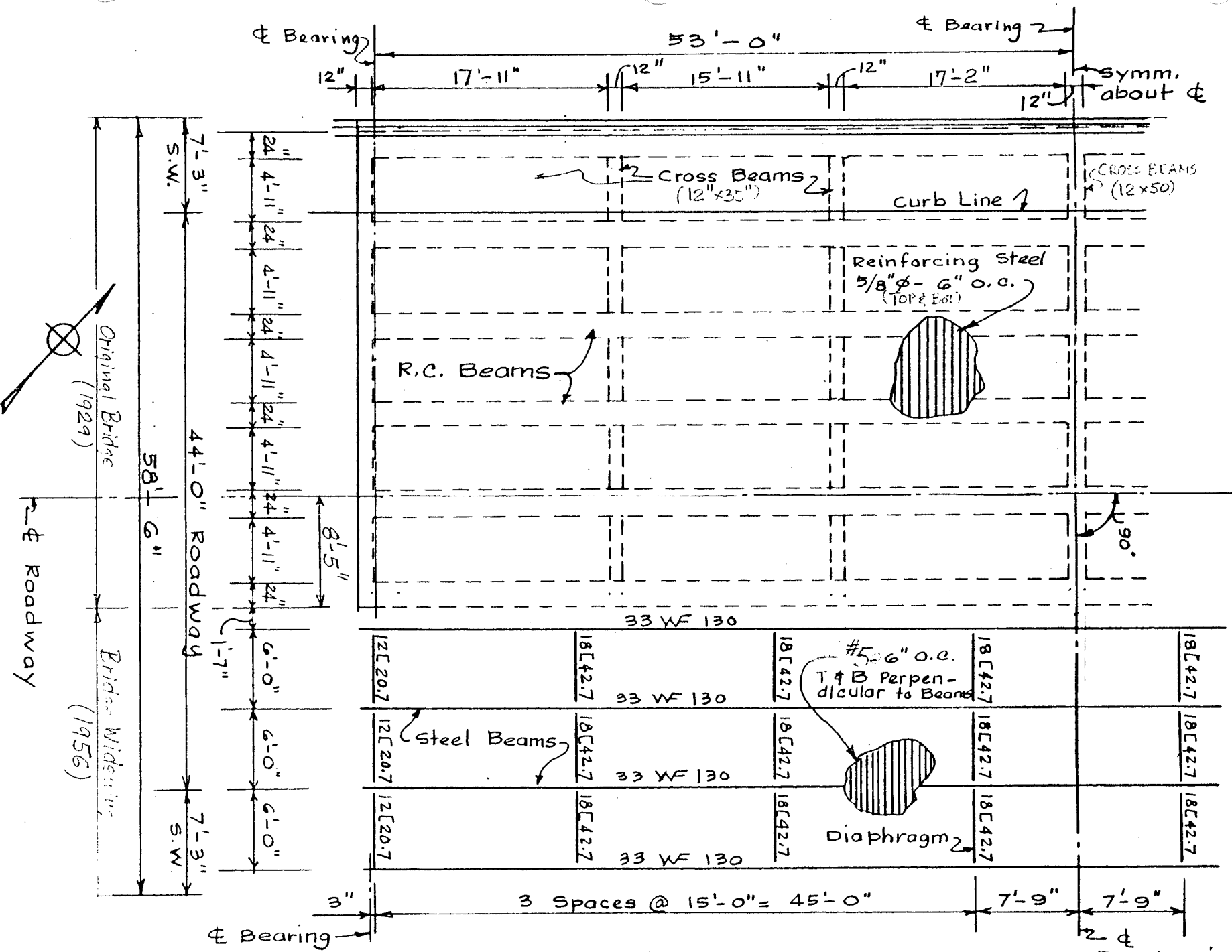
M.D.P.W. Computer Program #125 (Beam) Input Data	38
Program #125 Computer Input Sheets	41
Program #125 Bending Moment Influence Lines	45
Program #125 Interior Steel Stringer Rating for Type H Loading	53
Program #125 Interior Steel Stringer Rating for Type 3 Loading	68
Program #125 Interior Steel Stringer Rating for Type 3S2 Loading	76
Program #125 Fascia Steel Stringer Ratings for Type H, 3 and 3S2 Loading	86

BY: A.S. DATE 2/14/79
 CHKD. BY: ATP DATE 2/15/79
 SUBJECT: BR. No. W-6-13 MARION-WAREHAM, MA RTE 6 OVER WEWANTIC RIVER
 BRIDGE RATING
 SHEET NO. 1 OF 2
 PROJECT: W&E R. 201

LOUIS BERGER & ASSOCIATES INC.

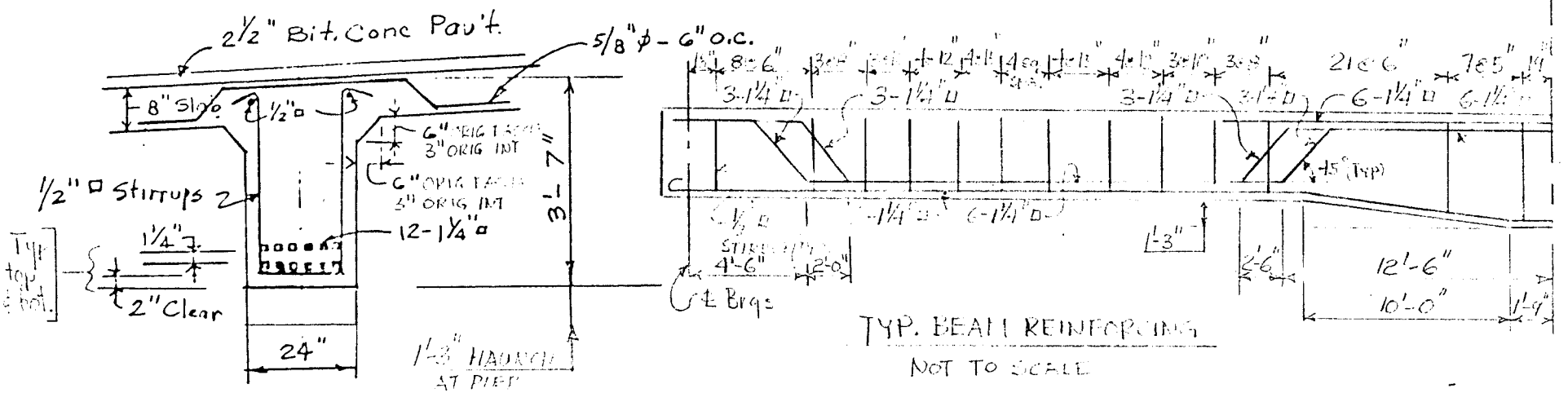
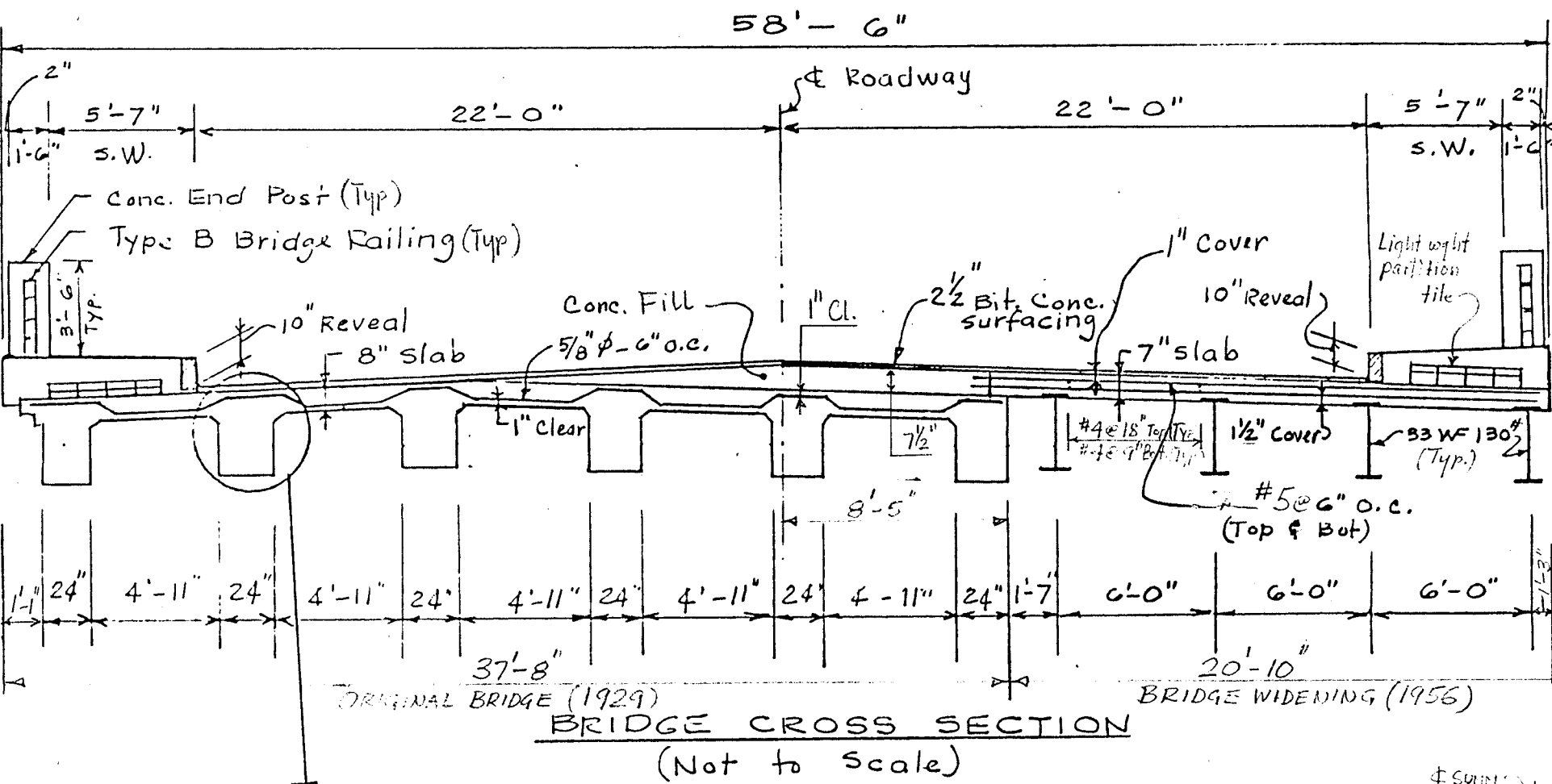


SUBJECT BR. No. W-6-13 MARION-WAREHAM, MA RTE 6 OVER WEWEANTIC RIVER



HALF DECK PLAN & STRINGER LAYOUT
 Not to Scale

SUBJECT BR. No. W-6-13 MARION-WAREHAM MA, RTE 6 OVER WEWANTIC RIVER



BY CDN DATE 10/29/79

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 4 OF 87

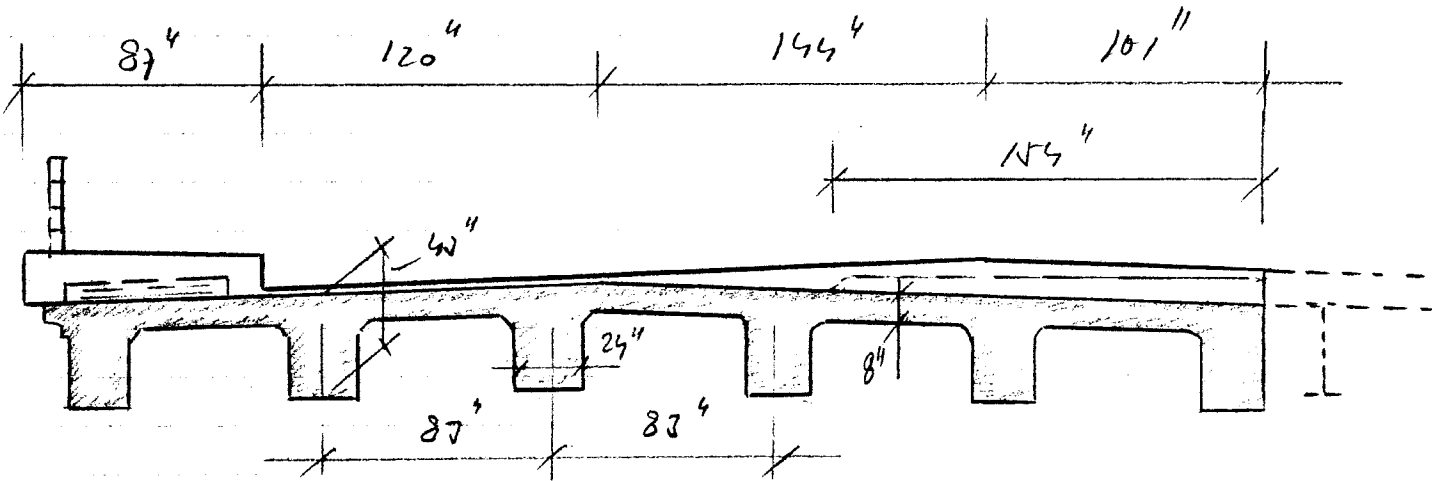
CHKD. BY _____ DATE _____

PROJECT W185 B 896

SUBJECT BR W-6-13

1ST COMPUTATION

DEAD LOAD



RAILING	=	√D	· 10 ⁻³	· 1/6	2	1.01
SIDEWALK	=	87 · 16.75	· 1.04 · 10 ⁻³	· 4	2	0.25
	=	-48 · 8.00	· 0.71 · 10 ⁻³	· 4	2	-0.05
PAVEMENT	=	120 · 3.38	· 1.00 · 10 ⁻³	· 4	2	0.07
	=	144 · 6.50	· 1.00 · 10 ⁻³	· 4	2	0.16
	=	101 · 10.78	· 1.00 · 10 ⁻³	· 4	2	0.18
	=	154 · 7.90	· 0.04 · 10 ⁻³	· 1	2	0.01
						<u>0.63</u> KIPS/FT
BEAM	=	87 · 8.00	· 1.04 · 10 ⁻³		2	0.69
	=	6 · 6.00	· 1.04 · 10 ⁻³		2	0.04
	=	24 · 75.00	· 1.04 · 10 ⁻³		2	0.87
						<u>2.23</u> KIPS/FT

Moment { $M_{0.40} = + 2.23 \cdot 53.00^2 \cdot 0.070 = + 478 \text{ K}$

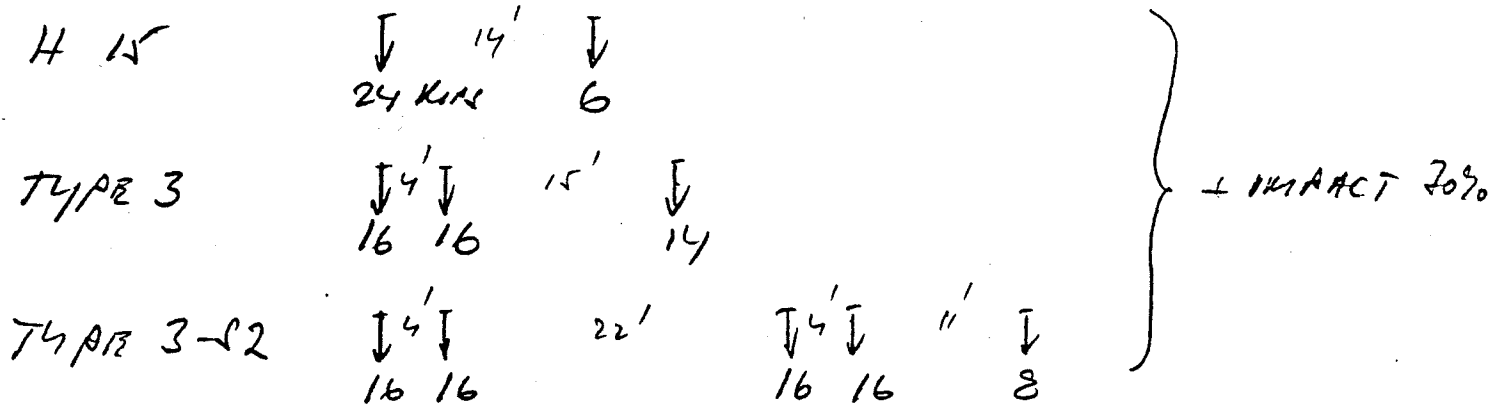
Moment { $M_{1.00} = - 2.23 \cdot 53.00^2 \cdot 0.125 = - 783 \text{ K}$

Shear { $V_{0.00} = 2.23 \cdot 53.00 \cdot 0.15 - \frac{783}{53.00} = 44.3 \text{ K}$

Shear { $V_{1.00} = - 4 + - 6 = 72.5 \text{ K}$

LIVE LOAD

THREE TYPES ARE CONSIDERED (AXLE LOADS)



ANTR. REDUCTION FACTOR IS (ASHTO)

$$AF = \frac{1}{2} \cdot \frac{692}{6} = 0.58$$

MOMENTS AND SHEAR FORCES ARE COMPUTED BY MEANS OF INFLUENCE LINES

THE AXLE LOADS MULTIPLIED BY THE ANTR. FACTOR 0.58 AND IMPACT 70% ARE AS FOLLOWS

H 15 180 + 45

J 120 + 120 + 105

J-S2 120 + 120 + 120 + 120 + 60

BY CON DATE 10/29/79

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 6 OF 87

CHKD. BY _____ DATE _____

PROJECT W185 B 896

SUBJECT BR W-6-13

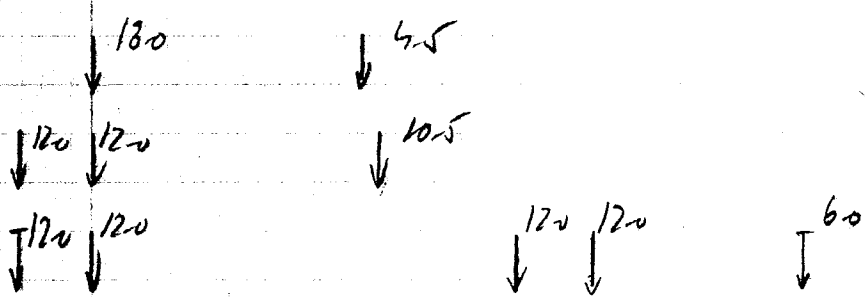
Section 0.40

450
SQUARE 4 X 4 TO THE INCH

H 5

3

J-12



10.94

$$\begin{aligned}
 H 5 &= M_{0.40} = 180 \cdot 10.94 + 4.5 \cdot 5.120 &= 220 \text{ k} \\
 J &= M_{0.40} = 12.0(8.80 + 10.94) + 10.5 \cdot 5.00 &= 289 \text{ k} \\
 J-12 &= M_{0.40} = 12.0(8.80 + 10.94 + 2.50 + 1.40) - 6.0 \cdot 0.90 &= 278 \text{ k}
 \end{aligned}$$

BY CSN DATE 10/29/79

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 7 OF 87

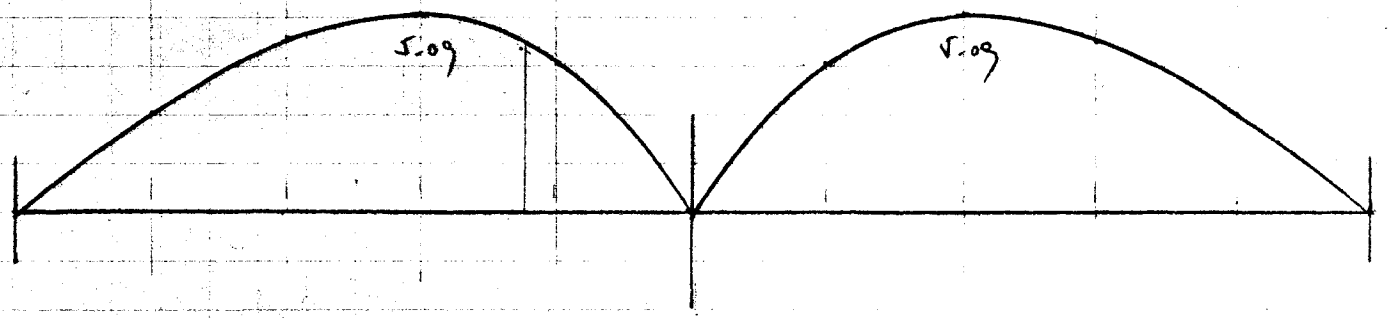
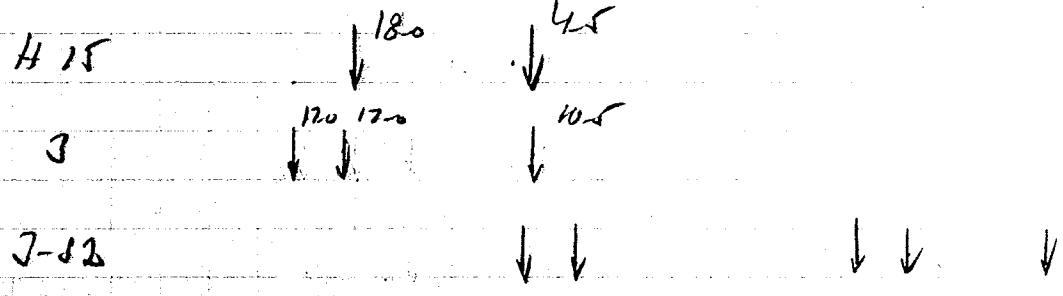
CHKD. BY _____ DATE _____

PROJECT W185 B 896

SUBJECT BR W-6-13

Section 120

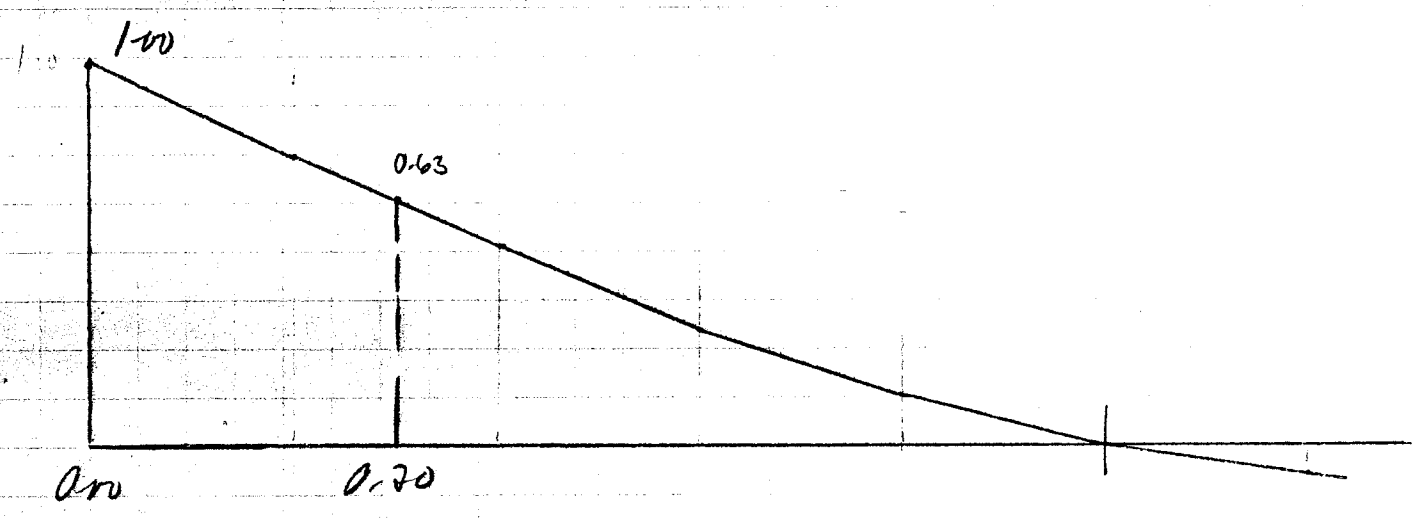
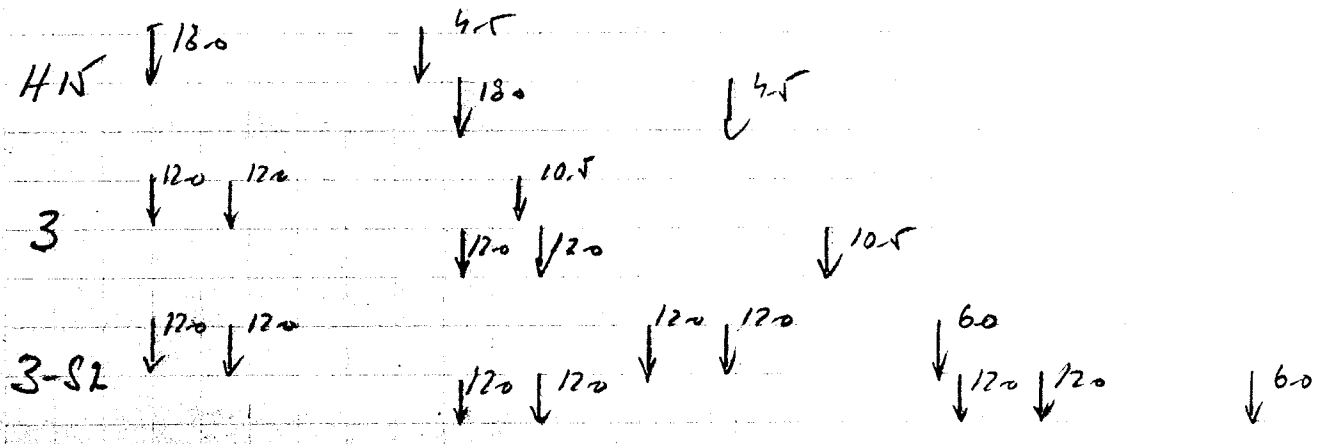
TO THE INCH
4 X 4
SQUARE



$$\begin{aligned}
 H\ 15 &: M_{120} = 180 \cdot 5.00 + 45 \cdot 4.70 = 109\text{ k} \\
 J &: M_{120} = 120(4.50 + 4.90) + 105 \cdot 4.20 = 158 \\
 J-52 &: M_{120} = 120(4.50 + 2.50 + 4.20 + 4.85) + 60 \cdot 4.90 = 276
 \end{aligned}$$

FLECTION 0.00 AND 0.20 WHEEL

TO THE INCH
SUBJECT 4 4 4
450



H-15 $V_{0.00} = 18.0 \cdot 1.00 + 4.5 \cdot 0.63 = 21.1^k$

$V_{0.20} = 18.0 \cdot 0.63 + 4.5 \cdot 0.20 = 12.8$

J $V_{0.00} = 12.0(1.00 + 0.91) + 10.5 \cdot 0.57 = 28.9$

$V_{0.20} = 12.0(0.63 + 0.57) + 10.5 \cdot 0.24 = 16.6$

J-S2 $V_{0.00} = 12.0(1.00 + 0.91 + 0.42 + 0.24) + 6.0 \cdot 0.15 = 32.7$

$V_{0.20} = 12.0(0.63 + 0.57 + 0.12 + 0.08) + 6.0 \cdot 0.00 = 16.4$

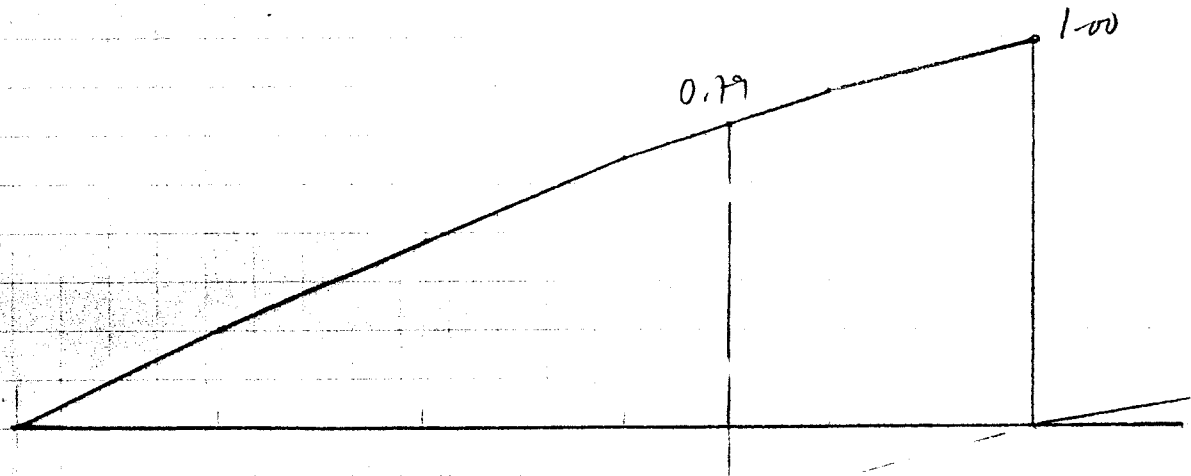
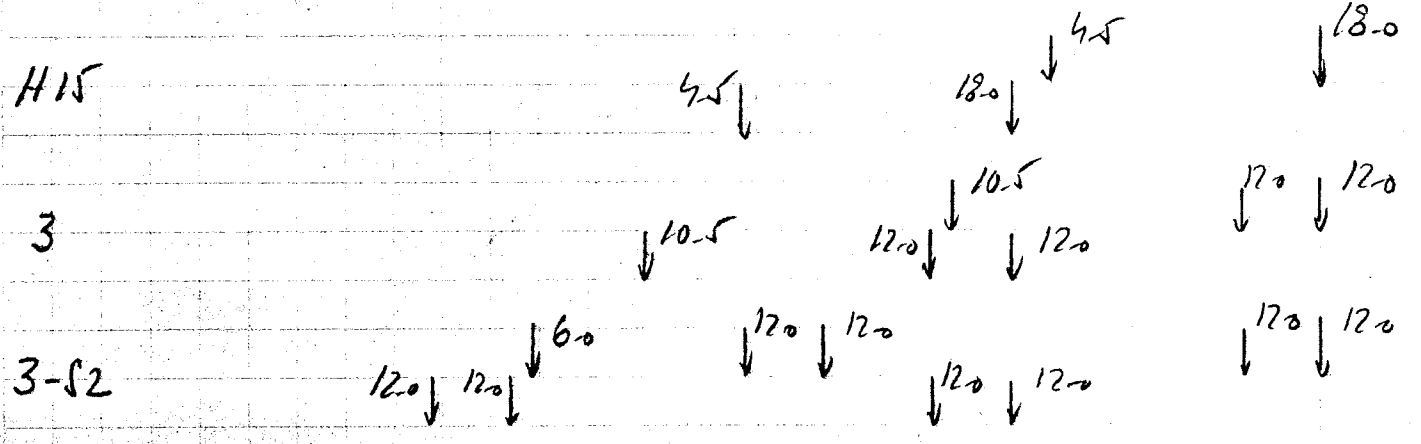
BY CON DATE 10/29/79
 CHKD. BY _____ DATE _____
 SUBJECT B.W-6-13

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 9 OF 87
 PROJECT W185 B 896

SECTION 0.70 AND 1.00 SHEAR

TO THE INCH
 4 x 4
 SQUARE
 450



H 15 $V_{1.00} = 18.0 \cdot 1.00 + 4.5 \cdot 0.82 = 21.7^k$

$V_{0.70} = 18.0 \cdot 0.79 + 4.5 \cdot 0.52 = 16.6$

3 $V_{1.00} = 12.0(1.00 + 0.95) + 10.5 \cdot 0.71 = 21.1$

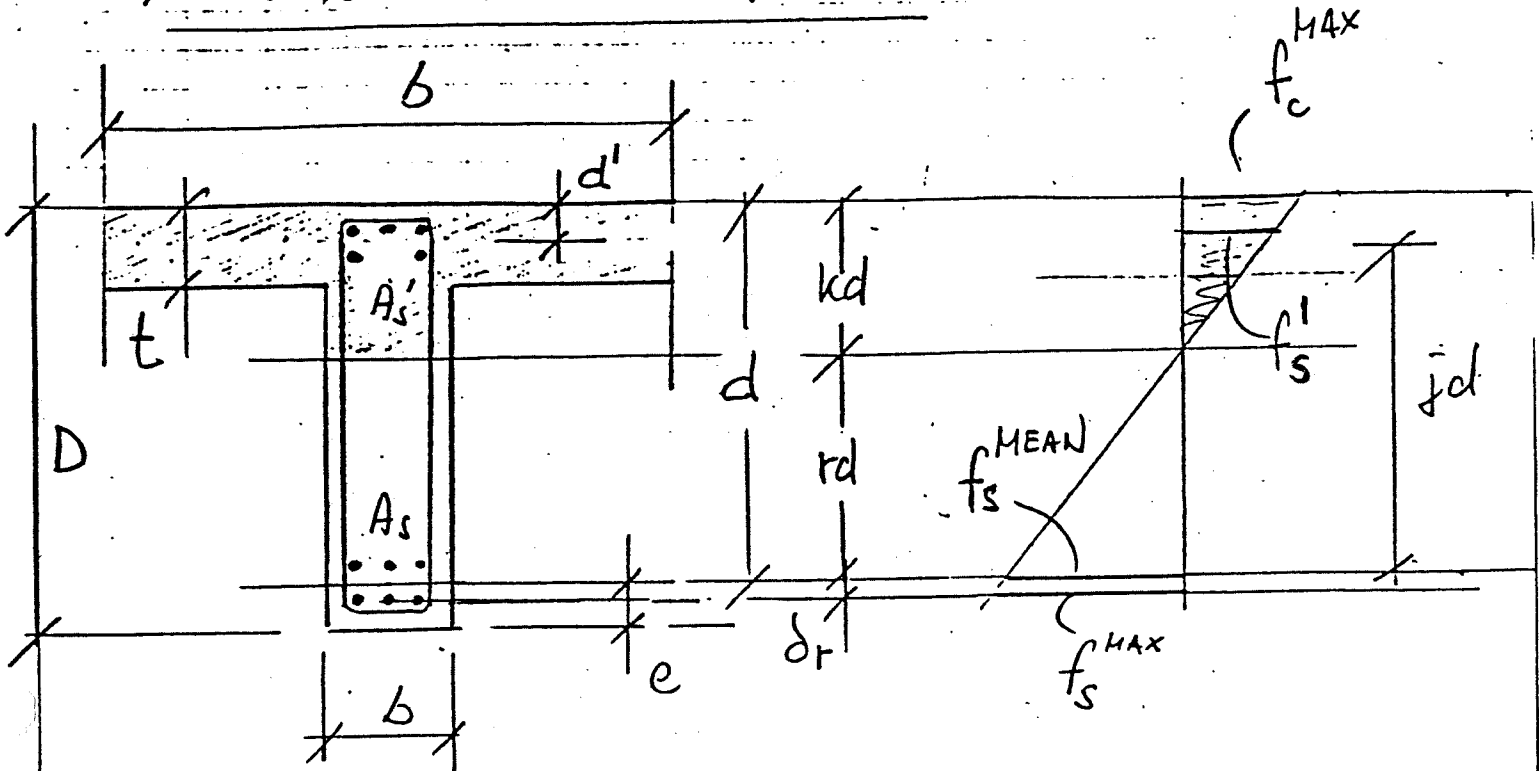
$V_{0.70} = 12.0(0.79 + 0.71) + 10.5 \cdot 0.41 = 22.3$

3-S2 $V_{1.00} = 12.0(1.00 + 0.95 + 0.60 + 0.53) + 6.0 \cdot 0.79 = 38.7$

$V_{0.70} = 12.0(0.79 + 0.71 + 0.26 + 0.17) = 27.2$

INTERIOR BEAM (Fascia Beam does not govern)

MOMENT AND SHEAR CAPACITIES



$$f_s^{MAX} = f_s^{MEAN} \times \left(\frac{rd + dr}{rd} \right)$$

n	=	15	
f _c '	=	2000	psi
f _c ^{MAX}	INV	=	800 "
	OPER	=	1100 "
V _c	INV	=	60 "
	OPER	=	100 "
f _s ^{MAX}	INV	=	18000 "
	OPER	=	25000 "

USE HA 67
 PROGRAM FOR
 T-SECTION

BY CON DATE 10/30/79

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 11 OF 87

CHKD. BY _____ DATE _____

PROJECT W 135 B 896

SUBJECT BR W-6-13

SECT	b	b'	D	t	e	d'	As	As'	dr	fd	fd'	INVENTORY					OPERATING				
												f_s^{MAX}	M	f_c^{MAX}	f_s'	Vc	f_u^{MAX}	M	f_c^{MAX}	f_u'	Vc
0.00	83	24	43	8	2.63		9.38		0	37.14				53.5						89.1	
0.30	83	24	43	8	3.88		18.75		1.25	35.26				50.8						84.6	
0.40	83	24	43	8	3.88		18.75		1.25	35.76											
0.70	83	24	43	8	3.88		18.75		1.25	35.16				50.8						84.6	
0.78	83	24	43	8	2.63		9.38		0	37.14				53.5						89.1	
1.00	24	24	58	0	3.88		18.75		1.25	45.53				65.6						109.3	

1 2 3 4 5 6 4 3

THE INTERIOR BRAM IS PROVIDED WITH THE FOLLOWING TYPES OF SHEAR REINFORCEMENT

TYPE

a	STEEPS $\phi 1/2$ @ 15"	$A_v = 2 \cdot \frac{0.150}{15}$	$= 0.0200$	in^2/in
b	— v — @ 12"	$A_v =$	$= 0.0417$	
c	— v — @ 10"	$A_v =$	$= 0.0500$	
d	— v — @ 8"	$A_v =$	$= 0.0625$	
e	— v — @ 6"	$A_v =$	$= 0.0833$	
f	3 45° BARS $\phi 1/4$ "	$A_v = 3 \cdot \frac{1.25 \cdot \sqrt{2}}{3900}$	$= 0.1700$	

COMBINATION	e + f	$A_v = 0.0833 + 0.1700$	$= 0.2533$	in^2/in
	d + f	$A_v = 0.0625 + 0.1700$	$= 0.2325$	
	d	$A_v =$	$= 0.0625$	
	c	$A_v =$	$= 0.0500$	
	b	$A_v =$	$= 0.0417$	
	a	$A_v =$	$= 0.0200$	
	e	$A_v =$	$= 0.0833$	

40088 4 4 4

400

BRIDGE ENGINEERING INC. PROVIDENT 5-A

BY CON DATE 10/30/77 LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 13 OF 87
PROJECT W/88 896

CHKD. BY _____ DATE _____
SUBJECT B W-6-13

AV SHEAR REINFORCEMENT CORRS						
e	e+f	d+f	d	c	b	a
64.9	178.5	164.6	57.0	42.6	37.1	31.5
122.1	230.0	260.7	102.8	91.2	82.5	75.7
94.9	202.8	189.6	81.7	73.7	68.5	63.1
149.2	299.1	280.7	170.8	119.9	112.6	105.2
65.3	172.2	160.0	52.1	44.1	38.9	33.5
119.6	269.5	251.1	101.3	90.7	83.0	74.6
61.7	174.9	161.0	47.4	39.0	33.5	27.9
118.5	276.4	257.1	99.2	87.6	79.9	72.1
60.0	199.3	182.2	42.9	32.7	25.9	19.0
130.2	323.7	300.0	106.5	92.7	82.9	73.3

TOTAL SHEAR CAPACITIES

	V_{dc}	V_c	V_t
SECT 0.00 =	100 - 44.3 +	53.5 + 18.	77.14 · Av
	OPER - 44.0 +	89.1 + 25.	77.14 · Av
0.20 =	- 8.8 +	50.8 + 18.	25.26 · Av
	- 8.8 +	87.6 + 25.	25.26 · Av
0.70 =	- 38.4 +	50.8 + 18.	25.26 · Av
	- 38.4 +	84.6 + 25.	25.26 · Av
0.78 =	- 47.9 +	53.5 + 18.	77.14 · Av
	- 47.9 +	89.1 + 25.	77.14 · Av
1.00 =	- 72.9 +	65.6 + 13.	45.53 · Av
	- 72.9 +	109.3 + 25.	45.53 · Av

450 SQUARE 4 x 4 10 E.P. IN. 2

BY CSW DATE 10/30/79

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 14 OF 87

CHKD. BY _____ DATE _____

PROJECT W 185 B 896

SUBJECT BR W-6-13

INTERIOR BEAM RATING FOR MOMENT

SECT 0.40
(at span)

INVENTORY M = 945 - 428 = 507^{1k}
OPERATING M = 1212 - 428 = 874

LOADING

INVENTORY

OPERATING

H 15 $\frac{507}{220} \times 15 = 34.6^T$

$\frac{874}{220} \times 15 = 59.6^T$

3 $\frac{507}{239} \times 23 = 40.3^T$

$\frac{874}{239} \times 23 = 69.6^T$

J-52 $\frac{507}{278} \times 36 = 65.7^T$

$\frac{874}{278} \times 36 = 113.2$

SECT 1.00
(at Pier)

INVENTORY M = 929 - 783 = 146^{1k}
OPERATING M = 1291 - 783 = 508^{1k}

LOADING

INVENTORY

OPERATING

H 15 $\frac{146}{109} \times 15 = 21.5^T$

$\frac{508}{109} \times 15 = 69.9^T$

3 $\frac{146}{158} \times 23 = 22.7^T$

$\frac{508}{158} \times 23 = 73.9^T$

J-52 $\frac{146}{276} \times 36 = 23.8^T$

$\frac{508}{276} \times 36 = 77.5^T$

SCALE 1:1

450

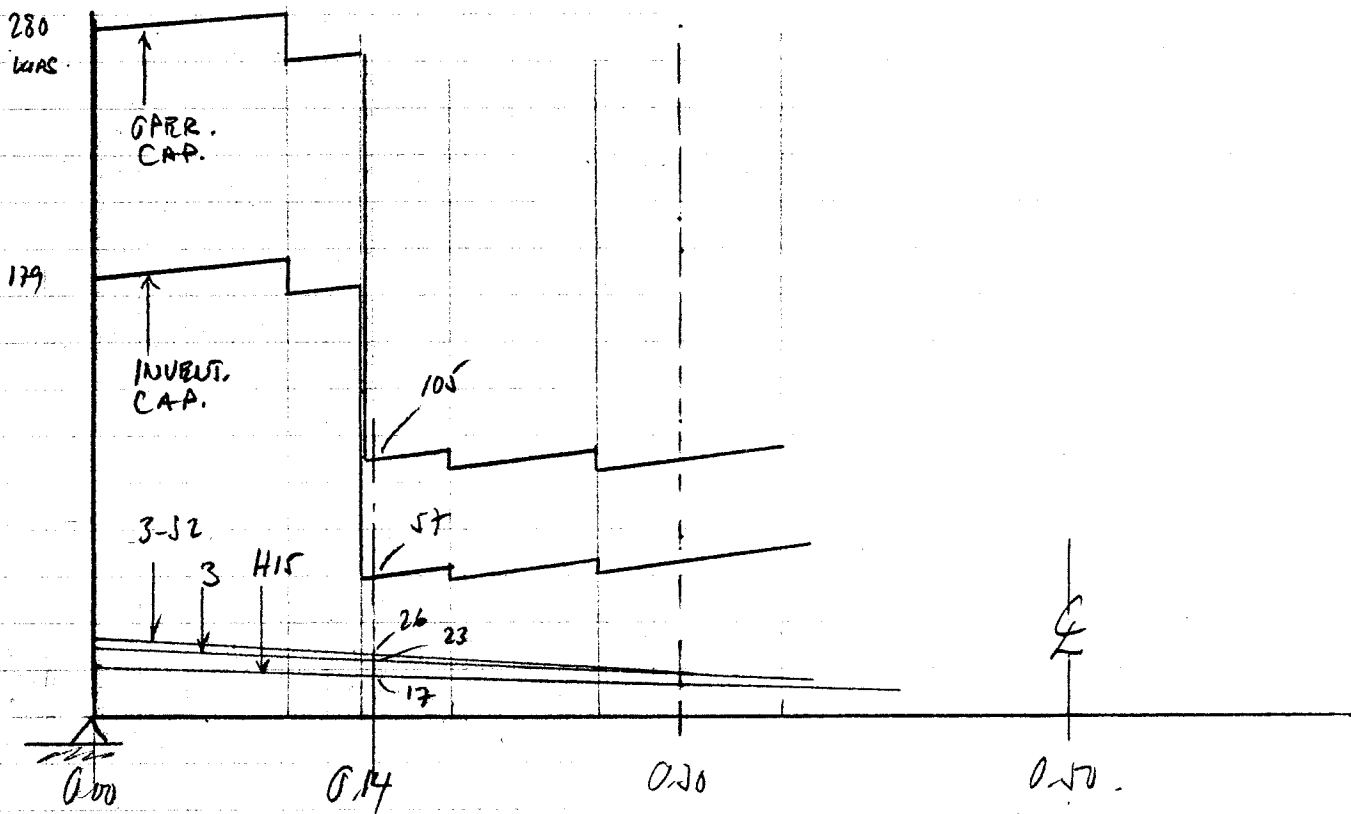
PHOTOGRAPH BY S.A.

5-11-79

INTERIOR BEAM RATING FOR SHEAR

SECTIONS 0.00 - 0.50

SCALE 4 X 4 1/4 IN. SQUARE



SECT 0.14 IS GOVERNING

INV $V = 57$ K
 OPER $V = 105$

LOADING	INVENTORY	OPERATING
H IS	$\frac{57}{17} \times 15 = 50.3$ T	$\frac{105}{17} \times 15 = 92.6$ T
J	$\frac{57}{23} \times 23 = 57.0$ T	$\frac{105}{23} \times 23 = 105.0$ T
J-S2	$\frac{57}{26} \times 36 = 78.9$ T	$\frac{105}{26} \times 36 = 145.4$ T

L. BERGER & ASSOCIATES INC. NEW YORK

BY CON. DATE 10/31/79

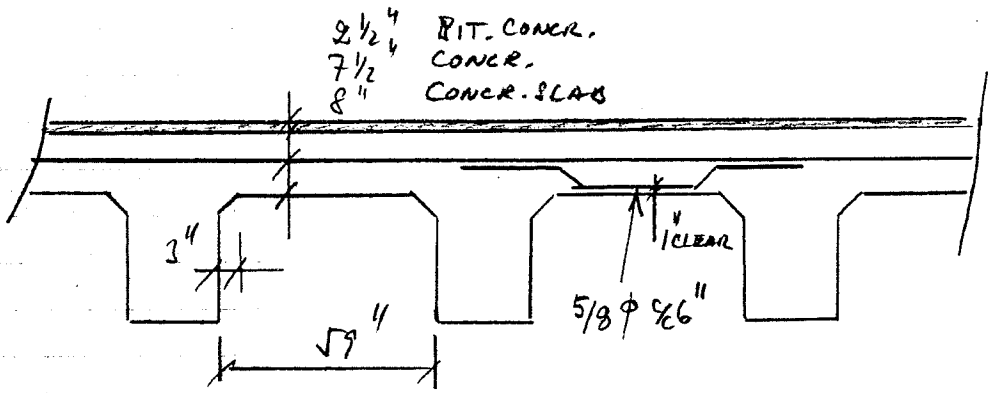
LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 17 OF 87

CHKD. BY DATE
SUBJECT DR No W-6-13

PROJECT W 185 B 896

CALCULATIONS FOR DECK SLAB I (Orig. bridge)



BIT. CONCR.	0.21	-	0.144	z	0.07
CONCR.	0.60	.	0.150	z	0.09
SLAB	0.67	.	0.150	z	0.10
					<u>0.22</u> k/ft ²

$M_{DL} = 0.22 \cdot 4.92^2 \cdot 0.125 \cdot 0.80 = 0.53 \text{ k/ft}$

$V_{DL} = 0.22 \cdot (4.92 \cdot 0.5 - 0.8) \cdot 1.15 = 0.42 \text{ k/ft}$

H-15 $M_{LL} = \frac{12}{0.6 \cdot 4.92 + 2.5} \cdot 0.2 \cdot 4.92 \cdot 1.20 = 2.81 \text{ k/ft}$

3-52 $M_{LL} = \frac{8}{0.36 \cdot 4.92 + 2.58} \cdot \dots = 2.35 \text{ k/ft}$

H-15 $V_{LL} = \frac{12}{0.6 \cdot 4.92 + 2.5} \cdot \frac{4.92 - 0.81}{4.92} \cdot 1.15 \cdot 1.20 = 2.75 \text{ k/ft}$

3-52 $V_{LL} = \frac{8}{0.36 \cdot 4.92 + 2.58} \cdot \frac{4.92 - 0.81}{4.92} \cdot 1.15 \cdot 1.20 = 2.70 \text{ k/ft}$

BY CON DATE 10/31/79

LOUIS BERGER & ASSOCIATES INC.

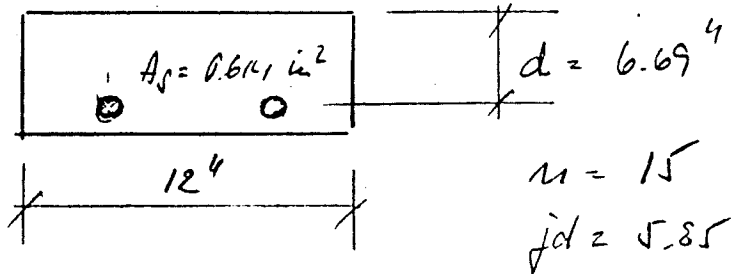
SHEET NO. 18 OF 87
PROJECT W 185 B 396

CHKD. BY _____ DATE _____
SUBJECT BR W-6-13

MOMENT AND SHEAR CAPACITY

	f'_c	=	2000	psi	CONCR. ULT STRENGTH
INVENT	f_c	=	800	"	ALLOW. STRESS
OPER	f_c	=	1100	"	
INVENT	V_c	=	60	"	ALLOW. SHEAR STRESS
OPER	V_c	=	100	"	
INVENT	f_s	=	18000	"	STEEL ALLOW. STRESS
OPER	f_s	=	25000	"	

USE HA 67
PROGRAM



$n = 15$
 $j d = 5.85$

INVENT	M_c	=	5.09	k/ft
OPERATING	M_c	=	7.48	"

INVENT	V_c	=	$0.06 \cdot 5.85 \cdot 12$	=	4.21	k/ft
OPERATING	V_c	=	$0.10 \cdot 5.85 \cdot 12$	=	7.02	"

BY CON DATE 10/31/79

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 19 OF 87
PROJECT W-185 B 396

CHKD. BY _____ DATE _____
SUBJECT BR W-6-13

ORIGINAL BRIDGE
DECK SLAB RATING FOR MOMENT

INV $M = 5.39 - 0.53$ ≈ 4.86 $\frac{k}{ft}$
OPER $M = 7.48 - 0.53$ ≈ 6.95 $-$

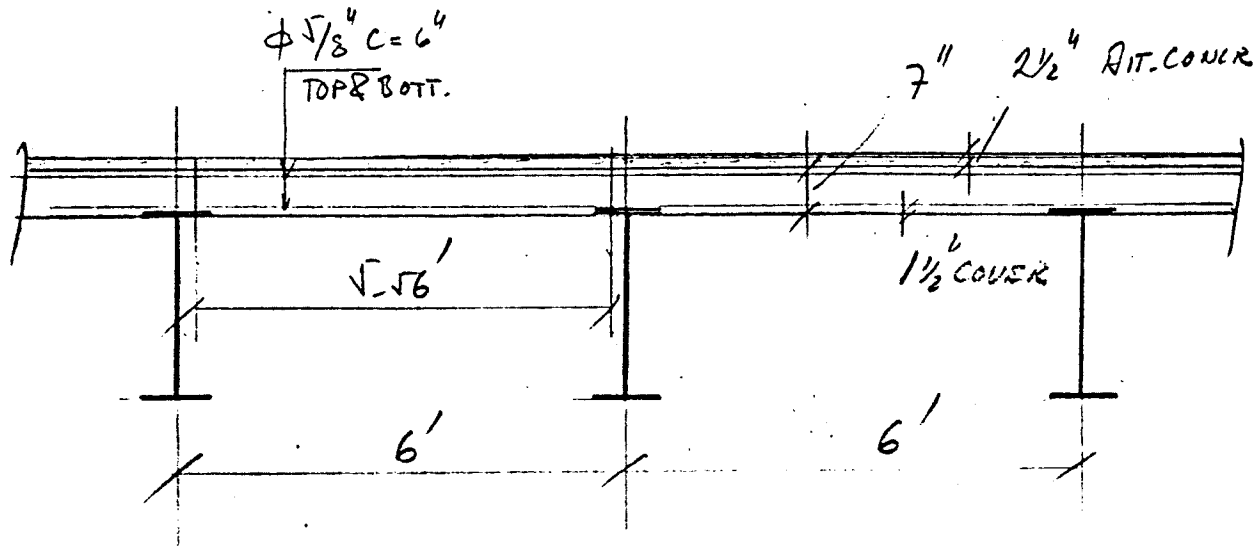
<u>LOADING</u>	<u>INVENTORY</u>	<u>OPERATING</u>
H 15	$\frac{4.86}{2.81} \times 15 = 25.9^T$	$\frac{6.95}{2.81} \times 15 = 37.1^T$
3	$\frac{4.86}{2.35} \times 23 = 47.6$	$\frac{6.95}{2.35} \times 23 = 68.0$
3-S2	$\frac{4.86}{2.35} \times 36 = 74.5$	$\frac{6.95}{2.35} \times 36 = 106.5$

ORIGINAL BRIDGE
DECK SLAB RATING FOR SHEAR

INV $V = 4.21 - 0.42$ ≈ 3.79 $\frac{k}{ft}$
OPER $V = 7.02 - 0.42$ ≈ 6.60 $-$

<u>LOADING</u>	<u>INVENTORY</u>	<u>OPERATING</u>
H-15	$\frac{3.79}{2.75} \times 15 = 20.7^T$	$\frac{6.60}{2.75} \times 15 = 36.0^T$
3	$\frac{3.79}{2.30} \times 23 = 37.9$	$\frac{6.60}{2.30} \times 23 = 66.0$
3-S2	$\frac{3.79}{2.30} \times 36 = 59.3$	$\frac{6.60}{2.30} \times 36 = 103.3$

CALCULATION FOR DECK SLAB II (Bridge Widening)



Air. Cover	:	0.21	·	0.144		2	0.03
SLAB	:	0.58	·	0.150		2	0.09
							0.12 k/ft ²

M _{DL}	=	0.12	·	5.56	·	0.125	·	0.80		2	0.37 k/ft	
V _{DL}	=	0.12	(5.56	·	0.5	-	0.47)	-	1.15	2	0.22 k/ft

H15	M _{LL}	=	$\frac{12}{0.6 \cdot 5.56 + 2.5}$	·	0.2	·	5.56	-	1.20	2	2.97 k/ft
-----	-----------------	---	-----------------------------------	---	-----	---	------	---	------	---	-----------

3 3-S2	M _{LL}	=	$\frac{8}{0.36 \cdot 5.56 + 2.58}$	·	—	·	—	·	—	2	2.52 —
-----------	-----------------	---	------------------------------------	---	---	---	---	---	---	---	--------

H15	V _{LL}	=	$\frac{12}{0.6 \cdot 5.56 + 2.5}$	·	$\frac{5.56 - 0.47}{5.56}$	·	1.15	·	1.20	2	2.81 k/ft
-----	-----------------	---	-----------------------------------	---	----------------------------	---	------	---	------	---	-----------

3 3-S2	V _{LL}	=	$\frac{8}{0.36 \cdot 5.56 + 2.58}$	·	—	·	—	·	—	2	2.39 —
-----------	-----------------	---	------------------------------------	---	---	---	---	---	---	---	--------

BY: CDW DATE: 11/28/79 LOUIS BERGER & ASSOCIATES INC.
 CHKD. BY: DATE:
 SUBJECT: W-6-13

SHEET NO. 21 OF 87
 PROJECT W18513 89

MOMENT AND SHEAR CAPACITY

	f'_c	=	3000	psi	CONCR. ULT. STRENGTH
INVENT	f_c	=	1200		ALLOW. CONCR. STRESS
OPER			1650	-u-	
INVENT	V_c	=	90	-u-	-u- SHEAR -u-
OPER			150	-u-	
INVENT	f_s	=	20000	-u-	-u- STEEL -u-
OPER			23000	+u-	

USE H&B7
 PROGRAM



$d = 5.19''$
 $A_s = 0.614 \text{ in}^2$
 ($\phi 5/8'' c = 6''$)

$u = 10$
 $f_{cd} = 4.57''$

INV	M_c	=	4.68	$10/14$;	f_c	=	1107	psi
OPER	M_c	=	6.55	-u-	;	f_c	=	1550	-u-
INV	V_c	=	0.09	$\cdot 4.57 \cdot 12$	=	4.94	u/ft		
OPER	V_c	=	0.15	$\cdot 4.57 \cdot 12$	=	8.23	-u-		

DECK SLAB RATING FOR MOMENT

INV = 4.62 - 0.37 = 4.25 ^{1k/ft}
 OPER = 6.55 - 0.37 = 6.23

LOADING

INVENTORY

OPERATING

H 15	$\frac{4.25}{2.97} \times 15 = 21.8^T$	$\frac{6.23}{2.97} \times 15 = 31.5^T$
3	$\frac{4.25}{2.52} \times 23 = 39.3$	$\frac{6.23}{2.52} \times 23 = 56.9$
3-52	$\frac{4.25}{2.52} \times 36 = 61.6$	$\frac{6.23}{2.52} \times 36 = 89.0$

DECK SLAB RATING FOR SHEAR

INV = 4.94 - 0.32 = 4.62 ^{1k/ft}
 OPER = 8.23 - 0.32 = 7.91

LOADING

INVENTORY

OPERATING

H 15	$\frac{4.62}{2.81} \times 15 = 24.7^T$	$\frac{7.91}{2.81} \times 15 = 42.2^T$
3	$\frac{4.62}{2.39} \times 23 = 44.5$	$\frac{7.91}{2.39} \times 23 = 76.1$
3-52	$\frac{4.62}{2.39} \times 36 = 69.6$	$\frac{7.91}{2.39} \times 36 = 119.1$

DECK SLAB RATING (ORIG. BRIDGE)

SLAB ALONG WITH CONC. BEAMS 8" THICK
S = 4.92'

DL MOMENT. 8" SLAB = 0.67 x 0.150 = 0.101
7 1/2" CONC = 0.66 x 0.150 = 0.099
2 1/2" BIT. CONC = 0.21 x 0.144 = 0.030
0.230

M_{DL} = 1/8 x 0.230 x 4.92² = 0.70^{1k} cont x 0.8 = 0.56^{1k}/LF.

LL MOMENT E = 0.6S + 2.5 = 0.6 x 4.92 + 2.5 = 5.45 S.A.
E = 0.36S + 2.58 = 0.36 x 4.92 + 2.58 = 4.35^{1k} T.A.

IMPACT 30%

H-15 M_{LL} = 1.3 x 0.2 x 12 / 5.45 x 4.92 = 2.82^{1k}/LF

3 M_{LL} = 1.3 x 0.2 x 8 / 4.35 x 4.92 = 2.35^{1k}/LF

3S2 M_{LL} = " " " = 2.35^{1k}/LF

SECTION CAPACITY.

5/8" ϕ @ 6" = 2 x 0.31 = 0.62² d = 8 - 1" - 0.31 = 6.69
n = 15

m = ρ = nAs / bd = 15 x 0.62 / 12 x 6.69 = 0.116

k = √(m² + 2ρ) - m = 0.379 j = 1 - zk for z = 0.33 j = 1 - 0.33 x 0.379
j = 0.875.

Moment Capacity.

Inv M_c = 18,000 x 0.875 x 6.69 x 0.62 / 12,000 = 5.44^{1k}/LF

OPER M = 25,000 x 0.875 x 6.69 x 0.62 / 12,000 = 7.56^{1k}/LF

Concrete stress.

Inv f_c = 18,000 x 0.379 / 15 (1 - 0.379) = 732 psi < 800 psi

OPER f_c = 25,000 x 0.379 / 15 (1 - 0.379) = 1017 psi < 1100 psi

DECK SLAB RATING FOR MOMENT. (ORIG. BRIDGE)

INV M = 5.44 - 0.56 = 4.88 -
 OPER M = 7.56 - 0.56 = 7.00

	<u>INV</u>	<u>OPERATING</u>
H-15	$(4.88 / 2.82) 15 = 26.0^T$	$(7.00 / 2.82) 15 = 37.2^T$
3	$(4.88 / 2.35) 23 = 47.8^T$	$(7.00 / 2.35) 23 = 68.5^T$
3S2	$(4.88 / 2.35) 36 = 74.8^T$	$(7.00 / 2.35) 36 = 107.2^T$

DL SHEAR

$V_{DL} = \frac{1}{2} \times 0.230 \times 4.92 - 0.230 \times \frac{6.69}{12} = 0.44 \frac{K}{LF} \text{ Cont } 1.15 = \underline{0.50} \frac{K}{LF}$
 $d = 6.64$
 H-15 $V_{LL} = \frac{1.3 \times 12}{5.45} \left[\frac{4.92 - 0.81}{4.92} \right] = 2.39 \frac{K}{LF} \text{ Cont } 1.15 = \underline{2.75} \frac{K}{LF}$
 $d/12 = 0.56$
 $\text{Haunch } \frac{3''}{3} = \frac{0.25}{0.81}$
 3&3S2 $V_{LL} = \frac{1.3 \times 8}{4.35} \left[\frac{4.92 - 0.81}{4.92} \right] = 2.00 \frac{K}{LF} \text{ Cont } 1.15 = \underline{2.30} \frac{K}{LF}$

SHEAR CAPACITY

INV $V_c = 60 \times 12 \times 6.69 \times 0.875 = \underline{4215}$ LBS
 OPER $V_c = 100 \times 12 \times 6.69 \times 0.875 = \underline{7025}$ LBS

DECK SLAB RATING FOR SHEAR (ORIG. BRIDGE)

INV $V = 4.22 - 0.50 = \underline{3.72} \frac{K}{LF}$
 OPER $V = 7.03 - 0.50 = \underline{6.53} \frac{K}{LF}$

	<u>INVENTORY</u>	<u>OPERATING</u>
H-15	$(3.72 / 2.75) 15 = 20.3^T$	$(6.53 / 2.75) 15 = 35.6^T$
3	$(3.72 / 2.30) 23 = 37.2^T$	$(6.53 / 2.30) 23 = 65.3^T$
3S2	$(3.72 / 2.30) 36 = 58.2^T$	$(6.53 / 2.30) 36 = 102.2^T$

SCALE 1" = 4'-0"
 SHEET 24 OF 87
 11/14/79
 L. BERGER & ASSOCIATES, INC.
 BUFFALO, NEW YORK

DECK SLAB RATING CONT'D

(BRIDGE WIDENING)

SLAB ALONG WITH STRINGER BEAMS

7" THICK SLAB

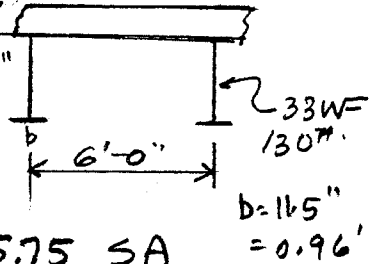
DL MOMENT 7" SLAB = $0.58 \times 0.150 = 0.087$

2 1/2" BIT CONC. = $0.21 \times 0.144 = 0.030$

0.117

$s = 6 - \frac{b}{2} = 6 - \frac{0.96}{2} = 5.42'$

$b = 11.5"$



$M_{DL} = \frac{1}{8} \times 0.117 \times 5.42^2 = 0.43 \text{ k} \text{ cont. } 0.8 = 0.34 \text{ k/lf.}$

LL MOMENT $E = 0.6S + 2.5 = 0.6 \times 5.42 + 2.5 = 5.75 \text{ SA}$

$E = 0.36S + 2.58 = 0.36 \times 5.42 + 2.58 = 4.53 \text{ TA}$

IMPACT 30%

H-15 $M_{LL} = 1.3 \times 0.2 \times \frac{12}{5.75} \times 5.42 = 2.94 \text{ k/lf}$

3 $M_{LL} = 1.3 \times 0.2 \times \frac{8}{4.53} \times 5.42 = 2.49 \text{ k/lf}$

3S2 $M_{LL} = \text{ " " " } = 2.49 \text{ k/lf}$

SECTION CAPACITY. $5/8 \text{ } \phi @ 6" = 0.62 \text{ } d = 7 - 1.5 - 0.31 = 5.19"$
 $n =$

$m = \frac{E_s}{E_c} = \frac{n A_s}{b d} = \frac{10 \times 0.62}{12 \times 5.19} = 0.100$

$k = \sqrt{m^2 + 2g} - m = 0.358$ $\phi = 1 - z k$ for $z = 0.33$ $\phi = 1 - 0.33 \times 0.358$
 $\phi = 0.882$

Moment Capacity

Inv $M = \frac{20,000 \times 0.882 \times 5.19 \times 0.62}{12000} = 4.73 \text{ k/lf}$

OPER $M = \frac{28,000 \times 0.882 \times 5.19 \times 0.62}{12000} = 6.62 \text{ k/lf}$

Concrete stress

Inv $f_c = \frac{20,000 \times 0.358}{10 \times (1 - 0.358)} = 1115 < 1200 \text{ psi}$

OPER $f_c = \frac{28,000 \times 0.358}{10 \times (1 - 0.358)} = 1561 < 1650 \text{ psi}$

DECK SLAB RATING FOR MOMENT (BRIDGE WIDENING)

INV M = 4.73 - 0.34 = 4.39
 OPER M = 6.62 - 0.34 = 6.28

	<u>INV</u>			<u>OPERATING</u>
H-15	(4.39/2.94) 15	= 22.4 ^T	(6.28/2.94) 15	= 32.0 ^T
3	(4.39/2.49) 23	= 40.6 ^T	(6.28/2.49) 23	= 58.0 ^T
3S2	(4.39/2.49) 36	= 63.5 ^T	(6.28/2.49) 36	= 90.8 ^T

DL SHEAR

$V_{DL} = \frac{1}{2} \times 0.117 \times 5.42 - 0.117 \times \frac{5.19}{12} = 0.27 \frac{K/FT}{cont 1.15} = 0.31 \frac{K/FT}{d=5.19}$
 $d_{1/2} = 0.43$

H-15 $V_{LL} = \frac{1.3 \times 12}{5.75} \left[\frac{5.42 - 0.43}{5.42} \right] = 2.50 \frac{K/FT}{cont 1.15} = 2.87 \frac{K/FT}$

3 & 3S2 $V_{LL} = \frac{1.3 \times 8}{4.53} \left[\frac{5.42 - 0.43}{5.42} \right] = 2.11 \frac{K/FT}{cont 1.15} = 2.43 \frac{K/FT}$

SHEAR CAPACITY

$\phi = 7/8$ (Assumed)

INV $V_c = 9.0 \times 12 \times 5.19 \times 0.875 = 4905$ LBS.
 OPER $V_c = 15.0 \times 12 \times 5.19 \times 0.875 = 8174$ LBS

DECK SLAB RATING FOR SHEAR (BRIDGE WIDENING)

INV $V = 4.91 - 0.31 = 4.60$
 OPER $V = 8.17 - 0.31 = 7.86$

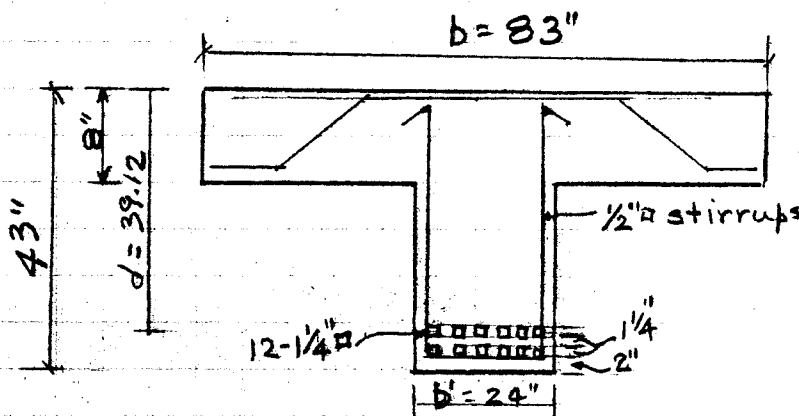
INVENTORY

OPERATING

H-15	(4.60/2.87) 15	= 24.0 ^T	(7.86/2.87) 15	= 41.1 ^T
3	(4.60/2.43) 23	= 43.5 ^T	(7.86/2.43) 23	= 74.4 ^T
3S2	(4.60/2.43) 36	= 68.1 ^T	(7.86/2.43) 36	= 116.4 ^T

MOMENT CAPACITIES FOR SECTIONS

INTERIOR BEAMS.



$n = 15.$

$1/4''^A = 1.563''^2$

$A_s = 12 \times 1.563 = 18.76''^2$

$1.25/2 = 0.63''$

$d \times 18.76 = 40.37 \times 9.38 + 37.87 \times 9.38$

$d = \frac{378.67 + 355.22}{18.76} = 39.12''$

Effective Slab Width

1) C to C of span $6'-11'' = 83''$

2) $1/4$ span Length = $1/4(53') = 159''$

3) $(6t)^2 = 12 \times 8 = 96''$

$m = q = \frac{n A_s}{b d} = \frac{15 \times 18.76}{24 \times 39.12} = 0.30$

$K = \sqrt{m^2 + 2g} - m = 0.531$ $Kd = 0.531 \times 39.12 = 20.76 > 8''$
use other method

$m = \frac{n A_s}{b d} + \frac{(b - b') t}{b d} = \frac{15 \times 18.76}{24 \times 39.12} + \frac{(83 - 24) 8}{24 \times 39.12} = 0.803$

$q = \frac{n A_s}{b d} + \frac{(b - b') t}{b d} \times \frac{t/2}{d} = 0.30 + \frac{0.503 \times 4}{39.12} = 0.351$

$K = \sqrt{m^2 + 2g} - m = \sqrt{0.803^2 + 2 \times 0.351} - 0.803 = 0.358$

$Kd = 0.358 \times 39.12 = 14.00$ $t/Kd = \frac{8}{14.00} = 0.57$ $y = 0.44$ (from table 9 Aci)

(table 9 Aci)

BY MN DATE 11/16/79

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 28 OF 87

CHKD. BY DATE

BR. RATING

PROJECT W1853896

SUBJECT BR NO W 6 13

$$\frac{1}{k} \times \frac{yt}{d} = \frac{0.44 \times 8}{14.00} = 0.251$$

$$\frac{1}{k} \frac{(b-b')t}{bd} = \frac{0.503}{0.358} = 1.405$$

$$z = \frac{\frac{1}{6} + \frac{1}{k} \frac{(b-b')t}{bd} \times \frac{yt}{kd} \left(1 - \frac{yt}{kd}\right)}{\frac{1}{2} + \frac{1}{k} \frac{(b-b')t}{bd} \left(1 - \frac{yt}{kd}\right)}$$

$$= \frac{\frac{1}{6} + 1.405 \times 0.251 (1 - 0.251)}{\frac{1}{2} + 1.405 (1 - 0.251)} = 0.278$$

$$j = 1 - z k = 1 - 0.278 \times 0.358 = 0.900$$

Moment Capacity $M = \frac{f_s A_s j d}{12,000}$

$$\text{INV. } M_c = \frac{18,000 \times 18.76 \times 0.900 \times 39.12}{12,000} = 990.8 \text{ }^{\text{IK}}$$

$$\text{OPER } M_c = \frac{25,000 \times 18.76 \times 0.900 \times 39.12}{12,000} = 1376.0 \text{ }^{\text{IK}}$$

Concrete stress

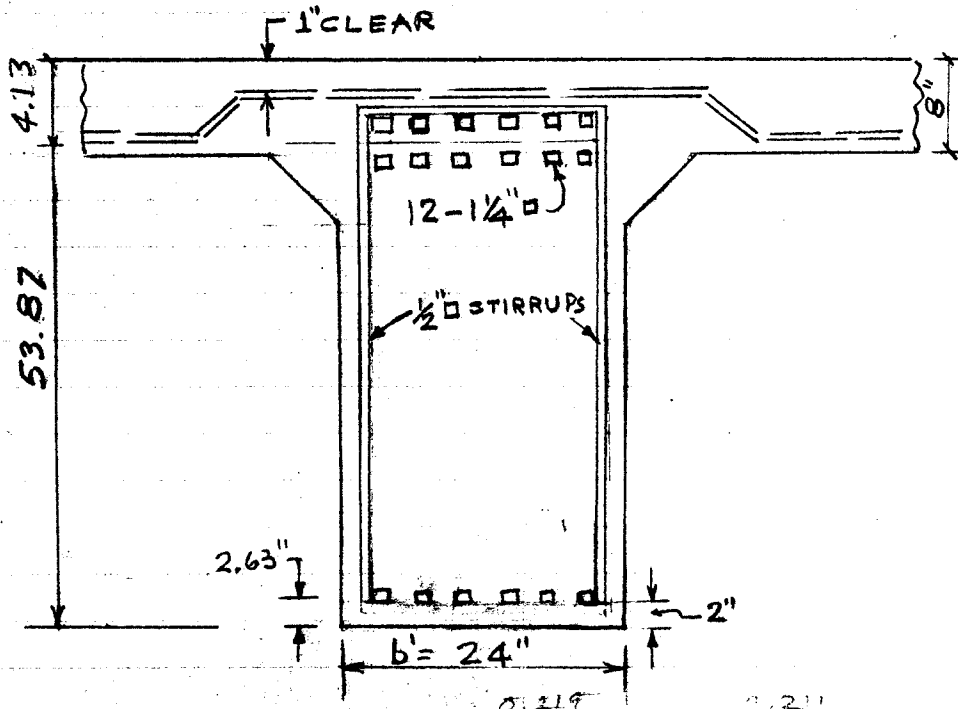
$$\text{INV } f_c = (f_s/m) \left(\frac{k}{1-k}\right) = \frac{18,000}{15} \left(\frac{0.358}{1-0.358}\right) = 669 < 800 \text{ psi}$$

$$\text{OPER } f_c = (f_s/m) \left(\frac{k}{1-k}\right) = \frac{25,000}{15} \left(\frac{0.358}{1-0.358}\right) = 930 < 1100 \text{ psi}$$

450
SUBMIT
450
BUILDING RESEARCH CORPORATION

MOMENT CAPACITIES FOR SECTIONS

NEGATIVE MOMENT AT SUPPORT - INTERIOR BEAMS



$$d = 58.00 - 4.13 = 53.87$$

$$d' = 2.63$$

$$n = 15$$

$$A_s = 12 \times 1.563 = 18.76$$

$$m = \rho = \frac{n A_s}{b d} = \frac{15 \times 18.76}{24 \times 53.87} = 0.218$$

$$k = \sqrt{m^2 + 2\rho} - m = 0.477 \quad z = 0.33 \quad j = 1 - 0.33 \times 0.477 = 0.842$$

$$j d = 0.842 \times 53.87 = 45.36$$

MOMENT CAPACITY $M = \frac{f_s A_s j d}{12,000}$

$$\text{INV } M_c = \frac{18,000 \times 18.76 \times 45.36}{12,000} = \frac{1276 \times 800}{1094.5} = 932.7$$

$$\text{OPER } = \frac{25,000 \times 18.76 \times 45.36}{12,000} = \frac{1772 \times 1100}{1520} = 1282.3$$

concrete stress

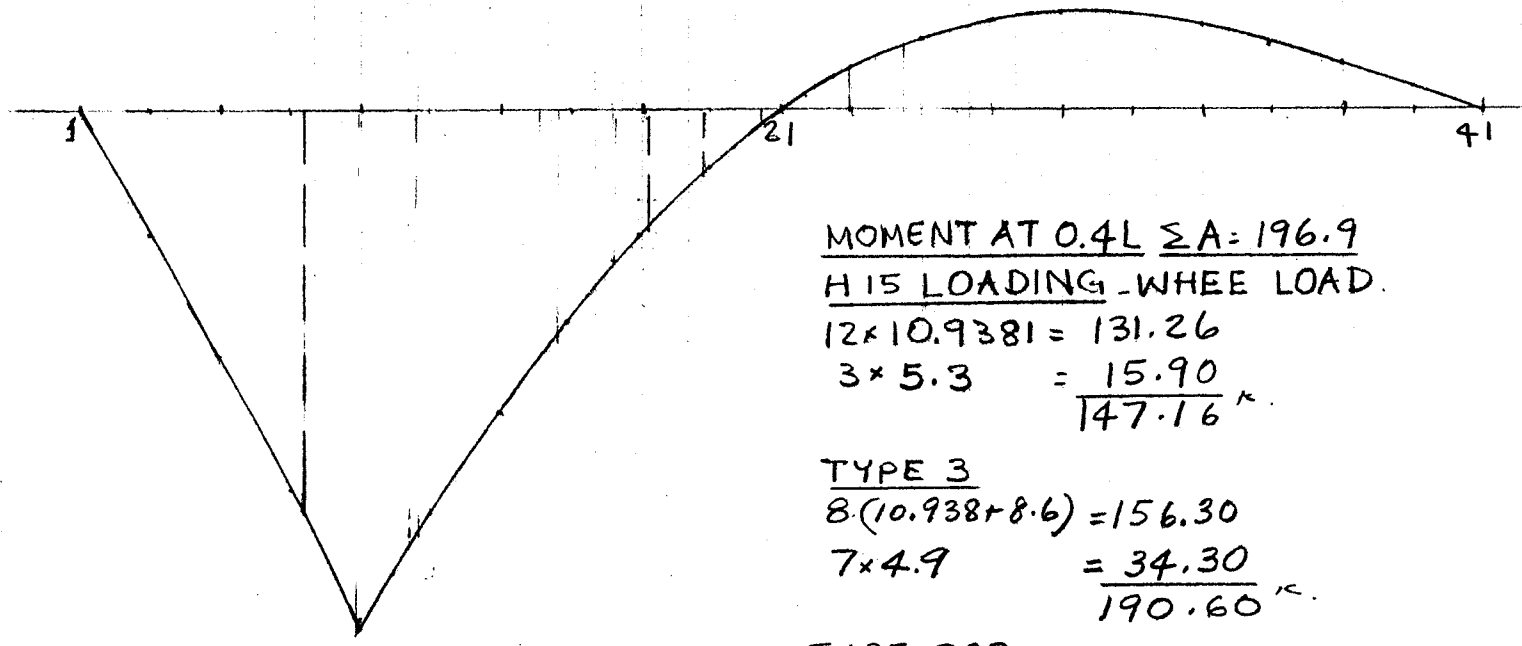
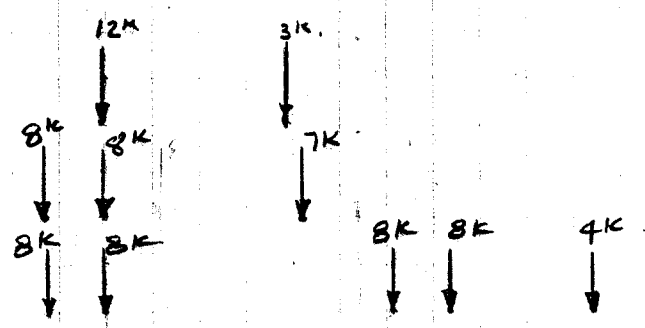
$$\text{INV } f_c = \left(\frac{f_s}{n} \right) \left(\frac{k}{1-k} \right) = \frac{18000}{15} \left(\frac{0.477}{1-0.477} \right) = 1094.5 > 800$$

$$\text{OPER } f_c = \frac{25,000}{15} \left(\frac{0.477}{1-0.477} \right) = 1520.1 > 1100$$

BY: MN DATE 11/21/79
 CHKD. BY: DATE
 SUBJECT: BR. NO. W-6-13

LOUIS BERGER & ASSOCIATES INC.
 BR. RATING

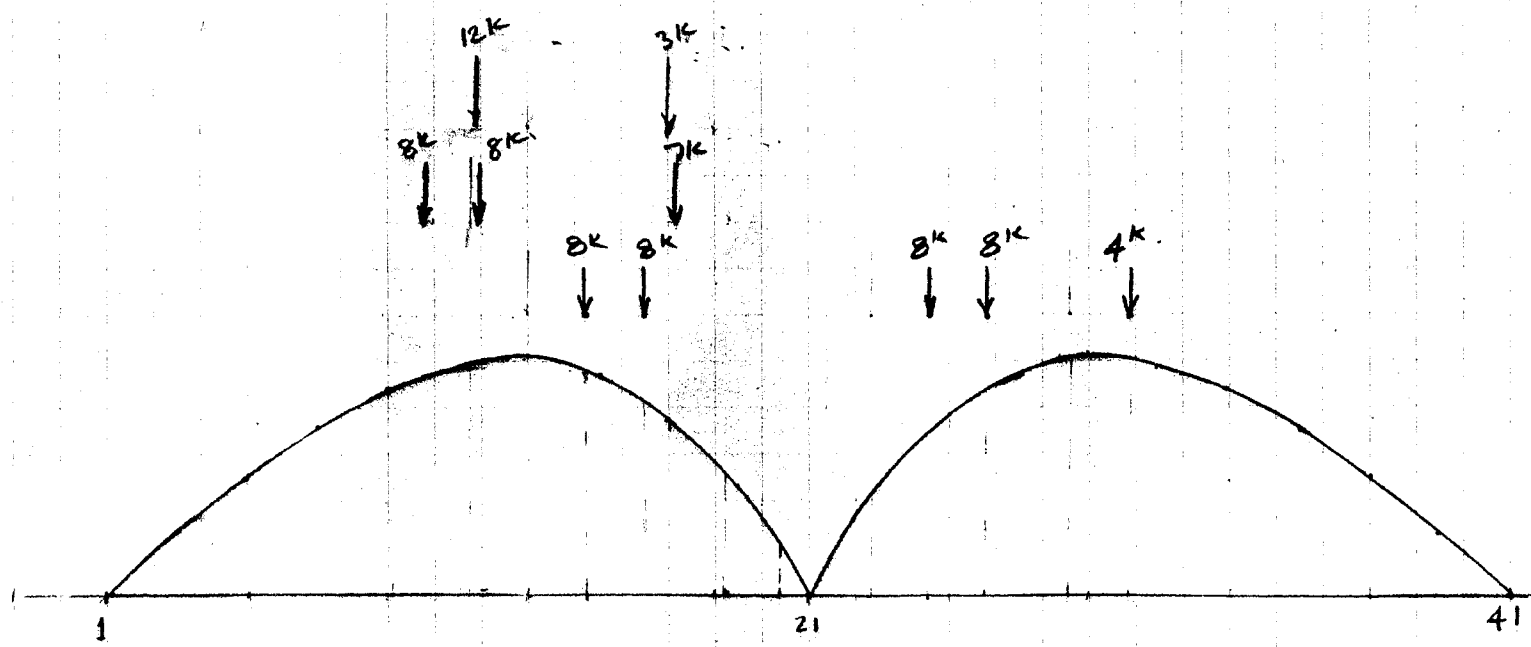
SHEET NO. 30 OF 87
 PROJECT W 185 B 896



MOMENT AT 0.4L $\Sigma A = 196.9$
 H IS LOADING - WHEEL LOAD.
 $12 \times 10.9381 = 131.26$
 $3 \times 5.3 = 15.90$
 $\underline{147.16^k}$

TYPE 3
 $8(10.938 + 8.6) = 156.30$
 $7 \times 4.9 = 34.30$
 $\underline{190.60^k}$

TYPE 3S2
 $8(10.938 + 8.6 + 2.6 + 1.4) = 188.3$
 $(4 \times 0.9) - = 3.6 (-)$
 $\underline{184.70^k}$



LOAD @ 21
 MOMENT $\Sigma A = (350.46) -$
HIS LOADING - WHEEL LOAD
 $12 \times 5.07 = 60.00$
 $3 \times 3.8 = 11.40$
 71.40

TYPE 3
 $8(5.0 + 4.7) = 77.6$
 $7 \times 3.7 = 25.9$
 103.5

TYPE 3S2
 $8(4.8 + 4.2 + 3.6 + 4.4) = 136$
 $4 \times 5 = 20$
 156

BY MN DATE 11/23/79
 CHKD. BY _____ DATE _____
 SUBJECT BR. No. W-6-13

LOUIS BERGER & ASSOCIATES INC.
 BRIDGE RATING

SHEET NO. 31 OF 87
 PROJECT W185 B 896

DEAD LOAD MOMENTS POSITIVE

D.L. BEAM = $\frac{24 \times 35}{12 \times 12} \times 0.150 = 0.875$

HAUNCH SW + Railing = $\frac{2 \times 6}{2 \times 12} \times \frac{6}{12} \times 0.150 = 0.038$
 0.310

SLAB + BIT. = $\frac{83}{12} \times 0.137 = 0.948$

CONC. @ SUPPORT = $\frac{15 \times 24}{12 \times 12} \times 0.150 = 0.036$
 $= 0.375 \times 9.5 / 495 = 0.036$

$\frac{0.375 \times 9.5}{2 \times 495} = 0.036$

K/LF AT MID SPAN

2.207 K/LF AT SUPPORT

$\frac{2.110 - 0.036}{2} = 2.148$

INTERIOR BEAM DEAD LOAD MOMENTS POSITIVE

PT 9 M = $\sum A \times w = 196.9 \times 2.207 = 435.2$ ^{1K}

LL+I MOMENTS POSITIVE

WHEEL DIST. FACTOR = $\frac{6.92}{6} = 1.15$ Impact I = $\frac{50}{L+125} = \frac{50}{53+125} = 0.28 = 28\%$

H-15 LOADING

At pt 9 M = $147.16 \times 1.15 \times 1.28 = 216.62$ ^{1K}

TYPE-3 LOADING

M = $190.60 \times 1.15 \times 1.28 = 280.56$ ^{1K}

TYPE-3S2 LOADING

M = $184.7 \times 1.15 \times 1.28 = 271.88$ ^{1K}

SQUARE 4 3 4 10 100 SCALE
 450

BY M.N. DATE 11/26/79

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 33 OF 87

CHKD. BY DATE

BR RATING

PROJECT W185B 896

SUBJECT BR NO. W-6-13

INTERIOR BEAM DEAD LOAD MOMENTS NEGATIVE

pt @ Support $M = -\sum Axw = -350.46 \times 2.207 = 773.5^{1K}$

LL+I MOMENTS NEGATIVE

H-15 LOADING

At pt 21 $M = -(71.4 \times 1.15 \times 1.28) = 105.1^{1K}$

TYPE-3 LOADING

$M = 103.52 \times 1.15 \times 1.28 = 152.4^{1K}$

TYPE-3S2 LOADING

$M = 156 \times 1.15 \times 1.28 = 229.63^{1K}$

BY: M.N. DATE 11/26/79

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 34 OF 87

CHKD. BY: DATE

BR RATING

PROJECT W185 B 896

SUBJECT: BR NO. W-6-13

DEAD LOAD SHEAR.

$DL + SDL = 2.485 \text{ K/LF}$

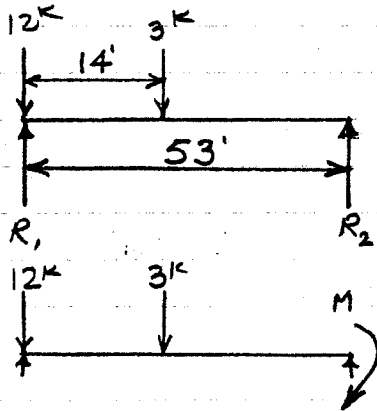
$V = \frac{3}{8} wL = 0.38 \times 2.485 \times 53 = 50.05 \text{ K}$

L/L + I SHEAR

INTERIOR BEAMS AT ABUTMENT

$DF = 1.15 \quad I = 28\%$

H 15 LOADING.

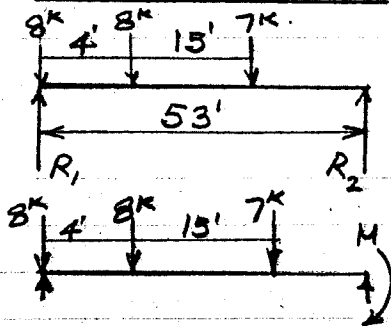


$R_1 \times 53 = 12 \times 53 + 3 \times 39$
 $R_1 = \frac{636 + 117}{53} = +14.21 \text{ K}$

$M = 3 \times 3.2 = 9.6$
 $V_M = \frac{9.6}{14.03} = -0.18 \text{ K}$

$V = 14.03 \times 1.15 \times 1.28 = \underline{\underline{20.65}}$

TYPE 3 LOADING.

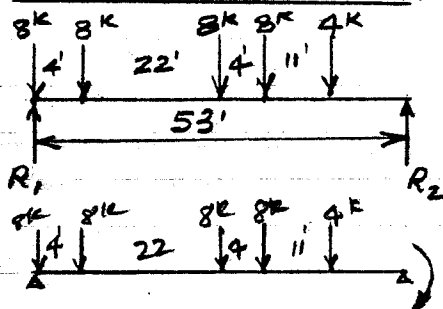


$R_1 \times 53 = 8 \times 53 + 8 \times 49 + 7 \times 34$
 $R_1 = 19.89 \text{ K}$

$M = 8 \times 1.1 + 7 \times 4.0 = 36.8 \text{ K}$
 $V_M = \frac{36.8}{53} = -0.69$
 $= \frac{-0.69}{19.20}$

$V = 19.2 \times 1.15 \times 1.28 = \underline{\underline{28.26 \text{ K}}}$

TYPE 3S2 LOADING.



$R_1 \times 53 = 8 \times 53 + 8 \times 49 + 8 \times 27 + 8 \times 23 + 4 \times 12$
 $R_1 = 23.85 \text{ K}$

$M = 8(1.1 + 4.9 + 5.1) + 4 \times 4 = 104.8$
 $V_M = \frac{104.8}{53} = -1.98$
 $= \frac{-1.98}{21.87}$

$V = 21.87 \times 1.15 \times 1.28 = \underline{\underline{32.19 \text{ K}}}$

BY MN DATE 11/26/79

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 35 OF 87

CHKD. BY _____ DATE _____

BR RATING _____

PROJECT W185B 896

SUBJECT BR NO. W-6-13

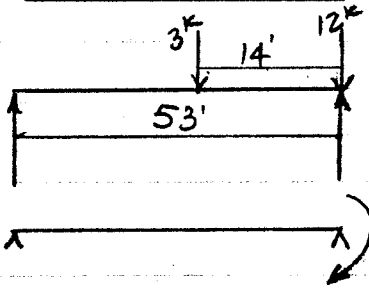
DEAD LOAD SHEAR.

AT PIER INTERIOR BEAMS

$$V = 5/8 wL = 0.62 \times 2.485 \times 53 = 81.66^k$$

LL + I SHEAR

$$DF = 1.15 \quad I = 28\%$$



$$R_2 = 14.21$$

$$= 14.21$$

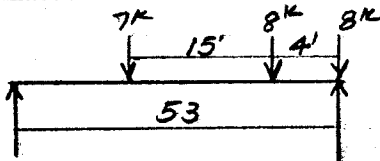
$$M = 3 \times 4.5 = 13.5$$

$$V_M = \frac{13.5}{53} = 0.25$$

$$= \frac{0.25}{14.46}^k$$

$$V = 14.46 \times 1.15 \times 1.28 = \underline{\underline{21.29^k}}$$

TYPE 3 LOADING



$$R = 19.89$$

$$= 19.89$$

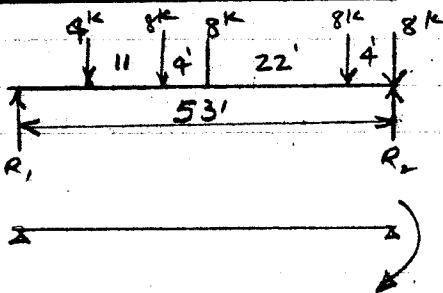
$$M = 8 \times 1.9 + 7 \times 5.0 = 50.2$$

$$V_M = \frac{50.2}{53} = 0.95$$

$$= \frac{0.95}{20.84}$$

$$V = 20.84 \times 1.15 \times 1.28 = \underline{\underline{30.68^k}}$$

TYPE 3S2 LOADING



$$R_2 = 23.85$$

$$= 23.85$$

$$M = 8(1.8 + 5.0 + 4.6) + 4 \times 2.9$$

$$= \frac{102.8}{53} = 1.94$$

$$= \frac{1.94}{25.79}$$

$$V = 25.79 \times 1.15 \times 1.28 = \underline{\underline{37.96^k}}$$

450

Produced by 3-A

Produced by 3-A

BY MN DATE 11/26/79

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 36 OF 87

CHKD. BY DATE

BR RATING

PROJECT W 185 B 896

SUBJECT BR NO. W-6-13

SHEAR CAPACITIES FOR SECTIONS.

AT PIER.

$d = 55.37$ $j \cong 0.875$ $jd = 48.45$ $A_v = 2 \times 0.25 = 0.5$ $s = 5"$

$\frac{58.00 - 2.63}{55.37}$

INV Conc. Capacity $V = v b j d = \frac{60 \times 24 \times 0.875 \times 55.37}{1000} = 69.77^k$

Stirrup Capacity $2 - \frac{1}{2}'' @ 5''$ $V' = \frac{f_v A_v j d}{s}$
 $= \frac{18,000 \times 0.5 \times 48.45}{1000 \times 5} = 87.21^k$
 $= 156.98^k$

OPER Conc. Capacity $V = \frac{100 \times 24 \times 48.45}{1000} = 116.28^k$

stirrup Capacity $= \frac{25,000 \times 0.5 \times 48.45}{1000 \times 5} = 121.13^k$
 237.41^k

SHEAR CAPACITY FOR SECTION AT ABUTMENT.

$d = 39.12$ $j \cong 0.875$ $jd = 34.23$ $A_v = 2 \times 0.25 = 0.5$ $s = 6''$

INV Conc. Capacity $V = v b j d = \frac{60 \times 24 \times 34.23}{1000} = 49.29^k$

Stirrup Capacity $2 - \frac{1}{2}'' @ 6''$ $V' = \frac{f_v A_v j d}{s}$
 $= \frac{18,000 \times 0.5 \times 34.23}{1000 \times 6} = 51.35^k$
 100.64^k

OPER Conc. Capacity $V = \frac{100 \times 24 \times 34.23}{1000} = 82.15^k$

stirrup Capacity $= \frac{25,000 \times 0.5 \times 34.23}{1000 \times 6} = 71.31^k$
 153.46^k

SHEAR CAPACITY OF BENT UP BARS.

INV. $v' = A f_v \sin \alpha$

$\alpha = 45^\circ$
 $A = 3 \times 1.56 = 4.69$

$= \frac{4.69 \times 18000 \times 0.707}{1000} = 59.7^k$

Total shear Capacity = $100.64 + 59.7 = 160.34^k$

OPER $v' = A f_v \sin \alpha$

$= \frac{4.69 \times 25000 \times 0.707}{1000} = 82.9^k$

Total shear Capacity = $153.46 + 82.9 = 236.36^k$

BY MN DATE 11/27/79

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 37 OF 87

CHKD. BY DATE

BRIDGE RATING

PROJECT W 185 B 896

SUBJECT BR NO. W-6-13

RATING FOR INTERIOR BEAMS POSITIVE MOMENT

INV 990.8 - 435.2 = 555.6
 OPER 1376.0 - 435.2 = 940.8

LOADING INVENTORY OPERATING

H-15 $(555.6/216.62) \times 15 = 38.5^T$ $(940.8/216.62) \times 15 = 65.1^T$
 3 $(555.6/280.56) \times 23 = 45.5^T$ $(940.8/280.56) \times 23 = 77.1^T$
 3S2 $(555.6/271.88) \times 36 = 73.6^T$ $(940.8/271.88) \times 36 = 124.6^T$

RATING FOR INTERIOR BEAMS NEGATIVE MOMENT AT PIER

INV 932.7 - 773.5 = 159.2
 OPER 1282.3 - 773.5 = 508.8

LOADING INVENTORY OPERATING

H-15 $(159.2/105.11) \times 15 = 22.7^T$ $(508.8/105.11) \times 15 = 72.6^T$
 3 $(159.2/152.4) \times 23 = 24.0^T$ $(508.8/152.4) \times 23 = 76.8^T$
 3S2 $(159.2/229.63) \times 36 = 25.0^T$ $(508.8/229.63) \times 36 = 79.8^T$

RATING FOR SHEAR FOR INTERIOR BEAMS AT ABUTMENT.

INV 160.3 - 50.1 = 110.2
 OPER 236.4 - 50.1 = 186.3

LOADING INVENTORY OPERATING

H-15 $(110.2/20.65) \times 15 = 80.0^T$ $(186.3/20.65) \times 15 = 135.3^T$
 3 $(110.2/28.26) \times 23 = 89.7^T$ $(186.3/28.26) \times 23 = 151.6^T$
 3S2 $(110.2/32.19) \times 36 = 123.2^T$ $(186.3/32.19) \times 36 = 208.4^T$

RATING FOR SHEAR FOR INTERIOR BEAMS AT PIER

INV 157 - 81.7 = 75.3
 OPER 237.4 - 81.7 = 155.7

LOADING INVENTORY OPERATING

H-15 $(75.3/21.29) \times 15 = 53.1^T$ $(155.7/21.29) \times 15 = 109.7^T$
 3 $(75.3/30.68) \times 23 = 56.5^T$ $(155.7/30.68) \times 23 = 116.7^T$
 3S2 $(75.3/37.96) \times 36 = 71.4^T$ $(155.7/37.96) \times 36 = 147.7^T$

450

Manufactured in U.S.A.

MDPW COMPUTER INPUT DATA

* 125 BR. M-5-1 = W-6-13 DEPT REF. NO. 896 MARION-WAREHAM

- a) Interior stringer 1957
- b) Fascia stringer 1957

IR = 100 100% AASHTO IMPACT FOR INVENTORY LOADING
 OR = 100 100% - II - OPERATING LOADING
 SLC = 100 100% - II - SAFE LOADING CAPACITY

SLC STRESS LEVEL a) 100 b) 125 100% for interior 125% for fascia beam
 SP LL BLANK NO SPECIAL LL DESIRED
 MATERIAL S STEEL

FLOOR SYSTEM	GGG	MULTIGIRDER SYSTEM
TIE PLATE	BLANK	NOT APPLICABLE
LOAD	BLANK	ALL STD. LOADINGS
BUG	BLANK	NOT USED
LANE	BLANK	NO LANE LOADING REQUIRED
INF	a) 1	b) Blank INFLUENCE LINES REQUIRED (INT BM ONLY)
UNL	0	= 7'-9" 33 WF 130 b = 11.51"
K	0	18150 - $6.3 \left(\frac{775 \times 12}{11.51} \right)^2 = 17738.7 \text{ psi}$
A	0	NO HOLES IN FLANGES. $1.20 \times 17738.7 = 21286 \text{ psi} > 18150 \text{ psi}$

Use UNL = 0 FOR 18150 psi

BRIDGE CROSS SECTION AND LOADING

PARAPET
 1/2 SIDEWALK WIDTH BLANK
 GIRDER SPACING a) 6.0' b) 4.25' $6.0/2 + 1.25 = 4.25'$ TO COMPUTE WGT OF CONC. SLAB ONLY RT FASCIA GDR.
 DISTR. FACTOR a) .545 b) .545 $\frac{1}{2} \times \frac{6.0}{5.5} = .545'$ S = 6'-0"
 SLAB THICK. 7"
 HAUNCH BLANK

BY AFP DATE 9/24/79

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 39 OF 87

CHKD. BY CDN DATE 9/26/79

BRIDGE RATING

PROJECT W185B 896

SUBJECT BRIDGE NO. M-5-1 = W-6-13 RTE 6 OVER WEWEANTIC RIVER

Superimposed
Dead Load
k/Ft

a) .390 b) .390

Superimposed DL

2 1/2" Bit conc .21 x 13.58 x .16 = .453

sidewalk 7.25 x (1.04 + 1.31) / 2 = 8.52

- 4.0 x .67 = 2.68

5.84 x .15 = .876

partition tiles .034 x 4.0 = .136

HANDRAIL say .100

1.565 k/LF

equally distr. to 4 GDRS 1.565/4 = .391

a) & b) say .390 k/LF /GDR

Hardware
Lbs/Ft.

a) 18 b) 9

Hardware

a) Diaphragms (0.427 x 6.0) / 15 = .017 k/LF

Connectors 3% .001 k/LF

.018 k/LF

b) 1/2 x .018 = .009 k/LF

SIDEWALK LIVE LOAD a) Blank b) 180
Lbs/Ft

Sidewalk Live Load

1/2 x 60 x 60 = 180 # /LF

F'c 3
n 10
SYMMETRY N

for 3000 psi concrete

No symmetry

SPAN LENGTH

CONT. C

FOR CONT GIRDER

① a) 53 b) 53

SPAN 1

② a) 53 b) 53

SPAN 2

BY AFP DATE 9/24/79

LOUIS BERGER & ASSOCIATES INC.

SHEET NO. 40 OF 87

CHKD. BY CON DATE 9/26/79

Bridge Rating

PROJECT W 185 B 896

SUBJECT BRIDGE NO. M-5-1-W-6-13 RTE 6 OVER WEWEANT

STEEL MEMBER PROPERTIES

G

Multigirder system

SPAN NO. 1

SPAN 1

RANGE 53

(FT.)

MOMENT OF INERTIA 6699

33WF130

I = 6699 in⁴

(IN⁴)

A = 38.26 in²

Area 38.26

d = 33.10 in²

(in²)

web th. = .58 in

DEPTH 33.1

WEB .58

flange width = 11.51 in.

Non composite N

FY 33

(ksi) yield strength

G

STR. STEEL 1956

SPAN NO. 2

RANGE 53

FT.

MOMENT OF INERTIA 6699

AREA 38.26

DEPTH 31.1

WEB .58

Non composite N

FY 33

(ksi) yield strength

STR STEEL 1956

450 434 434 10 100 100

Printed in U.S.A.

1 OF 6

* 1 2 5 BR. M - 5 - 1 = W - 6 - 13 DEPT. REF. 896 MARION -
 WAREHAM INTERIOR STEEL STRINGER 1957

PROBLEM IDENTIFICATION

% OF AASHTO IMPACT FACTOR			SLC STRESS LEVEL	SP. LL. MATERIAL	FLOOR SYSTEM	TIE PLATE	LOAD	BUG	LANE INF	GIRDER			FLOORBEAM			STRINGER		
IR	OR	SLC								UNL	K	A	UNL	K	A	UNL	K	A
1.00	1.00	1.00	1.00	S	G	G	G		1	0.	0.	0.						
1	4	7	10	15	19	24	26	31	35	38	43	47	50	55	59			

BRIDGE CROSS SECTION AND LOADING

PARAPET SIDEWALK WIDTH	GIRDER OR TRUSS SPACING	CL. OF GIRDER OR TRUSS TO CURB	LEFT ROADWAY WIDTH	MEDIAN WIDTH	RIGHT ROADWAY WIDTH	DISTR FACTOR	SLAB THICK	HAUNCH	SUPER DEAD LOAD	HARDWARE	SIDEWALK LL	F'C	N	SYMMETRY	LL LOCAT.	EFFECTIVE LENGTH FACTOR, %	NO. OF PANELS	TR OUT	
	6.	0	13	17	21	.545	7.		.390	1.8		3.	1.0N		53	64	56	60	63

SPAN LENGTHS

CONT.	1	2	3	4	5	6	7	8
C	53.	53.						

TRUSS ANALYSIS AND BRIDGE RATING

TRAFFIC LANE LOCATIONS

1			2			3			4			5			6			
DIST	WIDTH	% LL	DIST	WIDTH	% LL	DIST	WIDTH	% LL	DIST	WIDTH	% LL	DIST	WIDTH	% LL	DIST	WIDTH	% LL	
1	6	0	12	18	20	23	27	31	34	30	42	45	49	63	68	60	64	68

410287

1 OF 6

* 1 2 5 BR.M - 5 - I = W - 6 - 13 DEPT. REF. 896 MARION -
 WAREHAM FASCIA STEEL STRINGER 1957

PROBLEM IDENTIFICATION

% OF AASHTO IMPACT FACTOR			SLC STRESS LEVEL	SP. LL. MATERIAL	FLOOR SYSTEM	DECK PLATE	LOAD	RUG	LANE	INF	GIRDER			FLOORBEAM			STRINGER			
IR	OR	SLC									UNL	K	A	UNL	K	A	UNL	K	A	
1.00	1.00	1.00	1.25	S	GGG						0.	0.	0.							
1	4	7	10		15	19	24	26	31	35	38	43	47	50	55	59				

BRIDGE CROSS SECTION AND LOADING

PARAPET SIDEWALK WIDTH	GIRDER OR TRUSS SPACING	CL. OF GIRDER OR TRUSS TO CURB	LEFT ROADWAY WIDTH	MEDIAN WIDTH	RIGHT ROADWAY WIDTH	DISTR FACTOR	SLAB THICK	HAUNCH	SUPER DEAD LOAD	HARDWARE	SIDE-HALK LL	F'C	N	SYMMETRY	LL LOCAT.	EFFECTIVE LENGTH FACTOR, E	NO. OF PANELS	TR OUT
	4.25					.545	7.		.390		9180	3.	1.0	N				

SPAN LENGTHS

CONT.	1	2	3	4	5	6	7	8
C	53.	53.						

TRUSS ANALYSIS AND BRIDGE RATING

TRAFFIC LANE LOCATIONS

1			2			3			4			5			6			
DIST	WIDTH	% LL	DIST	WIDTH	% LL	DIST	WIDTH	% LL	DIST	WIDTH	% LL	DIST	WIDTH	% LL	DIST	WIDTH	% LL	
5		0	12	19	20	23	27	27	31	38	42	45	49	61	68	69	81	88

43087

***** BRIDGE ANALYSIS AND RATING *****
 9R.M-5-1=W-6-13 DEPT. REF. 896 MARION AREHAM INTERIOR STEEL STRINGER 1957

45 of 87

% OF AASHTO IMPACT FACTORS SLC STRESS SP. FLOOR TIE
 IR OR SLC LEVEL LL MATERIAL SYSTEM PLATE
 100. 100. 100. 100. 0 S GGG

LOAD BUG LANE INF GIRDER FLOORBEAM STRINGER
 UNL K A UNL K A JNL K A
 0.0 0 1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0

PARAPEL PLUS GIRDER OR CL. OF GIRDER OR ** ROADWAY WIDTH **
 SIDEWALK WIDTH TRUSS SPACING TRUSS TO CURB LEFT MEDIAN RIGHT
 0.0 6.00 0.0 0.0 0.0 0.0 0.0

DISTR. SLAB SUPER HARD- SIDEWALK
 FACTOR THICKNESS HAUNCH DL WARE LIVE LOAD F'C N SYMMETRY
 0.545 7.00 0.0 0.390 18. 0. 3.000 10. N

***** SPAN LENGTHS *****
 (CONTINUOUS)

SPAN # 1 2 3 4 5 6 7 8
 LENGTH 53.00 53.00

***** STEEL MEMBER PROPERTIES *****

TYPE	SPAN	RANGE	WF BEAM OR WEB		WF OR WEB PLATE		TOP PLATE		BOTTOM PLATE		COMP	FY
			BUILT-UP SECTION	DEPTH	LEFT	RIGHT	V	THICK	WIDTH	THICK		
G	1	53.00	6699.0	38.26	33.10	0.0	0.5800	0.0	0.0	0.0	N	33.0
G	2	53.00	6699.0	38.26	33.10	0.0	0.5800	0.0	0.0	0.0	N	33.0

 **** GIRDER RATINGS ****

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	1.6566
3	5.30	3.3162
4	7.95	4.9818
5	10.60	6.6563
6	13.25	8.3428
7	15.90	10.0441
8	18.55	9.1134
9	21.20	8.2036
10	23.85	7.3176
11	26.50	6.4584
12	29.15	5.6291
13	31.80	4.8326
14	34.45	4.0719
15	37.10	3.3500
16	39.75	2.6699
17	42.40	2.0345
18	45.05	1.4468
19	47.70	0.9099

20	50.35	0.4256
21	53.00	0.0
22	55.65	-0.3684
23	58.30	-0.6801
24	60.95	-0.9382
25	63.60	-1.1455
26	66.25	-1.3051
27	68.90	-1.4200
28	71.55	-1.4930
29	74.20	-1.5274
30	76.85	-1.5259
31	79.50	-1.4915
32	82.15	-1.4274
33	84.80	-1.3364
34	87.45	-1.2216
35	90.10	-1.0858
36	92.75	-0.9322
37	95.40	-0.7637
38	98.05	-0.5832
39	100.70	-0.3938
40	103.35	-0.1984
41	106.00	0.0

46 of 87

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	1.4911
3	5.30	2.9856
4	7.95	4.4871
5	10.60	5.9990
6	13.25	7.5249
7	15.90	9.0682
8	18.55	10.6323
9	21.20	9.5708
10	23.85	8.5372
11	26.50	7.5348
12	29.15	6.5673
13	31.80	5.6381
14	34.45	4.7506
15	37.10	3.9084
16	39.75	3.1149
17	42.40	2.3736
18	45.05	1.6879
19	47.70	1.0615
20	50.35	0.4977
21	53.00	0.0
22	55.65	-0.4298
23	58.30	-0.7935
24	60.95	-1.0945
25	63.60	-1.3364
26	66.25	-1.5226
27	68.90	-1.6566
28	71.55	-1.7419
29	74.20	-1.7819
30	76.85	-1.7802
31	79.50	-1.7401
32	82.15	-1.6653
33	84.80	-1.5592
34	87.45	-1.4252
35	90.10	-1.2668
36	92.75	-1.0876
37	95.40	-0.8909
38	98.05	-0.6804
39	100.70	-0.4594
40	103.35	-0.2314

41 106.00 0.0

MODIFIED INFLUENCE LINE
LOAD LOAD INFLUENCE
PT. DIST. VALUE

47 of 87

H C V

✓ 1	0.0	0.0
2	2.65	1.3255
3	5.30	2.6550 v
4	7.95	3.9924
5	10.60	5.3418 v
6	13.25	6.7070
7	15.90	8.0922 v
8	18.55	9.5012
✓ 9	21.20	10.9381 v
10	23.85	9.7568
11	26.50	8.6112 x
12	29.15	7.5055
13	31.80	6.4435
14	34.45	5.4293
15	37.10	4.4667 v
16	39.75	3.5598
17	42.40	2.7126
18	45.05	1.9291
19	47.70	1.2131
20	50.35	0.5688
21	53.00	0.0
22	55.65	-0.4912
23	58.30	-0.9069 v
24	60.95	-1.2509
25	63.60	-1.5273 v
26	66.25	-1.7401
27	68.90	-1.8933 v
28	71.55	-1.9907
29	74.20	-2.0365
30	76.85	-2.0345
31	79.50	-1.9887
32	82.15	-1.9032
33	84.80	-1.7819
34	87.45	-1.6288
35	90.10	-1.4478
36	92.75	-1.2429
37	95.40	-1.0182
38	98.05	-0.7776
39	100.70	-0.5250
40	103.35	-0.2645
41	106.00	0.0

MODIFIED INFLUENCE LINE
LOAD LOAD INFLUENCE
PT. DIST. VALUE

1	0.0	0.0
2	2.65	1.1600
3	5.30	2.3244
4	7.95	3.4977
5	10.60	4.6845
6	13.25	5.8892
7	15.90	7.1162
8	18.55	8.3701
9	21.20	9.6553
10	23.85	10.9764
11	26.50	9.6877
12	29.15	8.4437
13	31.80	7.2490
14	34.45	6.1079
15	37.10	5.0251
16	39.75	4.0048

PRINTED IN U.S.A.

17	42.40	3.0517
18	45.05	2.1702
19	47.70	1.3648
20	50.35	0.6399
21	53.00	0.0
22	55.65	-0.5526
23	58.30	-1.0202
24	60.95	-1.4073
25	63.60	-1.7183
26	66.25	-1.9577
27	68.90	-2.1299
28	71.55	-2.2396
29	74.20	-2.2910
30	76.85	-2.2888
31	79.50	-2.2373
32	82.15	-2.1411
33	84.80	-2.0046
34	87.45	-1.8324
35	90.10	-1.6288
36	92.75	-1.3983
37	95.40	-1.1455
38	98.05	-0.8748
39	100.70	-0.5906
40	103.35	-0.2976
41	106.00	0.0

48 of 87

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	0.9944
3	5.30	1.9937
4	7.95	3.0030
5	10.60	4.0272
6	13.25	5.0713
7	15.90	6.1402
8	18.55	7.2390
9	21.20	8.3726
10	23.85	9.5460
11	26.50	10.7641
12	29.15	9.3819
13	31.80	8.0544
14	34.45	6.7866
15	37.10	5.5834
16	39.75	4.4498
17	42.40	3.3908
18	45.05	2.4113
19	47.70	1.5164
20	50.35	0.7110
21	53.00	0.0
22	55.65	-0.6140
23	58.30	-1.1336
24	60.95	-1.5636
25	63.60	-1.9092
26	66.25	-2.1752
27	68.90	-2.3666
28	71.55	-2.4884
29	74.20	-2.5456
30	76.85	-2.5431
31	79.50	-2.4859
32	82.15	-2.3790
33	84.80	-2.2274
34	87.45	-2.0360
35	90.10	-1.8097
36	92.75	-1.5537
37	95.40	-1.2728

PRINTED IN U.S.A.

38	98.05	-0.9720
39	100.70	-0.6563
40	103.35	-0.3306
41	106.00	0.0

49 of 87

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	-0.6612
3	5.30	-1.3125
4	7.95	-1.9440
5	10.60	-2.5456
6	13.25	-3.1074
7	15.90	-3.6195
8	18.55	-4.0719
9	21.20	-4.4548
10	23.85	-4.7581
11	26.50	-4.9718
12	29.15	-5.0862
13	31.80	-5.0912
14	34.45	-4.9768
15	37.10	-4.7332
16	39.75	-4.3504
17	42.40	-3.8184
18	45.05	-3.1273
19	47.70	-2.2672
20	50.35	-1.2281
21	53.00	0.0
22	55.65	-1.2280
23	58.30	-2.2672
24	60.95	-3.1273
25	63.60	-3.8184
26	66.25	-4.3504
27	68.90	-4.7332
28	71.55	-4.9768
29	74.20	-5.0912
30	76.85	-5.0862
31	79.50	-4.9718
32	82.15	-4.7580
33	84.80	-4.4547
34	87.45	-4.0719
35	90.10	-3.6195
36	92.75	-3.1074
37	95.40	-2.5456
38	98.05	-1.9440
39	100.70	-1.3125
40	103.35	-0.6613
41	106.00	0.0

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	-0.3306
3	5.30	-0.6563
4	7.95	-0.9720
5	10.60	-1.2728
6	13.25	-1.5537
7	15.90	-1.8097
8	18.55	-2.0360
9	21.20	-2.2274
10	23.85	-2.3790
11	26.50	-2.4859
12	29.15	-2.5431
13	31.80	-2.5456

14	34.45	-2.4884
15	37.10	-2.3666
16	39.75	-2.1752
17	42.40	-1.9092
18	45.05	-1.5636
19	47.70	-1.1336
20	50.35	-0.6140
21	53.00	0.0
22	55.65	0.7110
23	58.30	1.5164
24	60.95	2.4114
25	63.60	3.3908
26	66.25	4.4498
27	68.90	5.5834
28	71.55	6.7866
29	74.20	8.0544
30	76.85	9.3819
31	79.50	10.7641
32	82.15	9.5460
33	84.80	8.3726
34	87.45	7.2390
35	90.10	6.1403
36	92.75	5.0713
37	95.40	4.0272
38	98.05	3.0030
39	100.70	1.9937
40	103.35	0.9944
41	106.00	0.0

50 of 87

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	-0.2975
3	5.30	-0.5906
4	7.95	-0.8748
5	10.60	-1.1455
6	13.25	-1.3983
7	15.90	-1.6288
8	18.55	-1.8324
9	21.20	-2.0047
10	23.85	-2.1411
11	26.50	-2.2374
12	29.15	-2.2888
13	31.80	-2.2910
14	34.45	-2.2396
15	37.10	-2.1299
16	39.75	-1.9577
17	42.40	-1.7183
18	45.05	-1.4073
19	47.70	-1.0202
20	50.35	-0.5526
21	53.00	0.0
22	55.65	0.6399
23	58.30	1.3648
24	60.95	2.1702
25	63.60	3.0517
26	66.25	4.0048
27	68.90	5.0251
28	71.55	6.1079
29	74.20	7.2489
30	76.85	8.4437
31	79.50	9.6876
32	82.15	10.9764
33	84.80	9.6553
34	87.45	8.3701

35	90.10	7.1162
36	92.75	5.8892
37	95.40	4.6845
38	98.05	3.4977
39	100.70	2.3244
40	103.35	1.1599
41	106.00	0.0

51 of 87

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	-0.2645
3	5.30	-0.5250
4	7.95	-0.7776
5	10.60	-1.0182
6	13.25	-1.2430
7	15.90	-1.4478
8	18.55	-1.6288
9	21.20	-1.7819
10	23.85	-1.9032
11	26.50	-1.9887
12	29.15	-2.0345
13	31.80	-2.0365
14	34.45	-1.9908
15	37.10	-1.8933
16	39.75	-1.7401
17	42.40	-1.5273
18	45.05	-1.2509
19	47.70	-0.9069
20	50.35	-0.4912
21	53.00	0.0
22	55.65	0.5688
23	58.30	1.2131
24	60.95	1.9291
25	63.60	2.7126
26	66.25	3.5598
27	68.90	4.4667
28	71.55	5.4293
29	74.20	6.4435
30	76.85	7.5055
31	79.50	8.6112
32	82.15	9.7568
33	84.80	10.9381
34	87.45	9.5012
35	90.10	8.0922
36	92.75	6.7070
37	95.40	5.3418
38	98.05	3.9924
39	100.70	2.6550
40	103.35	1.3255
41	106.00	0.0

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	-0.2314
3	5.30	-0.4594
4	7.95	-0.6804
5	10.60	-0.8909
6	13.25	-1.0876
7	15.90	-1.2668
8	18.55	-1.4252
9	21.20	-1.5592
10	23.85	-1.6653

H C V

PRINTED IN U.S.A.

11	26.50	-1.7402
12	29.15	-1.7802
13	31.80	-1.7819
14	34.45	-1.7419
15	37.10	-1.6566
16	39.75	-1.5226
17	42.40	-1.3364
18	45.05	-1.0945
19	47.70	-0.7935
20	50.35	-0.4298
21	53.00	0.0
22	55.65	0.4977
23	58.30	1.0615
24	60.95	1.6879
25	63.60	2.3736
26	66.25	3.1149
27	68.90	3.9084
28	71.55	4.7506
29	74.20	5.6381
30	76.85	6.5673
31	79.50	7.5348
32	82.15	8.5372
33	84.80	9.5708
34	87.45	10.6323
35	90.10	9.0682
36	92.75	7.5249
37	95.40	5.9990
38	98.05	4.4871
39	100.70	2.9856
40	103.35	1.4911
41	106.00	0.0

52 of 87

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	-0.1984
3	5.30	-0.3938
4	7.95	-0.5832
5	10.60	-0.7637
6	13.25	-0.9322
7	15.90	-1.0858
8	18.55	-1.2216
9	21.20	-1.3364
10	23.85	-1.4274
11	26.50	-1.4916
12	29.15	-1.5259
13	31.80	-1.5274
14	34.45	-1.4931
15	37.10	-1.4200
16	39.75	-1.3051
17	42.40	-1.1455
18	45.05	-0.9382
19	47.70	-0.6801
20	50.35	-0.3684
21	53.00	0.0
22	55.65	0.4266
23	58.30	0.9099
24	60.95	1.4468
25	63.60	2.0345
26	66.25	2.6699
27	68.90	3.3500
28	71.55	4.0720
29	74.20	4.8326
30	76.85	5.6291
31	79.50	6.4584

32	82.15	7.3176
33	84.80	8.2036
34	87.45	9.1134
35	90.10	10.0441
36	92.75	8.3428
37	95.40	6.6563
38	98.05	4.9818
39	100.70	3.3162
40	103.35	1.6566
41	106.00	0.0

53 of 87

***** LIVE LOAD - H20 *****

THE LOCATION OF THE CRITICAL SECTION IS AT
31.80 FT. FROM THE LEFT END OF SPAN NO. 2.

***** SECTION PROPERTIES *****

	DEPTH	GROSS MOMENT OF C		SECTION MODULUS	
		AREA	INERTIA	TOP	BOTTOM
NON-COMPOSITE	33.10	38.26	6699.00	16.55	404.8 404.8

DL1	DL2	LL + IMPACT MOMENT FOR			ALLOWABLE STRESSES FOR		
MOMENT	MOMENT	IR	OR	SLC	IR	OR	SLC
1590.6	921.5	3277.7	3277.7	3277.7	18.150	24.750	18.150
					18.150	24.750	18.150

TENSION
COMPRESSION

	STRESSES DUE TO		STRESSES DUE TO LL+I FOR		
	DL1	DL2	IR	OR	SLC
TOP FIBER	3.930	2.277	8.098	8.098	8.098
BOTTOM FIBER	3.930	2.277	8.098	8.098	8.098

INVENTORY RATING $1.4750 \times 20T = 29.50T$
 OPERATING RATING $2.2900 \times 20T = 45.80T$
 SAFE LOAD CAPACITY 1.4750

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	1.6566
3	5.30	3.3162
4	7.95	4.9818
5	10.60	6.6563
6	13.25	8.3428
7	15.90	10.0441
8	18.55	9.1134
9	21.20	8.2036
10	23.85	7.3176
11	26.50	6.4584
12	29.15	5.6291
13	31.80	4.8326
14	34.45	4.0719
15	37.10	3.3500
16	39.75	2.6699
17	42.40	2.0345
18	45.05	1.4468
19	47.70	0.9099
20	50.35	0.4266
21	53.00	0.0
22	55.65	-0.3684
23	58.30	-0.6801
24	60.95	-0.9382

PRINTED IN U.S.A.

25	63.60	-1.1455
26	66.25	-1.3051
27	68.90	-1.4200
28	71.55	-1.4930
29	74.20	-1.5274
30	76.85	-1.5259
31	79.50	-1.4915
32	82.15	-1.4274
33	84.80	-1.3364
34	87.45	-1.2216
35	90.10	-1.0858
36	92.75	-0.9322
37	95.40	-0.7637
38	98.05	-0.5832
39	100.70	-0.3938
40	103.35	-0.1984
41	106.00	0.0

54 of 87

MODIFIED INFLUENCE LINE

LOAD LOAD INFLUENCE
PT. DIST. VALUE

1	0.0	0.0
2	2.65	1.4911
3	5.30	2.9856
4	7.95	4.4871
5	10.60	5.9990
6	13.25	7.5249
7	15.90	9.0682
8	18.55	10.6323
9	21.20	9.5708
10	23.85	8.5372
11	26.50	7.5348
12	29.15	6.5673
13	31.80	5.6381
14	34.45	4.7506
15	37.10	3.9084
16	39.75	3.1149
17	42.40	2.3736
18	45.05	1.6879
19	47.70	1.0615
20	50.35	0.4977
21	53.00	0.0
22	55.65	-0.4298
23	58.30	-0.7935
24	60.95	-1.0945
25	63.60	-1.3364
26	66.25	-1.5226
27	68.90	-1.6566
28	71.55	-1.7419
29	74.20	-1.7819
30	76.85	-1.7802
31	79.50	-1.7401
32	82.15	-1.6653
33	84.80	-1.5592
34	87.45	-1.4252
35	90.10	-1.2668
36	92.75	-1.0876
37	95.40	-0.8909
38	98.05	-0.6804
39	100.70	-0.4594
40	103.35	-0.2314
41	106.00	0.0

MODIFIED INFLUENCE LINE
LOAD LOAD INFLUENCE
PT. DIST. VALUE

1	0.0	0.0
2	2.65	1.3255
3	5.30	2.6550
4	7.95	3.9924
5	10.60	5.3418
6	13.25	6.7070
7	15.90	8.0922
8	18.55	9.5012
9	21.20	10.9381
10	23.85	9.7568
11	26.50	8.6112
12	29.15	7.5055
13	31.80	6.4435
14	34.45	5.4293
15	37.10	4.4667
16	39.75	3.5598
17	42.40	2.7126
18	45.05	1.9291
19	47.70	1.2131
20	50.35	0.5688
21	53.00	0.0
22	55.65	-0.4912
23	58.30	-0.9069
24	60.95	-1.2509
25	63.60	-1.5273
26	66.25	-1.7401
27	68.90	-1.8933
28	71.55	-1.9907
29	74.20	-2.0365
30	76.85	-2.0345
31	79.50	-1.9887
32	82.15	-1.9032
33	84.80	-1.7819
34	87.45	-1.6288
35	90.10	-1.4478
36	92.75	-1.2429
37	95.40	-1.0182
38	98.05	-0.7776
39	100.70	-0.5250
40	103.35	-0.2645
41	106.00	0.0

MODIFIED INFLUENCE LINE
LOAD LOAD INFLUENCE
PT. DIST. VALUE

1	0.0	0.0
2	2.65	1.1600
3	5.30	2.3244
4	7.95	3.4977
5	10.60	4.6845
6	13.25	5.8892
7	15.90	7.1162
8	18.55	8.3701
9	21.20	9.6553
10	23.85	10.9764
11	26.50	9.6877
12	29.15	8.4437
13	31.80	7.2490
14	34.45	6.1079
15	37.10	5.0251
16	39.75	4.0048
17	42.40	3.0517
18	45.05	2.1702
19	47.70	1.3648
20	50.35	0.6399
21	53.00	0.0

22	55.65	-0.5526
23	58.30	-1.0202
24	60.95	-1.4073
25	63.60	-1.7183
26	66.25	-1.9577
27	68.90	-2.1299
28	71.55	-2.2396
29	74.20	-2.2910
30	76.85	-2.2888
31	79.50	-2.2373
32	82.15	-2.1411
33	84.80	-2.0046
34	87.45	-1.8324
35	90.10	-1.6288
36	92.75	-1.3983
37	95.40	-1.1455
38	98.05	-0.8748
39	100.70	-0.5906
40	103.35	-0.2976
41	106.00	0.0

56 of 87

MODIFIED INFLUENCE LINE
LOAD LOAD INFLUENCE
PT. DIST. VALUE

1	0.0	0.0
2	2.65	0.9944
3	5.30	1.9937
4	7.95	3.0030
5	10.60	4.0272
6	13.25	5.0713
7	15.90	6.1402
8	18.55	7.2390
9	21.20	8.3726
10	23.85	9.5460
11	26.50	10.7641
12	29.15	9.3819
13	31.80	8.0544
14	34.45	6.7866
15	37.10	5.5834
16	39.75	4.4498
17	42.40	3.3908
18	45.05	2.4113
19	47.70	1.5164
20	50.35	0.7110
21	53.00	0.0
22	55.65	-0.6140
23	58.30	-1.1336
24	60.95	-1.5636
25	63.60	-1.9092
26	66.25	-2.1752
27	68.90	-2.3666
28	71.55	-2.4884
29	74.20	-2.5456
30	76.85	-2.5431
31	79.50	-2.4859
32	82.15	-2.3790
33	84.80	-2.2274
34	87.45	-2.0360
35	90.10	-1.8097
36	92.75	-1.5537
37	95.40	-1.2728
38	98.05	-0.9720
39	100.70	-0.6563
40	103.35	-0.3306
41	106.00	0.0

MODIFIED INFLUENCE LINE

57 of 87

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	-0.6612
3	5.30	-1.3125
4	7.95	-1.9440
5	10.60	-2.5456
6	13.25	-3.1074
7	15.90	-3.6195
8	18.55	-4.0719
9	21.20	-4.4548
10	23.85	-4.7581
11	26.50	-4.9718
12	29.15	-5.0862
13	31.80	-5.0912
14	34.45	-4.9768
15	37.10	-4.7332
16	39.75	-4.3504
17	42.40	-3.8184
18	45.05	-3.1273
19	47.70	-2.2672
20	50.35	-1.2281
21	53.00	0.0
22	55.65	-1.2280
23	58.30	-2.2672
24	60.95	-3.1273
25	63.60	-3.8184
26	66.25	-4.3504
27	68.90	-4.7332
28	71.55	-4.9768
29	74.20	-5.0912
30	76.85	-5.0862
31	79.50	-4.9718
32	82.15	-4.7580
33	84.80	-4.4547
34	87.45	-4.0719
35	90.10	-3.6195
36	92.75	-3.1074
37	95.40	-2.5456
38	98.05	-1.9440
39	100.70	-1.3125
40	103.35	-0.6613
41	106.00	0.0

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	-0.3306
3	5.30	-0.6563
4	7.95	-0.9720
5	10.60	-1.2728
6	13.25	-1.5537
7	15.90	-1.8097
8	18.55	-2.0360
9	21.20	-2.2274
10	23.85	-2.3790
11	26.50	-2.4859
12	29.15	-2.5431
13	31.80	-2.5456
14	34.45	-2.4884
15	37.10	-2.3666
16	39.75	-2.1752
17	42.40	-1.9092
18	45.05	-1.5636

19	47.70	-1.1336
20	50.35	-0.6140
21	53.00	0.0
22	55.65	0.7110
23	58.30	1.5164
24	60.95	2.4114
25	63.60	3.3908
26	66.25	4.4498
27	68.90	5.5834
28	71.55	6.7866
29	74.20	8.0544
30	76.85	9.3819
31	79.50	10.7641
32	82.15	9.5460
33	84.80	8.3726
34	87.45	7.2390
35	90.10	6.1403
36	92.75	5.0713
37	95.40	4.0272
38	98.05	3.0030
39	100.70	1.9937
40	103.35	0.9944
41	106.00	0.0

58 of 87

MODIFIED INFLUENCE LINE

LOAD LOAD INFLUENCE
PT. DIST. VALUE

1	0.0	0.0
2	2.65	-0.2975
3	5.30	-0.5906
4	7.95	-0.8748
5	10.60	-1.1455
6	13.25	-1.3983
7	15.90	-1.6288
8	18.55	-1.8324
9	21.20	-2.0047
10	23.85	-2.1411
11	26.50	-2.2374
12	29.15	-2.2888
13	31.80	-2.2910
14	34.45	-2.2396
15	37.10	-2.1299
16	39.75	-1.9577
17	42.40	-1.7183
18	45.05	-1.4073
19	47.70	-1.0202
20	50.35	-0.5526
21	53.00	0.0
22	55.65	0.6399
23	58.30	1.3648
24	60.95	2.1702
25	63.60	3.0517
26	66.25	4.0048
27	68.90	5.0251
28	71.55	6.1079
29	74.20	7.2489
30	76.85	8.4437
31	79.50	9.6876
32	82.15	10.9764
33	84.80	9.6553
34	87.45	8.3701
35	90.10	7.1162
36	92.75	5.8892
37	95.40	4.6845
38	98.05	3.4977
39	100.70	2.3244

40 103.35 1.1599
41 106.00 0.0

MODIFIED INFLUENCE LINE
LOAD LOAD INFLUENCE
PT. DIST. VALUE

59 of 87

1	0.0	0.0
2	2.65	-0.2645
3	5.30	-0.5250
4	7.95	-0.7776
5	10.60	-1.0182
6	13.25	-1.2430
7	15.90	-1.4478
8	18.55	-1.6288
9	21.20	-1.7819
10	23.85	-1.9032
11	26.50	-1.9887
12	29.15	-2.0345
13	31.80	-2.0365
14	34.45	-1.9908
15	37.10	-1.8933
16	39.75	-1.7401
17	42.40	-1.5273
18	45.05	-1.2509
19	47.70	-0.9069
20	50.35	-0.4912
21	53.00	0.0
22	55.65	0.5688
23	58.30	1.2131
24	60.95	1.9291
25	63.60	2.7126
26	66.25	3.5598
27	68.90	4.4667
28	71.55	5.4293
29	74.20	6.4435
30	76.85	7.5055
31	79.50	8.6112
32	82.15	9.7568
33	84.80	10.9381
34	87.45	9.5012
35	90.10	8.0922
36	92.75	6.7070
37	95.40	5.3418
38	98.05	3.9924
39	100.70	2.6550
40	103.35	1.3255
41	106.00	0.0

MODIFIED INFLUENCE LINE
LOAD LOAD INFLUENCE
PT. DIST. VALUE

1	0.0	0.0
2	2.65	-0.2314
3	5.30	-0.4594
4	7.95	-0.6804
5	10.60	-0.8909
6	13.25	-1.0876
7	15.90	-1.2668
8	18.55	-1.4252
9	21.20	-1.5592
10	23.85	-1.6653
11	26.50	-1.7402
12	29.15	-1.7802
13	31.80	-1.7819
14	34.45	-1.7419
15	37.10	-1.6566

H C V

PRINTED IN U.S.A.

16	39.75	-1.5226
17	42.40	-1.3364
18	45.05	-1.0945
19	47.70	-0.7935
20	50.35	-0.4298
21	53.00	0.0
22	55.65	0.4977
23	58.30	1.0615
24	60.95	1.6879
25	63.60	2.3736
26	66.25	3.1149
27	68.90	3.9084
28	71.55	4.7506
29	74.20	5.6381
30	76.85	6.5673
31	79.50	7.5348
32	82.15	8.5372
33	84.80	9.5708
34	87.45	10.6323
35	90.10	9.0682
36	92.75	7.5249
37	95.40	5.9990
38	98.05	4.4871
39	100.70	2.9856
40	103.35	1.4911
41	106.00	0.0

60 of 87

MODIFIED INFLUENCE LIVE
LOAD LOAD INFLUENCE
PT. DIST. VALUE

1	0.0	0.0
2	2.65	-0.1984
3	5.30	-0.3938
4	7.95	-0.5832
5	10.60	-0.7637
6	13.25	-0.9322
7	15.90	-1.0858
8	18.55	-1.2216
9	21.20	-1.3364
10	23.85	-1.4274
11	26.50	-1.4916
12	29.15	-1.5259
13	31.80	-1.5274
14	34.45	-1.4931
15	37.10	-1.4200
16	39.75	-1.3051
17	42.40	-1.1455
18	45.05	-0.9382
19	47.70	-0.6801
20	50.35	-0.3684
21	53.00	0.0
22	55.65	0.4266
23	58.30	0.9099
24	60.95	1.4468
25	63.60	2.0345
26	66.25	2.6699
27	68.90	3.3500
28	71.55	4.0720
29	74.20	4.8326
30	76.85	5.6291
31	79.50	6.4584
32	82.15	7.3176
33	84.80	8.2036
34	87.45	9.1134
35	90.10	10.0441
36	92.75	8.3428

37	95.40	6.6563
38	98.05	4.9818
39	100.70	3.3162
40	103.35	1.6566
41	106.00	0.0

61 of 87

***** LIVE LOAD - HS20 *****

THE LOCATION OF THE CRITICAL SECTION IS AT
31.80 FT. FROM THE LEFT END OF SPAN NO. 2.

***** SECTION PROPERTIES *****

NON-COMPOSITE	DEPTH	GROSS MOMENT OF INERTIA		SECTION MODULUS	
		AREA	BOTTOM	TOP	BOTTOM
	33.10	38.26	6699.00	16.55	404.8

DL1 MOMENT	DL2 MOMENT	LL + IMPACT MOMENT FOR			ALLOWABLE STRESSES FOR			
		IR	OR	SLC	IR	OR	SLC	
1590.6	921.5	4556.7	4556.7	4556.7	18.150	24.750	18.150	TENSION
					18.150	24.750	18.150	COMPRESSION

	STRESSES DUE TO		STRESSES DUE TO LL+I FOR		
	DL1	DL2	IR	OR	SLC
TOP FIBER	3.930	2.277	11.257	11.257	11.257
BOTTOM FIBER	3.930	2.277	11.257	11.257	11.257

INVENTORY RATING	1.0610
OPERATING RATING	1.6473
SAFE LOAD CAPACITY	1.0610

MODIFIED INFLUENCE LINE
LOAD LOAD INFLUENCE

PT.	DIST.	VALUE
1	0.0	0.0
2	2.65	1.6566
3	5.30	3.3162
4	7.95	4.9818
5	10.60	6.6563
6	13.25	8.3428
7	15.90	10.0441
8	18.55	9.1134
9	21.20	8.2036
10	23.85	7.3176
11	26.50	6.4584
12	29.15	5.6291
13	31.80	4.8326
14	34.45	4.0719
15	37.10	3.3500
16	39.75	2.6699
17	42.40	2.0345
18	45.05	1.4468
19	47.70	0.9099
20	50.35	0.4266
21	53.00	0.0
22	55.65	-0.3684
23	58.30	-0.6801
24	60.95	-0.9382
25	63.60	-1.1455
26	66.25	-1.3051
27	68.90	-1.4200
28	71.55	-1.4930
29	74.20	-1.5274

30	76.85	-1.5259
31	79.50	-1.4915
32	82.15	-1.4274
33	84.80	-1.3364
34	87.45	-1.2216
35	90.10	-1.0858
36	92.75	-0.9322
37	95.40	-0.7637
38	98.05	-0.5832
39	100.70	-0.3938
40	103.35	-0.1984
41	106.00	0.0

62 of 87

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	1.4911
3	5.30	2.9856
4	7.95	4.4871
5	10.60	5.9990
6	13.25	7.5249
7	15.90	9.0682
8	18.55	10.6323
9	21.20	9.5708
10	23.85	8.5372
11	26.50	7.5348
12	29.15	6.5673
13	31.80	5.6381
14	34.45	4.7506
15	37.10	3.9084
16	39.75	3.1149
17	42.40	2.3736
18	45.05	1.6879
19	47.70	1.0615
20	50.35	0.4977
21	53.00	0.0
22	55.65	-0.4298
23	58.30	-0.7935
24	60.95	-1.0945
25	63.60	-1.3364
26	66.25	-1.5226
27	68.90	-1.6566
28	71.55	-1.7419
29	74.20	-1.7819
30	76.85	-1.7802
31	79.50	-1.7401
32	82.15	-1.6653
33	84.80	-1.5592
34	87.45	-1.4252
35	90.10	-1.2668
36	92.75	-1.0876
37	95.40	-0.8909
38	98.05	-0.6804
39	100.70	-0.4594
40	103.35	-0.2314
41	106.00	0.0

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	1.3255
3	5.30	2.6550
4	7.95	3.9924
5	10.60	5.3418

6	13.25	6.7070
7	15.90	8.0922
8	18.55	9.5012
9	21.20	10.9381
10	23.85	9.7568
11	26.50	8.6112
12	29.15	7.5055
13	31.80	6.4435
14	34.45	5.4293
15	37.10	4.4667
16	39.75	3.5598
17	42.40	2.7126
18	45.05	1.9291
19	47.70	1.2131
20	50.35	0.5638
21	53.00	0.0
22	55.65	-0.4912
23	58.30	-0.9069
24	60.95	-1.2509
25	63.60	-1.5273
26	66.25	-1.7401
27	68.90	-1.8933
28	71.55	-1.9907
29	74.20	-2.0365
30	76.85	-2.0345
31	79.50	-1.9887
32	82.15	-1.9032
33	84.80	-1.7819
34	87.45	-1.6288
35	90.10	-1.4478
36	92.75	-1.2429
37	95.40	-1.0182
38	98.05	-0.7776
39	100.70	-0.5250
40	103.35	-0.2645
41	106.00	0.0

63 of 87

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	1.1600
3	5.30	2.3244
4	7.95	3.4977
5	10.60	4.6845
6	13.25	5.8892
7	15.90	7.1162
8	18.55	8.3701
9	21.20	9.6553
10	23.85	10.9764
11	26.50	9.6877
12	29.15	8.4437
13	31.80	7.2490
14	34.45	6.1079
15	37.10	5.0251
16	39.75	4.0048
17	42.40	3.0517
18	45.05	2.1702
19	47.70	1.3648
20	50.35	0.6399
21	53.00	0.0
22	55.65	-0.5526
23	58.30	-1.0202
24	60.95	-1.4073
25	63.60	-1.7183
26	66.25	-1.9577

27	68.90	-2.1299
28	71.55	-2.2396
29	74.20	-2.2910
30	76.85	-2.2838
31	79.50	-2.2373
32	82.15	-2.1411
33	84.80	-2.0046
34	87.45	-1.8324
35	90.10	-1.6288
36	92.75	-1.3983
37	95.40	-1.1455
38	98.05	-0.8748
39	100.70	-0.5906
40	103.35	-0.2976
41	106.00	0.0

64 of 87

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	0.9944
3	5.30	1.9937
4	7.95	3.0030
5	10.60	4.0272
6	13.25	5.0713
7	15.90	6.1402
8	18.55	7.2390
9	21.20	8.3726
10	23.85	9.5460
11	26.50	10.7641
12	29.15	9.3819
13	31.80	8.0544
14	34.45	6.7866
15	37.10	5.5834
16	39.75	4.4498
17	42.40	3.3908
18	45.05	2.4113
19	47.70	1.5164
20	50.35	0.7110
21	53.00	0.0
22	55.65	-0.6140
23	58.30	-1.1336
24	60.95	-1.5636
25	63.60	-1.9092
26	66.25	-2.1752
27	68.90	-2.3666
28	71.55	-2.4884
29	74.20	-2.5456
30	76.85	-2.5431
31	79.50	-2.4859
32	82.15	-2.3790
33	84.80	-2.2274
34	87.45	-2.0360
35	90.10	-1.8097
36	92.75	-1.5537
37	95.40	-1.2728
38	98.05	-0.9720
39	100.70	-0.6563
40	103.35	-0.3306
41	106.00	0.0

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	-0.6612

3	5.30	-1.3125
4	7.95	-1.9440
5	10.60	-2.5456
6	13.25	-3.1074
7	15.90	-3.6195
8	18.55	-4.0719
9	21.20	-4.4548
10	23.85	-4.7581
11	26.50	-4.9718
12	29.15	-5.0862
13	31.80	-5.0912
14	34.45	-4.9768
15	37.10	-4.7332
16	39.75	-4.3504
17	42.40	-3.8184
18	45.05	-3.1273
19	47.70	-2.2672
20	50.35	-1.2281
21	53.00	0.0
22	55.65	-1.2280
23	58.30	-2.2672
24	60.95	-3.1273
25	63.60	-3.8184
26	66.25	-4.3504
27	68.90	-4.7332
28	71.55	-4.9768
29	74.20	-5.0912
30	76.85	-5.0862
31	79.50	-4.9718
32	82.15	-4.7580
33	84.80	-4.4547
34	87.45	-4.0719
35	90.10	-3.6195
36	92.75	-3.1074
37	95.40	-2.5456
38	98.05	-1.9440
39	100.70	-1.3125
40	103.35	-0.6613
41	106.00	0.0

6-1 of 87

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	-0.3306
3	5.30	-0.6563
4	7.95	-0.9720
5	10.60	-1.2728
6	13.25	-1.5537
7	15.90	-1.8097
8	18.55	-2.0360
9	21.20	-2.2274
10	23.85	-2.3790
11	26.50	-2.4859
12	29.15	-2.5431
13	31.80	-2.5456
14	34.45	-2.4884
15	37.10	-2.3666
16	39.75	-2.1752
17	42.40	-1.9092
18	45.05	-1.5636
19	47.70	-1.1336
20	50.35	-0.6140
21	53.00	0.0
22	55.65	0.7110
23	58.30	1.5164

24	60.95	2.4114
25	63.60	3.3908
26	66.25	4.4498
27	68.90	5.5834
28	71.55	6.7866
29	74.20	8.0544
30	76.85	9.3819
31	79.50	10.7641
32	82.15	9.5460
33	84.80	8.3726
34	87.45	7.2390
35	90.10	6.1403
36	92.75	5.0713
37	95.40	4.0272
38	98.05	3.0030
39	100.70	1.9937
40	103.35	0.9944
41	106.00	0.0

65 of 87

MODIFIED INFLUENCE LINE

LOAD LOAD INFLUENCE

PT.	DIST.	VALUE
1	0.0	0.0
2	2.65	-0.2975
3	5.30	-0.5906
4	7.95	-0.8748
5	10.60	-1.1455
6	13.25	-1.3983
7	15.90	-1.6288
8	18.55	-1.8324
9	21.20	-2.0047
10	23.85	-2.1411
11	26.50	-2.2374
12	29.15	-2.2888
13	31.80	-2.2910
14	34.45	-2.2396
15	37.10	-2.1299
16	39.75	-1.9577
17	42.40	-1.7183
18	45.05	-1.4073
19	47.70	-1.0202
20	50.35	-0.5526
21	53.00	0.0
22	55.65	0.6399
23	58.30	1.3648
24	60.95	2.1702
25	63.60	3.0517
26	66.25	4.0048
27	68.90	5.0251
28	71.55	6.1079
29	74.20	7.2489
30	76.85	8.4437
31	79.50	9.6876
32	82.15	10.9764
33	84.80	9.6553
34	87.45	8.3701
35	90.10	7.1162
36	92.75	5.8892
37	95.40	4.6845
38	98.05	3.4977
39	100.70	2.3244
40	103.35	1.1599
41	106.00	0.0

MODIFIED INFLUENCE LINE

LOAD LOAD INFLUENCE

PT.	DIST.	VALUE
1	0.0	0.0
2	2.65	-0.2645
3	5.30	-0.5250
4	7.95	-0.7776
5	10.60	-1.0182
6	13.25	-1.2430
7	15.90	-1.4478
8	18.55	-1.6238
9	21.20	-1.7819
10	23.85	-1.9032
11	26.50	-1.9887
12	29.15	-2.0345
13	31.80	-2.0365
14	34.45	-1.9908
15	37.10	-1.8933
16	39.75	-1.7401
17	42.40	-1.5273
18	45.05	-1.2509
19	47.70	-0.9069
20	50.35	-0.4912
21	53.00	0.0
22	55.65	0.5688
23	58.30	1.2131
24	60.95	1.9291
25	63.60	2.7126
26	66.25	3.5598
27	68.90	4.4667
28	71.55	5.4293
29	74.20	6.4435
30	76.85	7.5055
31	79.50	8.6112
32	82.15	9.7568
33	84.80	10.9381
34	87.45	9.5012
35	90.10	8.0922
36	92.75	6.7070
37	95.40	5.3418
38	98.05	3.9924
39	100.70	2.6550
40	103.35	1.3255
41	106.00	0.0

66 of 87

MODIFIED INFLUENCE LIVE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	-0.2314
3	5.30	-0.4594
4	7.95	-0.6804
5	10.60	-0.8909
6	13.25	-1.0876
7	15.90	-1.2668
8	18.55	-1.4252
9	21.20	-1.5592
10	23.85	-1.6653
11	26.50	-1.7402
12	29.15	-1.7802
13	31.80	-1.7819
14	34.45	-1.7419
15	37.10	-1.6566
16	39.75	-1.5226
17	42.40	-1.3364
18	45.05	-1.0945
19	47.70	-0.7935
20	50.35	-0.4298

21	53.00	0.0
22	55.65	0.4977
23	58.30	1.0615
24	60.95	1.6879
25	63.60	2.3736
26	66.25	3.1149
27	68.90	3.9084
28	71.55	4.7506
29	74.20	5.6381
30	76.85	6.5673
31	79.50	7.5348
32	82.15	8.5372
33	84.80	9.5708
34	87.45	10.6323
35	90.10	9.0682
36	92.75	7.5249
37	95.40	5.9990
38	98.05	4.4871
39	100.70	2.9856
40	103.35	1.4911
41	106.00	0.0

67487

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	-0.1984
3	5.30	-0.3938
4	7.95	-0.5832
5	10.60	-0.7637
6	13.25	-0.9322
7	15.90	-1.0858
8	18.55	-1.2216
9	21.20	-1.3364
10	23.85	-1.4274
11	26.50	-1.4916
12	29.15	-1.5259
13	31.80	-1.5274
14	34.45	-1.4931
15	37.10	-1.4200
16	39.75	-1.3051
17	42.40	-1.1455
18	45.05	-0.9382
19	47.70	-0.6801
20	50.35	-0.3684
21	53.00	0.0
22	55.65	0.4266
23	58.30	0.9099
24	60.95	1.4468
25	63.60	2.0345
26	66.25	2.6699
27	68.90	3.3500
28	71.55	4.0720
29	74.20	4.8326
30	76.85	5.6291
31	79.50	6.4584
32	82.15	7.3176
33	84.80	8.2036
34	87.45	9.1134
35	90.10	10.0441
36	92.75	8.3428
37	95.40	6.6563
38	98.05	4.9818
39	100.70	3.3162
40	103.35	1.6566
41	106.00	0.0

***** LIVE LOAD - 3 *****

THE LOCATION OF THE CRITICAL SECTION IS AT
31.80 FT. FROM THE LEFT END OF SPAN NO. 2.

68 of 87

***** SECTION PROPERTIES *****

NON-COMPOSITE	DEPTH	GROSS AREA	MOMENT OF INERTIA	SECTION MODULJS	
				C BOTTOM	TOP BOTTOM
	33.10	38.26	6699.00	16.55	404.8 404.3

DL1	DL2	LL + IMPACT MOMENT FOR			ALLOWABLE STRESSES FOR		
MOMENT	MOMENT	IR	OR	SLC	IR	OR	SLC
1590.6	921.5	3205.5	3205.5	3205.5	18.150	24.750	18.150
					18.150	24.750	18.150
							TENSION
							COMPRESSION

	STRESSES DUE TO			STRESSES DUE TO LL+I FOR		
	DL1	DL2	IR	OR	SLC	
TOP FIBER	3.930	2.277	7.919	7.919	7.919	
BOTTOM FIBER	3.930	2.277	7.919	7.919	7.919	

INVENTORY RATING $1.5082 \times 23 T = \underline{34.69T}$
 OPERATING RATING $2.3416 \times 23 T = \underline{53.86T}$
 SAFE LOAD CAPACITY 1.5082

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	1.6566
3	5.30	3.3162
4	7.95	4.9818
5	10.60	6.6563
6	13.25	8.3428
7	15.90	10.0441
8	18.55	9.1134
9	21.20	8.2036
10	23.85	7.3176
11	26.50	6.4584
12	29.15	5.6291
13	31.80	4.8326
14	34.45	4.0719
15	37.10	3.3500
16	39.75	2.6699
17	42.40	2.0345
18	45.05	1.4468
19	47.70	0.9099
20	50.35	0.4266
21	53.00	0.0
22	55.65	-0.3684
23	58.30	-0.6801
24	60.95	-0.9382
25	63.60	-1.1455
26	66.25	-1.3051
27	68.90	-1.4200
28	71.55	-1.4930
29	74.20	-1.5274
30	76.85	-1.5259
31	79.50	-1.4915
32	82.15	-1.4274
33	84.80	-1.3364
34	87.45	-1.2216

35	90.10	-1.0858
36	92.75	-0.9322
37	95.40	-0.7637
38	98.05	-0.5832
39	100.70	-0.3938
40	103.35	-0.1984
41	106.00	0.0

69 of 87

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	1.4911
3	5.30	2.9856
4	7.95	4.4871
5	10.60	5.9990
6	13.25	7.5249
7	15.90	9.0682
8	18.55	10.6323
9	21.20	9.5708
10	23.85	8.5372
11	26.50	7.5348
12	29.15	6.5673
13	31.80	5.6381
14	34.45	4.7506
15	37.10	3.9084
16	39.75	3.1149
17	42.40	2.3736
18	45.05	1.6879
19	47.70	1.0615
20	50.35	0.4977
21	53.00	0.0
22	55.65	-0.4298
23	58.30	-0.7935
24	60.95	-1.0945
25	63.60	-1.3364
26	66.25	-1.5226
27	68.90	-1.6566
28	71.55	-1.7419
29	74.20	-1.7819
30	76.85	-1.7802
31	79.50	-1.7401
32	82.15	-1.6653
33	84.80	-1.5592
34	87.45	-1.4252
35	90.10	-1.2668
36	92.75	-1.0876
37	95.40	-0.8909
38	98.05	-0.6804
39	100.70	-0.4594
40	103.35	-0.2314
41	106.00	0.0

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	1.3255
3	5.30	2.6550
4	7.95	3.9924
5	10.60	5.3418
6	13.25	6.7070
7	15.90	8.0922
8	18.55	9.5012
9	21.20	10.9381
10	23.85	9.7568

11	26.50	8.6112
12	29.15	7.5055
13	31.80	6.4435
14	34.45	5.4293
15	37.10	4.4667
16	39.75	3.5598
17	42.40	2.7126
18	45.05	1.9291
19	47.70	1.2131
20	50.35	0.5688
21	53.00	0.0
22	55.65	-0.4912
23	58.30	-0.9069
24	60.95	-1.2509
25	63.60	-1.5273
26	66.25	-1.7401
27	68.90	-1.8933
28	71.55	-1.9907
29	74.20	-2.0365
30	76.85	-2.0345
31	79.50	-1.9887
32	82.15	-1.9032
33	84.80	-1.7819
34	87.45	-1.6288
35	90.10	-1.4478
36	92.75	-1.2429
37	95.40	-1.0182
38	98.05	-0.7776
39	100.70	-0.5250
40	103.35	-0.2645
41	106.00	0.0

70 of 87

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	1.1600
3	5.30	2.3244
4	7.95	3.4977
5	10.60	4.6845
6	13.25	5.8892
7	15.90	7.1162
8	18.55	8.3701
9	21.20	9.6553
10	23.85	10.9764
11	26.50	9.6877
12	29.15	8.4437
13	31.80	7.2490
14	34.45	6.1079
15	37.10	5.0251
16	39.75	4.0048
17	42.40	3.0517
18	45.05	2.1702
19	47.70	1.3648
20	50.35	0.6399
21	53.00	0.0
22	55.65	-0.5526
23	58.30	-1.0202
24	60.95	-1.4073
25	63.60	-1.7183
26	66.25	-1.9577
27	68.90	-2.1299
28	71.55	-2.2396
29	74.20	-2.2910
30	76.85	-2.2888
31	79.50	-2.2373

32	82.15	-2.1411
33	84.80	-2.0046
34	87.45	-1.8324
35	90.10	-1.6288
36	92.75	-1.3983
37	95.40	-1.1455
38	98.05	-0.8748
39	100.70	-0.5906
40	103.35	-0.2976
41	106.00	0.0

71 of 87

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	0.9944
3	5.30	1.9937
4	7.95	3.0030
5	10.60	4.0272
6	13.25	5.0713
7	15.90	6.1402
8	18.55	7.2390
9	21.20	8.3726
10	23.85	9.5460
11	26.50	10.7641
12	29.15	9.3819
13	31.80	8.0544
14	34.45	6.7866
15	37.10	5.5834
16	39.75	4.4498
17	42.40	3.3908
18	45.05	2.4113
19	47.70	1.5164
20	50.35	0.7110
21	53.00	0.0
22	55.65	-0.6140
23	58.30	-1.1336
24	60.95	-1.5636
25	63.60	-1.9092
26	66.25	-2.1752
27	68.90	-2.3666
28	71.55	-2.4884
29	74.20	-2.5456
30	76.85	-2.5431
31	79.50	-2.4859
32	82.15	-2.3790
33	84.80	-2.2274
34	87.45	-2.0360
35	90.10	-1.8097
36	92.75	-1.5537
37	95.40	-1.2728
38	98.05	-0.9720
39	100.70	-0.6563
40	103.35	-0.3306
41	106.00	0.0

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	-0.6612
3	5.30	-1.3125
4	7.95	-1.9440
5	10.60	-2.5456
6	13.25	-3.1074
7	15.90	-3.6195

PRINTED IN U.S.A.

H C V

8	18.55	-4.0719
9	21.20	-4.4548
10	23.85	-4.7581
11	26.50	-4.9718
12	29.15	-5.0862
13	31.80	-5.0912
14	34.45	-4.9768
15	37.10	-4.7332
16	39.75	-4.3504
17	42.40	-3.8184
18	45.05	-3.1273
19	47.70	-2.2672
20	50.35	-1.2281
21	53.00	0.0
22	55.65	-1.2280
23	58.30	-2.2672
24	60.95	-3.1273
25	63.60	-3.8184
26	66.25	-4.3504
27	68.90	-4.7332
28	71.55	-4.9768
29	74.20	-5.0912
30	76.85	-5.0862
31	79.50	-4.9718
32	82.15	-4.7580
33	84.80	-4.4547
34	87.45	-4.0719
35	90.10	-3.6195
36	92.75	-3.1074
37	95.40	-2.5456
38	98.05	-1.9440
39	100.70	-1.3125
40	103.35	-0.6613
41	106.00	0.0

72 of 87

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	-0.3306
3	5.30	-0.6563
4	7.95	-0.9720
5	10.60	-1.2728
6	13.25	-1.5537
7	15.90	-1.8097
8	18.55	-2.0360
9	21.20	-2.2274
10	23.85	-2.3790
11	26.50	-2.4859
12	29.15	-2.5431
13	31.80	-2.5456
14	34.45	-2.4884
15	37.10	-2.3666
16	39.75	-2.1752
17	42.40	-1.9092
18	45.05	-1.5636
19	47.70	-1.1336
20	50.35	-0.6140
21	53.00	0.0
22	55.65	0.7110
23	58.30	1.5164
24	60.95	2.4114
25	63.60	3.3908
26	66.25	4.4498
27	68.90	5.5834
28	71.55	6.7866

PRINTED IN U.S.A.

29	74.20	8.0544
30	76.85	9.3819
31	79.50	10.7641
32	82.15	9.5460
33	84.80	8.3726
34	87.45	7.2390
35	90.10	6.1403
36	92.75	5.0713
37	95.40	4.0272
38	98.05	3.0030
39	100.70	1.9937
40	103.35	0.9944
41	106.00	0.0

73.487

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	-0.2975
3	5.30	-0.5906
4	7.95	-0.8748
5	10.60	-1.1455
6	13.25	-1.3983
7	15.90	-1.6288
8	18.55	-1.8324
9	21.20	-2.0047
10	23.85	-2.1411
11	26.50	-2.2374
12	29.15	-2.2888
13	31.80	-2.2910
14	34.45	-2.2396
15	37.10	-2.1299
16	39.75	-1.9577
17	42.40	-1.7183
18	45.05	-1.4073
19	47.70	-1.0202
20	50.35	-0.5526
21	53.00	0.0
22	55.65	0.6399
23	58.30	1.3648
24	60.95	2.1702
25	63.60	3.0517
26	66.25	4.0048
27	68.90	5.0251
28	71.55	6.1079
29	74.20	7.2489
30	76.85	8.4437
31	79.50	9.6876
32	82.15	10.9764
33	84.80	9.6553
34	87.45	8.3701
35	90.10	7.1162
36	92.75	5.8892
37	95.40	4.6845
38	98.05	3.4977
39	100.70	2.3244
40	103.35	1.1599
41	106.00	0.0

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	-0.2645
3	5.30	-0.5250
4	7.95	-0.7776

H C V

5	10.60	-1.0182
6	13.25	-1.2430
7	15.90	-1.4478
8	18.55	-1.6288
9	21.20	-1.7819
10	23.85	-1.9032
11	26.50	-1.9887
12	29.15	-2.0345
13	31.80	-2.0365
14	34.45	-1.9908
15	37.10	-1.8933
16	39.75	-1.7401
17	42.40	-1.5273
18	45.05	-1.2509
19	47.70	-0.9069
20	50.35	-0.4912
21	53.00	0.0
22	55.65	0.5688
23	58.30	1.2131
24	60.95	1.9291
25	63.60	2.7126
26	66.25	3.5598
27	68.90	4.4667
28	71.55	5.4293
29	74.20	6.4435
30	76.85	7.5055
31	79.50	8.6112
32	82.15	9.7568
33	84.80	10.9381
34	87.45	9.5012
35	90.10	8.0922
36	92.75	6.7070
37	95.40	5.3418
38	98.05	3.9924
39	100.70	2.6550
40	103.35	1.3255
41	106.00	0.0

74 of 87

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	-0.2314
3	5.30	-0.4594
4	7.95	-0.6804
5	10.60	-0.8909
6	13.25	-1.0876
7	15.90	-1.2668
8	18.55	-1.4252
9	21.20	-1.5592
10	23.85	-1.6653
11	26.50	-1.7402
12	29.15	-1.7802
13	31.80	-1.7819
14	34.45	-1.7419
15	37.10	-1.6566
16	39.75	-1.5226
17	42.40	-1.3364
18	45.05	-1.0945
19	47.70	-0.7935
20	50.35	-0.4298
21	53.00	0.0
22	55.65	0.4977
23	58.30	1.0615
24	60.95	1.6879
25	63.60	2.3736

PRINTED IN U.S.A.

26	66.25	3.1149
27	68.90	3.9084
28	71.55	4.7506
29	74.20	5.6381
30	76.85	6.5673
31	79.50	7.5348
32	82.15	8.5372
33	84.80	9.5708
34	87.45	10.6323
35	90.10	9.0682
36	92.75	7.5249
37	95.40	5.9990
38	98.05	4.4871
39	100.70	2.9856
40	103.35	1.4911
41	106.00	0.0

75 of 87

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	-0.1984
3	5.30	-0.3938
4	7.95	-0.5832
5	10.60	-0.7637
6	13.25	-0.9322
7	15.90	-1.0858
8	18.55	-1.2216
9	21.20	-1.3364
10	23.85	-1.4274
11	26.50	-1.4916
12	29.15	-1.5259
13	31.80	-1.5274
14	34.45	-1.4931
15	37.10	-1.4200
16	39.75	-1.3051
17	42.40	-1.1455
18	45.05	-0.9382
19	47.70	-0.6801
20	50.35	-0.3684
21	53.00	0.0
22	55.65	0.4266
23	58.30	0.9099
24	60.95	1.4468
25	63.60	2.0345
26	66.25	2.6699
27	68.90	3.3500
28	71.55	4.0720
29	74.20	4.8326
30	76.85	5.6291
31	79.50	6.4584
32	82.15	7.3176
33	84.80	8.2036
34	87.45	9.1134
35	90.10	10.0441
36	92.75	8.3428
37	95.40	6.6563
38	98.05	4.9818
39	100.70	3.3162
40	103.35	1.6566
41	106.00	0.0

PRINTED IN U.S.A.

***** LIVE LOAD - 3S2 *****

THE LOCATION OF THE CRITICAL SECTION IS AT

***** SECTION PROPERTIES *****

	DEPTH	GROSS AREA	GROSS MOMENT OF INERTIA		SECTION MODULUS	
			TOP	BOTTOM	TOP	BOTTOM
NON-COMPOSITE	33.10	38.26	6699.00	16.55	404.8	404.9

DL1		DL2		LL + IMPACT MOMENT FOR			ALLOWABLE STRESSES FOR		
MOMENT	MOMENT	IR	OR	SLC	IR	OR	SLC		
-2831.1	-1640.1	-2488.8	-2488.8	-2488.8	18.150	24.750	18.150	TENSION	
					18.150	24.750	18.150	COMPRESSION	

	STRESSES DUE TO			STRESSES DUE TO LL+I FOR		
	DL1	DL2	IR	OR	SLC	
TOP FIBER	6.994	4.052	6.149	6.149	6.149	
BOTTOM FIBER	6.994	4.052	6.149	6.149	6.149	

INVENTORY RATING $1.1554 \times 36T = 41.59T$
 OPERATING RATING $2.2288 \times 36T = 80.24T$
 SAFE LOAD CAPACITY 1.1554

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	1.6566
3	5.30	3.3162
4	7.95	4.9818
5	10.60	6.6563
6	13.25	8.3428
7	15.90	10.0441
8	18.55	9.1134
9	21.20	8.2036
10	23.85	7.3176
11	26.50	6.4584
12	29.15	5.6291
13	31.80	4.8326
14	34.45	4.0719
15	37.10	3.3500
16	39.75	2.6699
17	42.40	2.0345
18	45.05	1.4468
19	47.70	0.9099
20	50.35	0.4266
21	53.00	0.0
22	55.65	-0.3684
23	58.30	-0.6801
24	60.95	-0.9382
25	63.60	-1.1455
26	66.25	-1.3051
27	68.90	-1.4200
28	71.55	-1.4930
29	74.20	-1.5274
30	76.85	-1.5259
31	79.50	-1.4915
32	82.15	-1.4274
33	84.80	-1.3364
34	87.45	-1.2216
35	90.10	-1.0858
36	92.75	-0.9322
37	95.40	-0.7637
38	98.05	-0.5832
39	100.70	-0.3938

40 103.35 -0.1984
 41 106.00 0.0

MODIFIED INFLUENCE LINE
 LOAD LOAD INFLUENCE
 PT. DIST. VALUE

77 of 87

1	0.0	0.0
2	2.65	1.4911
3	5.30	2.9856
4	7.95	4.4871
5	10.60	5.9990
6	13.25	7.5249
7	15.90	9.0682
8	18.55	10.6323
9	21.20	9.5708
10	23.85	8.5372
11	26.50	7.5348
12	29.15	6.5673
13	31.80	5.6381
14	34.45	4.7506
15	37.10	3.9084
16	39.75	3.1149
17	42.40	2.3736
18	45.05	1.6879
19	47.70	1.0615
20	50.35	0.4977
21	53.00	0.0
22	55.65	-0.4298
23	58.30	-0.7935
24	60.95	-1.0945
25	63.60	-1.3364
26	66.25	-1.5226
27	68.90	-1.6566
28	71.55	-1.7419
29	74.20	-1.7819
30	76.85	-1.7802
31	79.50	-1.7401
32	82.15	-1.6653
33	84.80	-1.5592
34	87.45	-1.4252
35	90.10	-1.2668
36	92.75	-1.0876
37	95.40	-0.8909
38	98.05	-0.6804
39	100.70	-0.4594
40	103.35	-0.2314
41	106.00	0.0

MODIFIED INFLUENCE LINE
 LOAD LOAD INFLUENCE
 PT. DIST. VALUE

1	0.0	0.0
2	2.65	1.3255
3	5.30	2.6550
4	7.95	3.9924
5	10.60	5.3418
6	13.25	6.7070
7	15.90	8.0922
8	18.55	9.5012
9	21.20	10.9381
10	23.85	9.7568
11	26.50	8.6112
12	29.15	7.5055
13	31.80	6.4435
14	34.45	5.4293
15	37.10	4.4667

16	39.75	3.5598
17	42.40	2.7126
18	45.05	1.9291
19	47.70	1.2131
20	50.35	0.5688
21	53.00	0.0
22	55.65	-0.4912
23	58.30	-0.9069
24	60.95	-1.2509
25	63.60	-1.5273
26	66.25	-1.7401
27	68.90	-1.8933
28	71.55	-1.9907
29	74.20	-2.0365
30	76.85	-2.0345
31	79.50	-1.9887
32	82.15	-1.9032
33	84.80	-1.7819
34	87.45	-1.6288
35	90.10	-1.4478
36	92.75	-1.2429
37	95.40	-1.0182
38	98.05	-0.7776
39	100.70	-0.5250
40	103.35	-0.2645
41	106.00	0.0

78 d 87

MODIFIED INFLUENCE LINE
LOAD LOAD INFLUENCE
PT. DIST. VALUE

1	0.0	0.0
2	2.65	1.1600
3	5.30	2.3244
4	7.95	3.4977
5	10.60	4.6845
6	13.25	5.8892
7	15.90	7.1162
8	18.55	8.3701
9	21.20	9.6553
10	23.85	10.9764
11	26.50	9.6877
12	29.15	8.4437
13	31.80	7.2490
14	34.45	6.1079
15	37.10	5.0251
16	39.75	4.0048
17	42.40	3.0517
18	45.05	2.1702
19	47.70	1.3648
20	50.35	0.6399
21	53.00	0.0
22	55.65	-0.5526
23	58.30	-1.0202
24	60.95	-1.4073
25	63.60	-1.7183
26	66.25	-1.9577
27	68.90	-2.1299
28	71.55	-2.2396
29	74.20	-2.2910
30	76.85	-2.2888
31	79.50	-2.2373
32	82.15	-2.1411
33	84.80	-2.0046
34	87.45	-1.8324
35	90.10	-1.6288
36	92.75	-1.3983

H C V

PRINTED IN U.S.A.

37	95.40	-1.1455
38	98.05	-0.8748
39	100.70	-0.5906
40	103.35	-0.2976
41	106.00	0.0

79 of 87

MODIFIED INFLUENCE LINE
LOAD LOAD INFLUENCE
PT. DIST. VALUE

1	0.0	0.0
2	2.65	0.9944
3	5.30	1.9937
4	7.95	3.0030
5	10.60	4.0272
6	13.25	5.0713
7	15.90	6.1402
8	18.55	7.2390
9	21.20	8.3726
10	23.85	9.5460
11	26.50	10.7641
12	29.15	9.3819
13	31.80	8.0544
14	34.45	6.7866
15	37.10	5.5834
16	39.75	4.4498
17	42.40	3.3908
18	45.05	2.4113
19	47.70	1.5164
20	50.35	0.7110
21	53.00	0.0
22	55.65	-0.6140
23	58.30	-1.1336
24	60.95	-1.5636
25	63.60	-1.9092
26	66.25	-2.1752
27	68.90	-2.3666
28	71.55	-2.4884
29	74.20	-2.5456
30	76.85	-2.5431
31	79.50	-2.4859
32	82.15	-2.3790
33	84.80	-2.2274
34	87.45	-2.0360
35	90.10	-1.8097
36	92.75	-1.5537
37	95.40	-1.2728
38	98.05	-0.9720
39	100.70	-0.6563
40	103.35	-0.3306
41	106.00	0.0

MODIFIED INFLUENCE LINE
LOAD LOAD INFLUENCE
PT. DIST. VALUE

1	0.0	0.0
2	2.65	-0.6612
3	5.30	-1.3125
4	7.95	-1.9440
5	10.60	-2.5456
6	13.25	-3.1074
7	15.90	-3.6195
8	18.55	-4.0719
9	21.20	-4.4548
10	23.85	-4.7581
11	26.50	-4.9718
12	29.15	-5.0862

13	31.80	-5.0912
14	34.45	-4.9768
15	37.10	-4.7332
16	39.75	-4.3504
17	42.40	-3.8184
18	45.05	-3.1273
19	47.70	-2.2672
20	50.35	-1.2281
21	53.00	0.0
22	55.65	-1.2280
23	58.30	-2.2672
24	60.95	-3.1273
25	63.60	-3.8184
26	66.25	-4.3504
27	68.90	-4.7332
28	71.55	-4.9768
29	74.20	-5.0912
30	76.85	-5.0862
31	79.50	-4.9718
32	82.15	-4.7580
33	84.80	-4.4547
34	87.45	-4.0719
35	90.10	-3.6195
36	92.75	-3.1074
37	95.40	-2.5456
38	98.05	-1.9440
39	100.70	-1.3125
40	103.35	-0.6613
41	106.00	0.0

80 of 87

MODIFIED INFLUENCE LINE

LOAD PT.	LOAD DIST.	INFLUENCE VALUE
1	0.0	0.0
2	2.65	-0.3306
3	5.30	-0.6563
4	7.95	-0.9720
5	10.60	-1.2728
6	13.25	-1.5537
7	15.90	-1.8097
8	18.55	-2.0360
9	21.20	-2.2274
10	23.85	-2.3790
11	26.50	-2.4859
12	29.15	-2.5431
13	31.80	-2.5456
14	34.45	-2.4884
15	37.10	-2.3666
16	39.75	-2.1752
17	42.40	-1.9092
18	45.05	-1.5636
19	47.70	-1.1336
20	50.35	-0.6140
21	53.00	0.0
22	55.65	0.7110
23	58.30	1.5164
24	60.95	2.4114
25	63.60	3.3908
26	66.25	4.4498
27	68.90	5.5834
28	71.55	6.7866
29	74.20	8.0544
30	76.85	9.3819
31	79.50	10.7641
32	82.15	9.5460
33	84.80	8.3726

H C V

PRINTED IN U.S.A.

34	87.45	7.2390
35	90.10	6.1403
36	92.75	5.0713
37	95.40	4.0272
38	98.05	3.0030
39	100.70	1.9937
40	103.35	0.9944
41	106.00	0.0

81 of 87

MODIFIED INFLUENCE LINE
LOAD LOAD INFLUENCE
PT. DIST. VALUE

1	0.0	0.0
2	2.65	-0.2975
3	5.30	-0.5906
4	7.95	-0.8748
5	10.60	-1.1455
6	13.25	-1.3983
7	15.90	-1.6288
8	18.55	-1.8324
9	21.20	-2.0047
10	23.85	-2.1411
11	26.50	-2.2374
12	29.15	-2.2888
13	31.80	-2.2910
14	34.45	-2.2396
15	37.10	-2.1299
16	39.75	-1.9577
17	42.40	-1.7183
18	45.05	-1.4073
19	47.70	-1.0202
20	50.35	-0.5526
21	53.00	0.0
22	55.65	0.6399
23	58.30	1.3648
24	60.95	2.1702
25	63.60	3.0517
26	66.25	4.0048
27	68.90	5.0251
28	71.55	6.1079
29	74.20	7.2489
30	76.85	8.4437
31	79.50	9.6876
32	82.15	10.9764
33	84.80	9.6553
34	87.45	8.3701
35	90.10	7.1162
36	92.75	5.8892
37	95.40	4.6845
38	98.05	3.4977
39	100.70	2.3244
40	103.35	1.1599
41	106.00	0.0

MODIFIED INFLUENCE LINE
LOAD LOAD INFLUENCE
PT. DIST. VALUE

1	0.0	0.0
2	2.65	-0.2645
3	5.30	-0.5250
4	7.95	-0.7776
5	10.60	-1.0182
6	13.25	-1.2430
7	15.90	-1.4478
8	18.55	-1.6288
9	21.20	-1.7819

10	23.85	-1.9032
11	26.50	-1.9887
12	29.15	-2.0345
13	31.80	-2.0365
14	34.45	-1.9908
15	37.10	-1.8933
16	39.75	-1.7401
17	42.40	-1.5273
18	45.05	-1.2509
19	47.70	-0.9069
20	50.35	-0.4912
21	53.00	0.0
22	55.65	0.5688
23	58.30	1.2131
24	60.95	1.9291
25	63.60	2.7126
26	66.25	3.5598
27	68.90	4.4667
28	71.55	5.4293
29	74.20	6.4435
30	76.85	7.5055
31	79.50	8.6112
32	82.15	9.7568
33	84.80	10.9381
34	87.45	9.5012
35	90.10	8.0922
36	92.75	6.7070
37	95.40	5.3418
38	98.05	3.9924
39	100.70	2.6550
40	103.35	1.3255
41	106.00	0.0

82 of 87

MODIFIED INFLUENCE LINE

LOAD LOAD INFLUENCE
PT. DIST. VALUE

1	0.0	0.0
2	2.65	-0.2314
3	5.30	-0.4594
4	7.95	-0.6804
5	10.60	-0.8909
6	13.25	-1.0876
7	15.90	-1.2668
8	18.55	-1.4252
9	21.20	-1.5592
10	23.85	-1.6653
11	26.50	-1.7402
12	29.15	-1.7802
13	31.80	-1.7819
14	34.45	-1.7419
15	37.10	-1.6566
16	39.75	-1.5226
17	42.40	-1.3364
18	45.05	-1.0945
19	47.70	-0.7935
20	50.35	-0.4298
21	53.00	0.0
22	55.65	0.4977
23	58.30	1.0615
24	60.95	1.6879
25	63.60	2.3736
26	66.25	3.1149
27	68.90	3.9084
28	71.55	4.7506
29	74.20	5.6381
30	76.85	6.5673

H C V

PRINTED IN U.S.A.

31	79.50	7.5348
32	82.15	8.5372
33	84.80	9.5708
34	87.45	10.6323
35	90.10	9.0682
36	92.75	7.5249
37	95.40	5.9990
38	98.05	4.4871
39	100.70	2.9856
40	103.35	1.4911
41	106.00	0.0

83 of 87

MODIFIED INFLUENCE LIVE

LOAD LOAD INFLUENCE
PT. DIST. VALUE

1	0.0	0.0
2	2.65	-0.1984
3	5.30	-0.3938
4	7.95	-0.5832
5	10.60	-0.7637
6	13.25	-0.9322
7	15.90	-1.0858
8	18.55	-1.2216
9	21.20	-1.3364
10	23.85	-1.4274
11	26.50	-1.4916
12	29.15	-1.5259
13	31.80	-1.5274
14	34.45	-1.4931
15	37.10	-1.4200
16	39.75	-1.3051
17	42.40	-1.1455
18	45.05	-0.9382
19	47.70	-0.6801
20	50.35	-0.3684
21	53.00	0.0
22	55.65	0.4266
23	58.30	0.9099
24	60.95	1.4468
25	63.60	2.0345
26	66.25	2.6699
27	68.90	3.3500
28	71.55	4.0720
29	74.20	4.8326
30	76.85	5.6291
31	79.50	6.4584
32	82.15	7.3176
33	84.80	8.2036
34	87.45	9.1134
35	90.10	10.0441
36	92.75	8.3428
37	95.40	6.6563
38	98.05	4.9818
39	100.70	3.3162
40	103.35	1.6566
41	106.00	0.0

***** LIVE LOAD - 3-3 *****

THE LOCATION OF THE CRITICAL SECTION IS AT
53.00 FT. FROM THE LEFT END OF SPAN NO. 1.

* * * * * SECTION PROPERTIES * * * * *
GROSS MOMENT OF C SECTION MODULUS

	DEPTH	AREA	INERTIA	BOTTOM	TOP	BOTTOM
NON-COMPOSITE	33.10	38.26	6699.00	16.55	404.8	404.8

84 of 87

DL1	DL2	LL + IMPACT MOMENT FOR			ALLOWABLE STRESSES FOR			
MOMENT	MOMENT	IR	OR	SLC	IR	OR	SLC	
-2831.1	-1640.1	-2577.0	-2577.0	-2577.0	18.150	24.750	18.150	TENSION
					18.150	24.750	18.150	COMPRESSION

	STRESSES DUE TO			STRESSES DUE TO LL+I FOR		
	DL1	DL2		IR	OR	SLC
TOP FIBER	6.994	4.052		6.366	6.366	6.366
BOTTOM FIBER	6.994	4.052		6.366	6.366	6.366

INVENTORY RATING	1.1158
OPERATING RATING	2.1525
SAFE LOAD CAPACITY	1.1158

***** BRIDGE ANALYSIS AND RATING *****
 BR.M-5-1-W-6-13 DEPT.REF.896 MARION-WAREHAM FASCIA STEEL STRINGER 1957

25 of 87

% OF AASHTU IMPACT FACTORS SLC STRESS SP. FLOOR TIE
 IR OR SLC LEVEL LL. MATERIAL SYSTEM PLATE
 100. 100. 100. 125. 0 S GGG

			GIRDER			FLOORBEAM			STRINGER			
LOAD	BUG	LANE	INF	UNL	K	A	UNL	K	A	JNL	K	A
0.0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

PARAPET PLUS GIRDER OR CL.OF GIRDER OR ** ROADWAY WIDTH **
 SIDEWALK WIDTH TRUSS SPACING TRUSS TO CURB LEFT MEDIAN RIGHT
 0.0 4.25 0.0 0.0 0.0 0.0 0.0

DISTR. SLAB SUPER HARD- SIDEWALK
 FACTOR THICKNESS HAUNCH DL WARE LIVE LOAD F'G N SYMMETRY
 0.545 7.00 0.0 0.390 9. 180. 3.000 10. N

***** SPAN LENGTHS *****
 (CONTINUOUS)

SPAN #	1	2	3	4	5	6	7	8
LENGTH	53.00	53.00						

***** STEEL MEMBER PROPERTIES *****

TYPE	SPAN	RANGE	WF BEAM OR WEB BUILT-UP SECTION		WF OR WEB PLATE DEPTH		TOP PLATE		BOTTOM PLATE		COMP	F	
			INERTIA	AREA	LEFT	RIGHT	V	THICK	WIDTH	THICK			WIDTH
G	1	53.00	6699.0	38.26	33.10	0.0	0.5800	0.0	0.0	0.0	0.0	N	33
G	2	53.00	6699.0	38.26	33.10	0.0	0.5800	0.0	0.0	0.0	0.0	N	33

***** GIRDER RATINGS *****

***** LIVE LOAD - H20 *****

THE LOCATION OF THE CRITICAL SECTION IS AT
 31.80 FT. FROM THE LEFT END OF SPAN NO. 2.

***** SECTION PROPERTIES *****

	GROSS MOMENT OF INERTIA		SECTION MODULUS	
	DEPTH	AREA	BOTTOM	TOP
NON-COMPOSITE	33.10	38.26	6699.00	16.55 404.8 404.8

DL1	DL2	LL + IMPACT MOMENT FOR			ALLOWABLE STRESSES FOR		
MOMENT	MOMENT	IR	OR	SLC	IR	OR	SLC
1207.5	1346.8	3277.7	3277.7	3277.7	18.150	24.750	22.687
					18.150	24.750	22.687
							TENSION
							COMPRESSION

	STRESSES DUE TO			STRESSES DUE TO LL+I FOR		
	DL1	DL2	IR	OR	SLC	
TOP FIBER	2.983	3.327	8.098	8.098	8.098	

BOTTOM FIBER 2.983 3.327 8.098 8.098 8.098

INVENTORY RATING 1.4621
OPERATING RATING 2.2771 x 20T = 45.54T
SAFE LOAD CAPACITY 2.0224 x 20T = 40.45T
(125% of all stress)

86 of 87

***** LIVE LOAD - HS20 *****

THE LOCATION OF THE CRITICAL SECTION IS AT
31.80 FT. FROM THE LEFT END OF SPAN NO. 2.

***** SECTION PROPERTIES *****

	GROSS MOMENT OF C			SECTION MODULUS	
	DEPTH	AREA	INERTIA	BOTTOM	TOP
NON-COMPOSITE	33.10	38.26	6699.00	16.55	404.8

DL1 MOMENT	DL2 MOMENT	LL + IMPACT MOMENT FOR			ALLOWABLE STRESSES FOR			
		IR	OR	SLC	IR	OR	SLC	
1207.5	1346.8	4556.7	4556.7	4556.7	18.150	24.750	22.687	TENSION
					18.150	24.750	22.687	COMPRESSION

	STRESSES DUE TO		STRESSES DUE TO LL+I FOR		
	DL1	DL2	IR	OR	SLC
TOP FIBER	2.983	3.327	11.257	11.257	11.257
BOTTOM FIBER	2.983	3.327	11.257	11.257	11.257

INVENTORY RATING 1.0517
OPERATING RATING 1.6380
SAFE LOAD CAPACITY 1.4548

***** LIVE LOAD - 3 *****

THE LOCATION OF THE CRITICAL SECTION IS AT
31.80 FT. FROM THE LEFT END OF SPAN NO. 2.

***** SECTION PROPERTIES *****

	GROSS MOMENT OF C			SECTION MODULUS	
	DEPTH	AREA	INERTIA	BOTTOM	TOP
NON-COMPOSITE	33.10	38.26	6699.00	16.55	404.8

DL1 MOMENT	DL2 MOMENT	LL + IMPACT MOMENT FOR			ALLOWABLE STRESSES FOR			
		IR	OR	SLC	IR	OR	SLC	
1207.5	1346.8	3205.5	3205.5	3205.5	18.150	24.750	22.687	TENSION
					18.150	24.750	22.687	COMPRESSION

	STRESSES DUE TO		STRESSES DUE TO LL+I FOR		
	DL1	DL2	IR	OR	SLC
TOP FIBER	2.983	3.327	7.919	7.919	7.919
BOTTOM FIBER	2.983	3.327	7.919	7.919	7.919

INVENTORY RATING 1.4950
OPERATING RATING 2.3284 x 23T = 53.55T
SAFE LOAD CAPACITY 2.0680 x 23T = 47.56T
(125% of all stress)

***** LIVE LOAD - 3S2 *****

THE LOCATION OF THE CRITICAL SECTION IS AT

PRINTED IN U.S.A.

53.00 FT. FROM THE LEFT END OF SPAN NO. 1.

87 of 87

***** SECTION PROPERTIES *****

	DEPTH	AREA	GROSS MOMENT OF		SECTION MODULUS	
			INERTIA	BOTTOM	TOP	BOTTOM
NON-COMPOSITE	33.10	38.26	6699.00	16.55	404.8	404.8

DL1	DL2	LL + IMPACT MOMENT FOR			ALLOWABLE STRESSES FOR			
MOMENT	MOMENT	IR	OR	SLC	IR	OR	SLC	
-2149.2	-2397.1	-2488.8	-2488.8	-2488.8	18.150	24.750	22.687	TENSION
					18.150	24.750	22.687	COMPRESSION

	STRESSES DUE TO			STRESSES DUE TO LL+I FOR		
	DL1	DL2		IR	OR	SLC
TOP FIBER	5.310	5.922		6.149	6.149	6.149
BOTTOM FIBER	5.310	5.922		6.149	6.149	6.149

INVENTORY RATING	1.1252
OPERATING RATING	$2.1986 \times 36 T = 79.15 T$
SAFE LOAD CAPACITY	$1.8631 \times 36 T = 67.07 T$

***** LIVE LOAD - 3-3 *****

THE LOCATION OF THE CRITICAL SECTION IS AT
53.00 FT. FROM THE LEFT END OF SPAN NO. 1.

***** SECTION PROPERTIES *****

	DEPTH	AREA	GROSS MOMENT OF		SECTION MODULUS	
			INERTIA	BOTTOM	TOP	BOTTOM
NON-COMPOSITE	33.10	38.26	6699.00	16.55	404.8	404.8

DL1	DL2	LL + IMPACT MOMENT FOR			ALLOWABLE STRESSES FOR			
MOMENT	MOMENT	IR	OR	SLC	IR	OR	SLC	
-2149.2	-2397.1	-2577.0	-2577.0	-2577.0	18.150	24.750	22.687	TENSION
					18.150	24.750	22.687	COMPRESSION

	STRESSES DUE TO			STRESSES DUE TO LL+I FOR		
	DL1	DL2		IR	OR	SLC
TOP FIBER	5.310	5.922		6.366	6.366	6.366
BOTTOM FIBER	5.310	5.922		6.366	6.366	6.366

INVENTORY RATING	1.0867
OPERATING RATING	2.1233
SAFE LOAD CAPACITY	1.7994