Engineering Summary Report

LOG-13-1.58
McColly Covered Bridge Over the Great Miami River

Logan County, Ohio

June 1997

BURGESS
& NIPLE
ENGINEERS
ARCHITECTS

Table of Contents

1.0 BRIDGE CONDITION

1.1 Introduction

On November 25, 1996 an inspection of the McColly Covered Bridge was performed by Ronald Mattox, Jeffrey Griffin, and Anthony Allbery of Burgess & Niple, Limited. This inspection included sounding and probing of each timber member to determine the extent of any rot or deterioration. The findings of this inspection are summarized in the following report.

Overall the McColly Covered Bridge is in "imminent" failure condition and has been closed.

1.2 Deck

Timber plank flooring is in fair condition. Dirt and moisture on the deck will create optimum conditions to promote rot.

A steel guardrail has been attached to the diagonal members of the truss. These guardrails are in generally good condition with collision damage exhibited on the right side near the rear abutment.

1.3 Superstructure

Reference Figures 1 and 2 for location of superstructure conditions identified in the following narrative.

The horizontal alignment of the bridge is good. In the vertical plane however, the bridge exhibits a sag which is most notable at the ends of the bridge. Both trusses also lean to the north.

Steel floorbeams and stringers were installed in 1959. They exhibit minor rusting and are in fair condition.

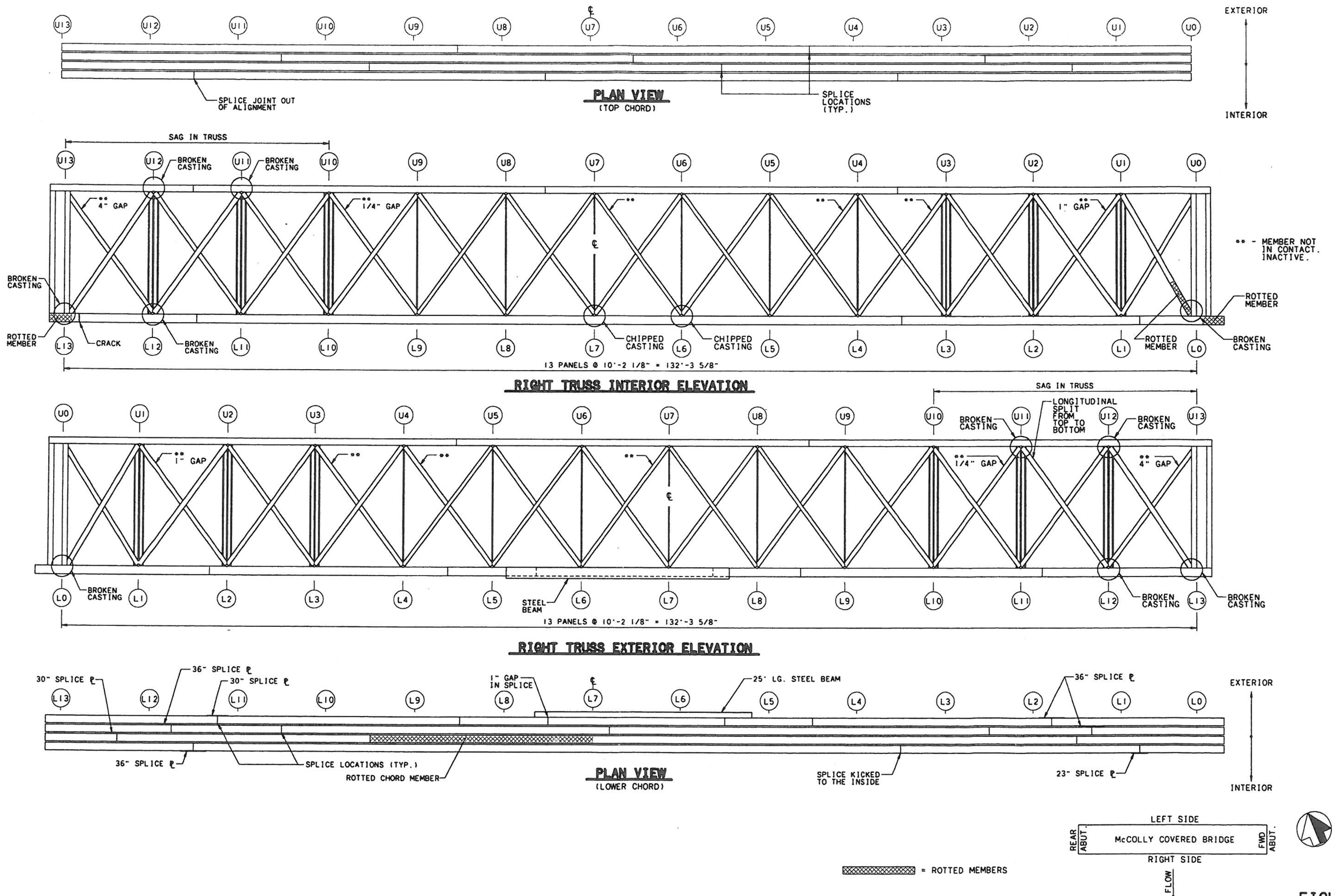
PLAN VIEW
(TOP CHORD)
SPLICE JOINT OUT OF ALIGNMENT
SPLICE LOCATIONS (TYP.)
EXTERIOR
INTERIOR
SAG IN TRUSS
BROKEN CASTING
4" GAP
1/4" GAP
1" GAP
•• - MEMBER NOT IN CONTACT. INACTIVE.
ROTTED MEMBER
CRACK
CHIPPED CASTING
13 PANELS @ 10'-2 1/8" = 132'-3 5/8"
RIGHT TRUSS INTERIOR ELEVATION
LONGITUDINAL SPLIT FROM TOP TO BOTTOM
STEEL BEAM
RIGHT TRUSS EXTERIOR ELEVATION
30" SPLICE ℄
36" SPLICE ℄
1" GAP IN SPLICE
25' LG. STEEL BEAM
SPLICE LOCATIONS (TYP.)
ROTTED CHORD MEMBER
PLAN VIEW
(LOWER CHORD)
SPLICE KICKED TO THE INSIDE
23" SPLICE ℄
LEFT SIDE
REAR ABUT.
McCOLLY COVERED BRIDGE
FWD ABUT.
RIGHT SIDE
FLOW
= ROTTED MEMBERS

FIGURE 1

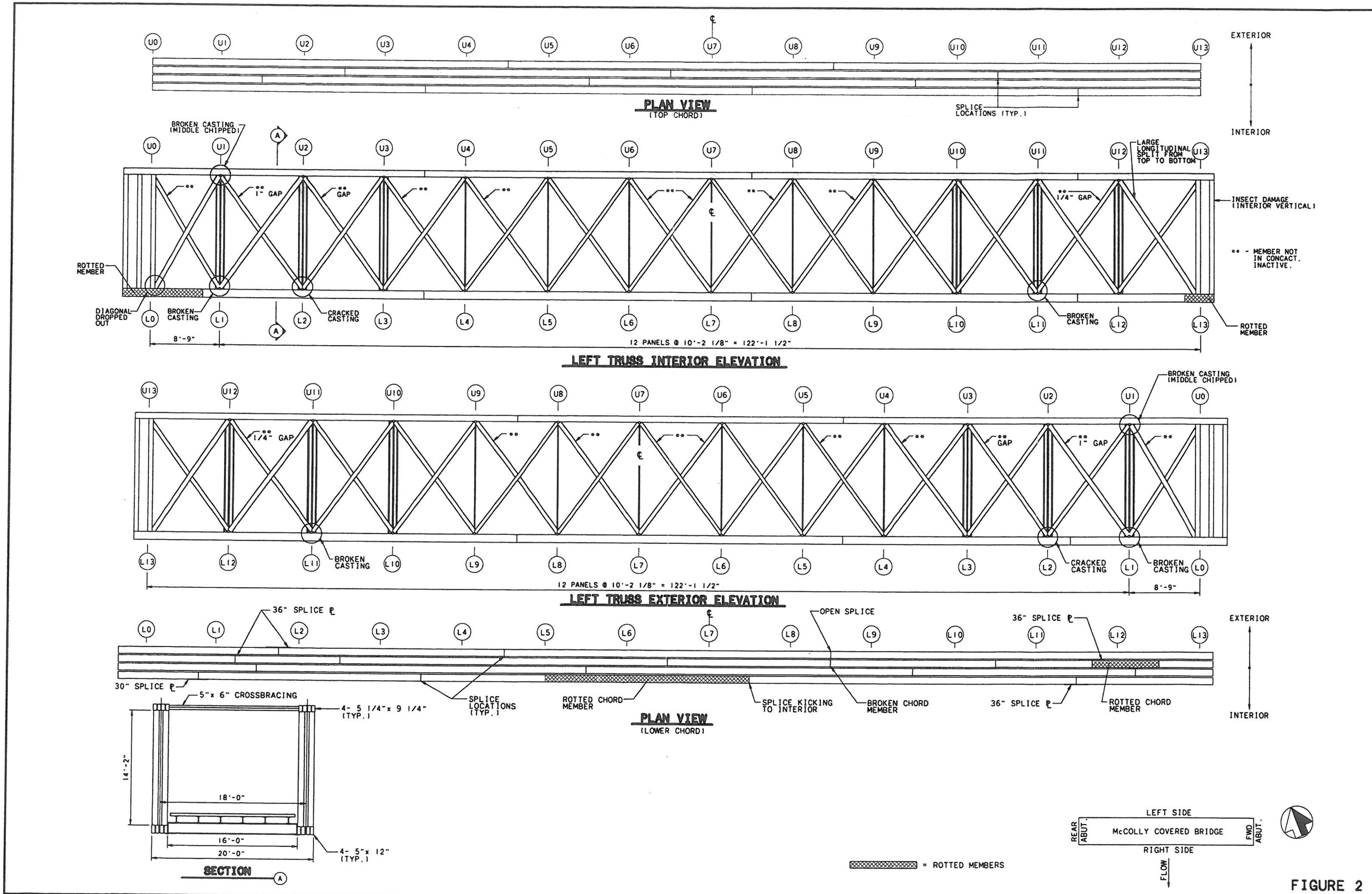
PLAN VIEW
(TOP CHORD)
SPLICE LOCATIONS (TYP.)
EXTERIOR
INTERIOR
BROKEN CASTING (MIDDLE CHIPPED)
1" GAP
GAP
1/4" GAP
LARGE LONGITUDINAL SPLIT FROM TOP TO BOTTOM
INSECT DAMAGE (INTERIOR VERTICAL)
•• - MEMBER NOT IN CONCACT, INACTIVE.
ROTTED MEMBER
DIAGONAL DROPPED OUT
BROKEN CASTING
CRACKED CASTING
8'-9"
12 PANELS @ 10'-2 1/8" = 122'-1 1/2"
LEFT TRUSS INTERIOR ELEVATION
LEFT TRUSS EXTERIOR ELEVATION
36" SPLICE
OPEN SPLICE
30" SPLICE
5"x 6" CROSSBRACING
4- 5 1/4"x 9 1/4" (TYP.)
SPLICE LOCATIONS (TYP.)
ROTTED CHORD MEMBER
SPLICE KICKING TO INTERIOR
BROKEN CHORD MEMBER
PLAN VIEW
(LOWER CHORD)
14'-2"
18'-0"
16'-0"
20'-0"
4- 5"x 12" (TYP.)
SECTION
= ROTTED MEMBERS
LEFT SIDE
REAR ABUT.
McCOLLY COVERED BRIDGE
FWD ABUT.
RIGHT SIDE
FLOW

FIGURE 2

Vertical tension members at each of the intermediate panel points consist of multiple wrought iron rods which extend through both the upper and lower chords and are bolted against gib plates. In 1959, additional rods were installed at specific locations to supplement the existing rods. All rods and gib plates are in good condition. No crushing of the timber member beneath the gib plates was noted.

Timber diagonal braces and counter braces are framed squarely into cast-iron angle blocks that are framed into the upper and lower chord members. Generally the diagonals are in fair condition; however, several exhibit rot at the lower ends. Those diagonals that exhibit rot are in locations where the siding has been removed allowing water to collect on the members. Approximately 60 percent of the counter braces are loose or are completely removed from the angle block. Approximately 20 percent of the cast-iron angle blocks are cracked or completely broken.

End posts for the Howe type truss are not main load carrying members. They support the roof in the end panels and the portals. Between 1944 and 1958, the end post at the northwest corner of the bridge was moved and the diagonals were modified accordingly. The end posts are generally in good condition.

The upper chord consists of four timber members continuous for the length of the bridge. Upper chord members are in fair condition. No signs of rot, insect damage, or deterioration were found; however, a significant sag in the chord exists.

The lower chord also consists of four timber members continuous from abutment to abutment. The lower chord is in critical condition. Rot is evident at several locations along the chord. At the abutments, the rot has resulted in significant loss of section. At the individual member joints the rot has allowed the joints to open which has increased the stress in the remaining members resulting in member fractures and sagging of the superstructure. Fractures of the chord members at the abutments were noted. Steel beams have been added to the lower chords to keep them together.

Lower lateral bracing angles are in fair condition exhibiting minor surface rusting.

Upper lateral bracing consists of timber x-bracing with iron tie rods. Generally the bracing is in good condition. At one location the timber cross brace has split and has been bolted together.

In 1944 the entire roof was replaced. The roof constructed consists of new rafters on 2 foot centers, supporting wooden shingles covered with 20 gage sheet metal. The current condition of this roof is fair. At several locations, water is penetrating the roof and falling to the deck below.

The wooden plank siding is in critical condition. Approximately 30 percent of the siding is missing. The remaining planks exhibit rot and are splitting.

At each of the four corners of the bridge, the lower chord of the trusses are set on steel plates that are bolted to the abutment. The bearings are covered with dirt and debris.

1.4 Substructure

The original abutments were made of local stone. The substructures visible today are concrete. The stone abutments may have been covered with concrete. The abutments are in fair condition with minor cracking exhibited.

Both abutment seats are covered with dirt and debris. This material has collected against the lower chord and has promoted rotting of these members.

2.0 ANALYSIS

2.1 Loads

Dead loads for the primary analysis include self weight of each truss and point loads representing the roof, siding, and floor. Roof loads include the existing shingles and metal sheeting. The floor loads represent a new glued laminated floorbeam and deck system. Additional analyses were performed with a reduction of dead load. The reduction was obtained by using the existing floor system and removal of the shingles under the metal roof.

Primary live load analysis is based on American Association of State Highway and Transportation Officials (AASHTO) H15 loading. This represents a single 15 ton truck with two axles spaced at 14 feet (Figure 3). Half of the live load is applied to each truss. The live load was applied to the truss as a moving load from one end to the other to determine the maximum and minimum loads within each member.

A secondary live load representing a school bus fully loaded with children was also applied to the truss. The bus live load shown in Figure 4 was applied in the same manner as the H15 truck load.

2.2 Methodology

A plane frame analysis was performed on the trusses using STAAD III release 21, developed by Research Engineers. The model created within STAAD is shown in Figure 5. Members 27 through 66 are designated as truss members, which by definition are capable of axial loads only. Members 67 through 93 are added to the truss to model the actual transfer of live loads to truss panels through the floorbeams.

Member forces from the STAAD III analysis output were transferred to a Summary Table spreadsheet (Table 2) for calculation of member stresses and load rating capacity. The summary spreadsheet also includes calculation of member properties based on field measurements, and allowable stress design values.

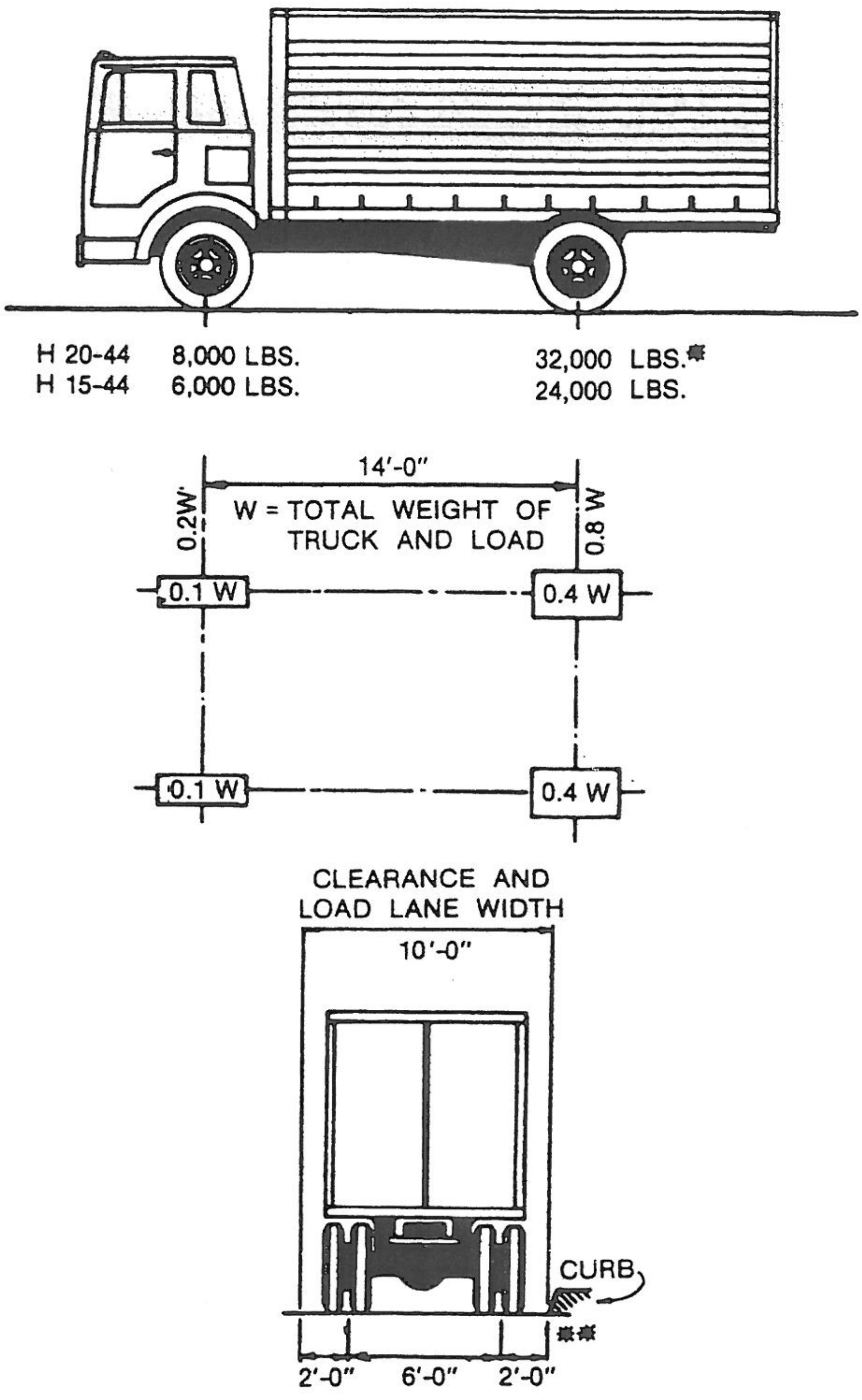
H 20-44 8,000 LBS.
H 15-44 6,000 LBS.
32,000 LBS.*
24,000 LBS.
14'-0"
W = TOTAL WEIGHT OF TRUCK AND LOAD
0.2W
0.8 W
0.1 W
0.4 W
0.1 W
0.4 W
CLEARANCE AND LOAD LANE WIDTH
10'-0"
CURB
**
2'-0"
6'-0"
2'-0"

FIGURE 3

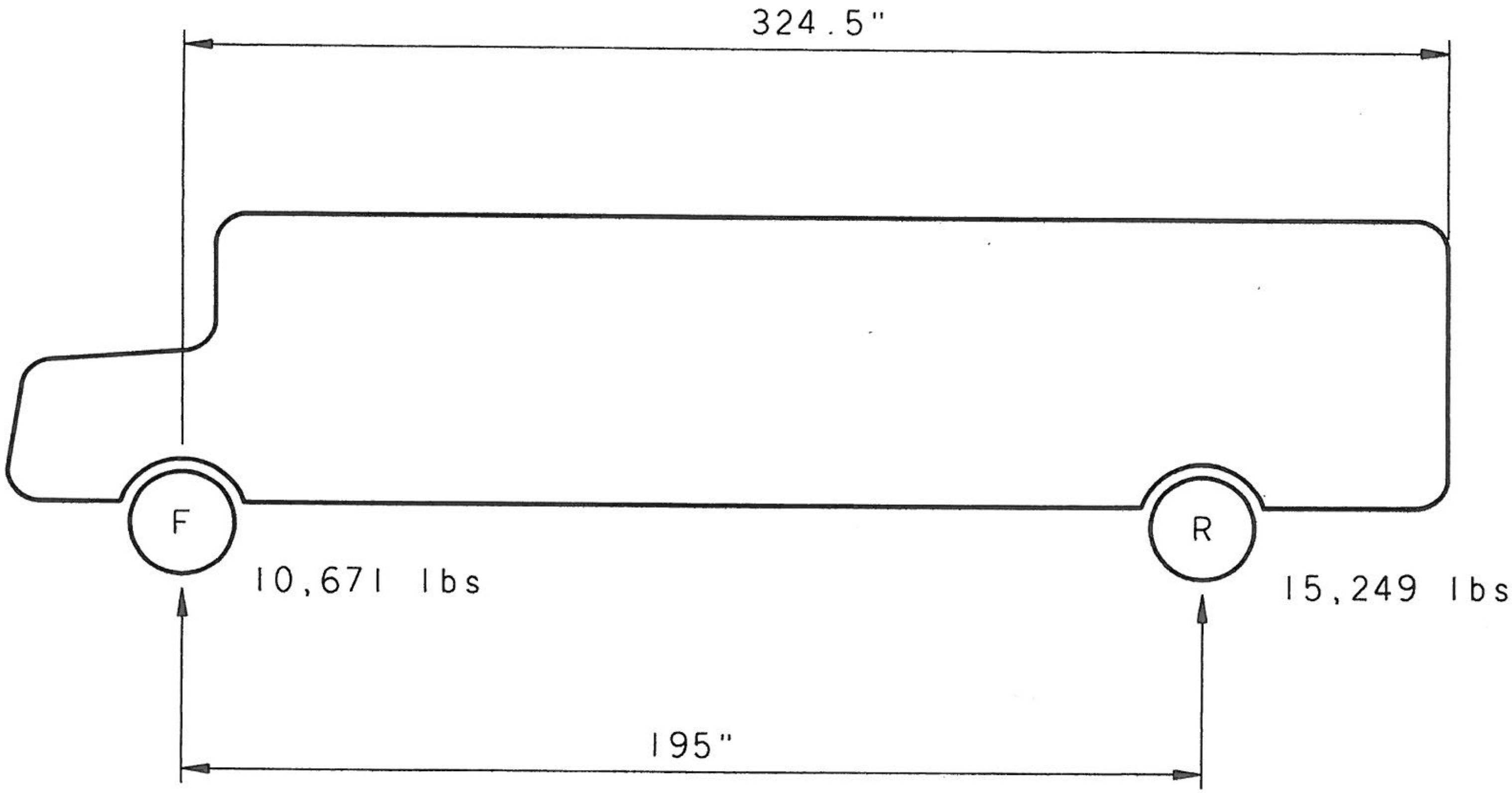

FIGURE 4

Logan County

McColly Covered Bridge

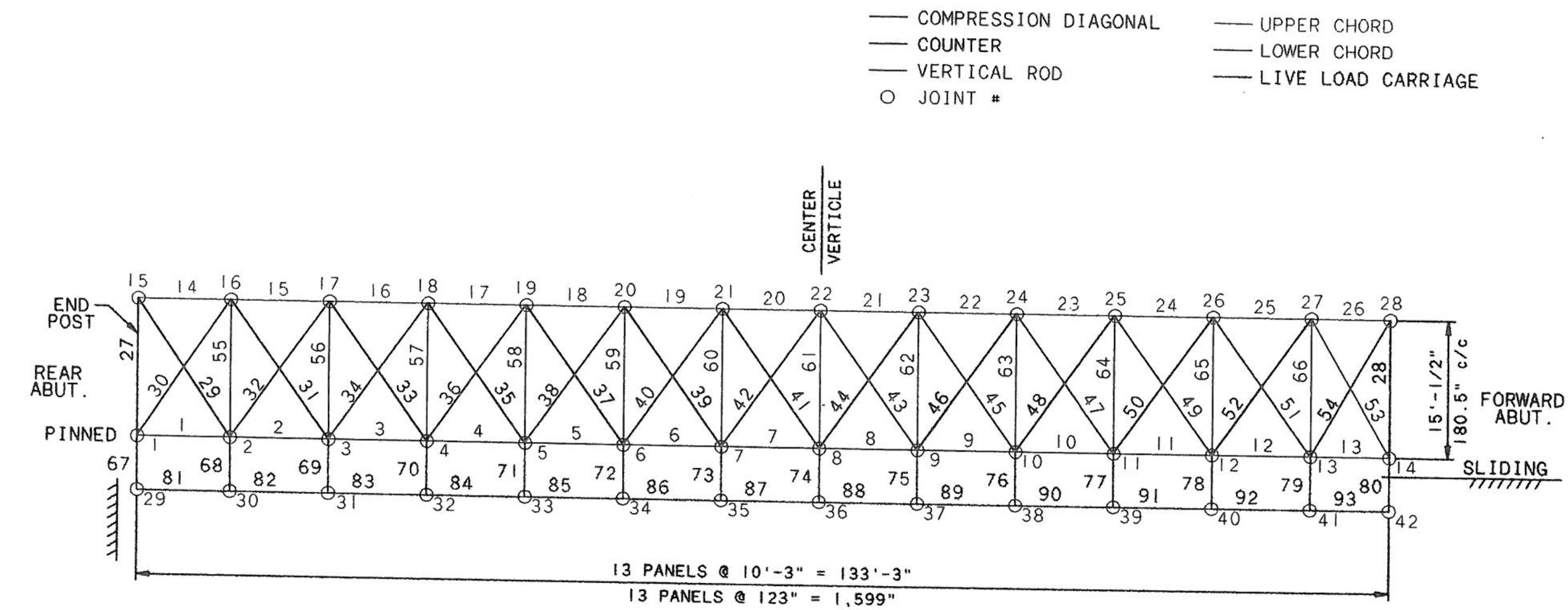

FIGURE 5

Logan County

McColly Covered Bridge

Allowable stress values are in accordance with AASHTO, 16th edition, and the *National Design Specification for Wood Construction*, 1991 edition. Timber samples from the structure were sent to the U.S. Department of Agriculture and identified as Red Pine. Tabulated values for Red Pine have been multiplied by the applicable adjustment factors to determine allowable design values (Table 1).

2.3 Member Capacity

An initial analysis was performed on the complete truss with full dead load only. This analysis indicated that all truss counters are in tension. The actual structure does not provide a tension connection for these members; therefore, they are inactive. These members were removed from the truss configuration for all subsequent analyses. Dead load compression in member 42 is less than 500 pounds. Under minimal live load, this member will be in tension. Therefore, this member has also been eliminated from subsequent analyses.

Full H15 live load was applied to the truss. This analysis indicated that under specific load conditions, the compression diagonals on both sides of the truss centerline develop tension greater than dead load compression. This indicated that a sequential analysis of the truss would be required. Several analyses have been run with an increasing percentage of live load to determine at what percent of live load compression members go into tension and become inactive. Inactive members were removed for subsequent analyses. Truss EVENTS have been established for each change in configuration up to full H15 loading.

The initial truss configuration for live load analysis is shown in Figure 6. This configuration, without counters and member 42, is valid up to 60 percent of H15 live load. This load level, defined as EVENT A, establishes the level at which members 40 and 43 are in tension and become inactive.

Figure 7 shows the truss configuration for live load analysis between EVENT A and EVENT B (0.92 H15). Beyond EVENT B, members 38 and 45 become inactive (Figure 8). This configuration is valid to EVENT C. EVENT C represents 100 percent of H15 live load.

Allowable Member Stresses (psi)
Red Pine Sawn Lumber (1.)

Loading	Member	Value	Red Pine Table 4D	X	CD	CM	Ct	CL	CF	CV	Cfu	Cr	Cc	Cf	CP	CH	CT	Cb	=	Allowable Value	Allowable Red Pine
					Adjustment Factors																
		AASHTO Reference			13.5.5.2 T 13.5.5A	13.5.5.1 T 13.5.1A		13.6.4.4	13.6.4.2 T 13.5.1A	13.6.4.3	T 13.5.1A	T 13.5.1A		13.6.4.5	13.7.3.3	T 13.5.1A		13.6.6.3			
		NDS Reference			2.3.2 Append B	2.3.3 Table 4D	2.3.4 Append C	2.3.7 3.3.3	4.3.2 Table 4D	5.3.2	4.3.3, 5.3.3	4.3.4	5.3.4	2.3.8	2.3.9 3.7.1	Table 4D	4.4.3	2.3.10			
		Tabulated design		X	Load Duration	Wet Service	Temperature	Beam Stability	Size	Volume	Flat Use	Repetitive Member	Curvature	Form	Column Stability	Shear Stress	Buckling Stiffness	Bearing Area	=	Allowable	
Dead Load	Beams & Stringers (Chords)	Fb	1,050	X	0.90	1.00	1.00	1.00	1.00										=	Fb'	945
		Ft	625	X	0.90	1.00	1.00		1.00										=	Ft'	563
		Fv	65	X	0.90	1.00	1.00									1.00			=	Fv'	59
		Fc|	440	X		0.67	1.00											1.00	=	Fc|'	295
		Fc	725	X	0.90	0.91	1.00		1.00						1.00				=	Fc'	594
		E	1,100,000	X		1.00	1.00												=	E'	1,100,000
		Fg	880	X	0.90		1.00												=	Fg'	792
	Posts & Timbers (Vert.) (Diag.)	Fb	1,000	X	0.90	1.00	1.00	1.00	1.00										=	Fb'	900
		Ft	675	X	0.90	1.00	1.00		1.00										=	Ft'	608
		Fv	65	X	0.90	1.00	1.00									1.00			=	Fv'	59
		Fc|	440	X		0.67	1.00											1.00	=	Fc|'	295
		Fc	775	X	0.90	0.91	1.00		1.00						1.00				=	Fc'	635
		E	1,100,000	X		1.00	1.00												=	E'	1,100,000
		Fg	880	X	0.90		1.00												=	Fg'	792
Foot Notes									2	3	4	4	3	5	6		4				
Live Load	Beams & Stringers (Chords)	Fb	1,050	X	1.20	1.00	1.00	1.00	1.00										=	Fb'	1,260
		Ft	625	X	1.20	1.00	1.00		1.00										=	Ft'	750
		Fv	65	X	1.20	1.00	1.00									1.00			=	Fv'	78
		Fc|	440	X		0.67	1.00											1.00	=	Fc|'	295
		Fc	725	X	1.20	0.91	1.00		1.00						1.00				=	Fc'	792
		E	1,100,000	X		1.00	1.00												=	E'	1,100,000
		Fg	880	X	1.20		1.00												=	Fg'	1,056
	Posts & Timbers (Vert.) (Diag.)	Fb	1,000	X	1.20	1.00	1.00	1.00	1.00										=	Fb'	1,200
		Ft	675	X	1.20	1.00	1.00		1.00										=	Ft'	810
		Fv	65	X	1.20	1.00	1.00									1.00			=	Fv'	78
		Fc|	440	X		0.67	1.00											1.00	=	Fc|'	295
		Fc	775	X	1.20	0.91	1.00		1.00						1.00				=	Fc'	846
		E	1,100,000	X		1.00	1.00												=	E'	1,100,000
		Fg	880	X	1.20		1.00												=	Fg'	1,056
Foot Notes			9		7				2	3	4	4	3	5	8		4				

1. Red Pine for truss members is Select Structural
2. (For d> 12") CF = (12/d)**1/9 = 1.0 (not applicable to McColly)
3. Applies to glued laminated members, not sawn lumber
4. Not applicable to timbers
5. For circular or diamond sections
6. Factors for CP (dead load) = McColly U.C. 0.89
   McColly Diag. 0.90
7. AASHTO = 1.15 increased for truss configuration to 1.2
8. Factors for CP (live load) = McColly U.C. 0.85
   McColly Diag. 0.86
9. Base design values for wet service conditions, actual conditions will be better
10. Allowable stress for wrought iron = 20,000 psi (per AASHTO)

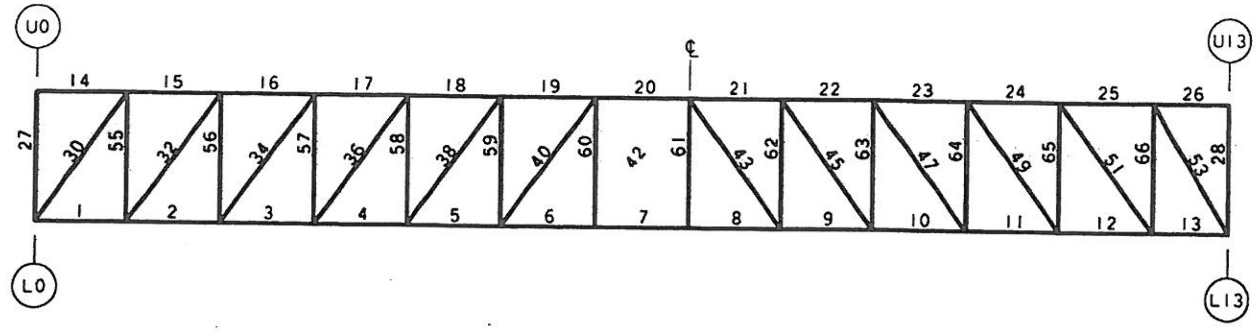

FIGURE 6: 0.0H15 → 0.60H15
EVENT A

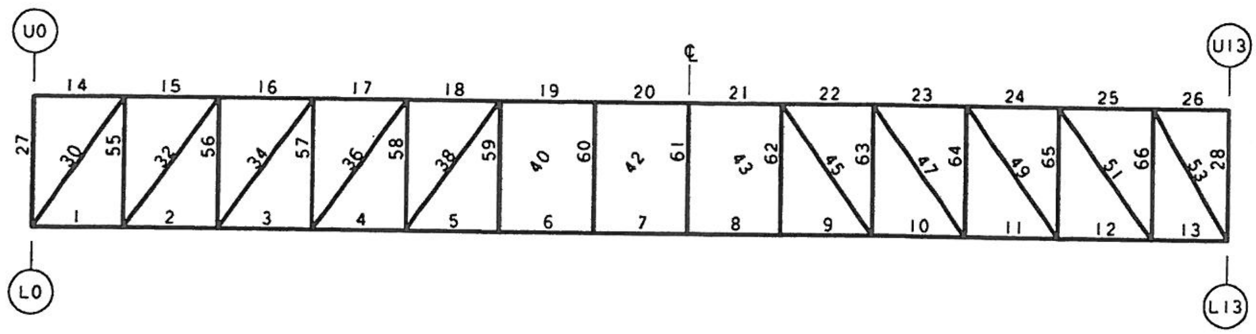

FIGURE 7: .060H15 → 0.92H15
EVENT A → EVENT B

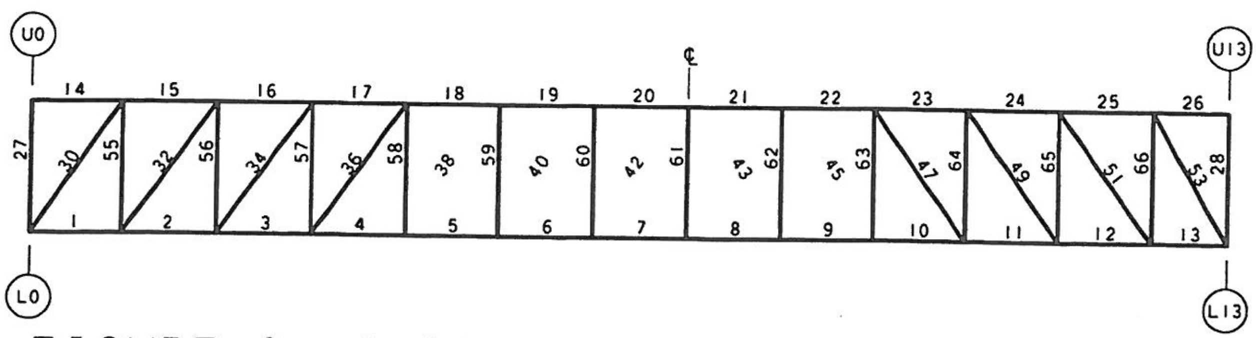

FIGURE 8: 0.92H15 → 1.00H15
EVENT B → EVENT C

Table 2 is a summary of the loads, stresses, and load rating for each member for sequential live loading to full H15. End posts, compression diagonals, counters, and verticals (members 27 through 66) are designated as truss members. The shaded areas in Table 2, for bending end shear, do not apply for these members.

As shown in the Rating columns, members 4, 5, 9, and 10 are rated for less than 10 tons.

A similar analysis was performed using the school bus live load. Results provided in Table 3 indicate that all members are capable of withstanding this live load.

Interaction Analysis - Capacities and ratings for members shown in Tables 2 and 3 are based on axial, shear, and bending forces acting separately on each individual member. The lower and upper chords are actually acted upon by a combination of axial and bending forces simultaneously. For these members, a restriction based on the interaction of axial and bending stresses is also imposed. The Comment column in Tables 2 and 3 indicates members exceeding the interaction requirement. Additional analyses were performed to determine the maximum allowable load due to this restriction. A maximum load of 0.55 x H15 (8.25 tons) was established. Table 4 provides the member ratings and interaction values at this load level.

Results of the interaction analysis also indicate that the bridge cannot carry the fully loaded school bus.

In summary, the interaction analysis indicates that the rehabilitated bridge would have to be posted for 8 tons and could not be used by fully loaded school buses.

McCOLLY COVERED BRIDGE
FULL TRUSS
ALL COUNTERS AND SELECTED DIAGONALS INACTIVE
MEMBER PROPERTIES, FORCES, STRESSES AND RATING
STAAD FILES: PR19165 FTC TRUSSDL & EVENTA, B & C

FILE: SUMMARY.WB2
PAGE 2
R. Hatton, M. Killian
02-May-97

Member	no.	DIMENSIONS: outside width (w)	outside height (h)	outside rod diameter (d)	middle outside width (w)	middle outside height (h)	left rod diameter (d)	right rod diameter (d)	middle inside width (w)	middle inside height (h)	inside rod diameter (d)	inside width (w)	inside height (h)	PROPERTIES: full area (in**2)	I (in**4)	weight (lb/inch)	A: joint area (in**2)
	1	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00	240.00	2880.00	6.67	192.00
	2	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00	240.00	2880.00	6.67	192.00
	3	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00	240.00	2880.00	6.67	192.00
	4	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00	240.00	2880.00	6.67	192.00
	5	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00	240.00	2880.00	6.67	192.00
	6	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00	240.00	2880.00	6.67	192.00
LC	7	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00	240.00	2880.00	6.67	192.00
	8	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00	240.00	2880.00	6.67	192.00
	9	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00	240.00	2880.00	6.67	192.00
	10	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00	240.00	2880.00	6.67	192.00
	11	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00	240.00	2880.00	6.67	192.00
	12	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00	240.00	2880.00	6.67	192.00
	13	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00	240.00	2880.00	6.67	192.00
	14	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25	194.25	1385.04	5.40	157.25
	15	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25	194.25	1385.04	5.40	157.25
	16	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25	194.25	1385.04	5.40	157.25
	17	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25	194.25	1385.04	5.40	157.25
	18	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25	194.25	1385.04	5.40	157.25
	19	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25	194.25	1385.04	5.40	157.25
UC	20	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25	194.25	1385.04	5.40	157.25
	21	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25	194.25	1385.04	5.40	157.25
	22	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25	194.25	1385.04	5.40	157.25
	23	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25	194.25	1385.04	5.40	157.25
	24	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25	194.25	1385.04	5.40	157.25
	25	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25	194.25	1385.04	5.40	157.25
	26	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25	194.25	1385.04	5.40	157.25
END	27	4.00	8.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.50	7.00	64.50	315.80	1.79	64.50
POST	28	4.50	8.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.50	7.00	67.50	320.63	1.88	67.50
	30	7.00	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.00	8.75	120.75	749.03	3.35	103.50
	32	7.25	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.00	8.75	122.88	761.82	3.41	105.63
	34	6.25	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.25	8.75	107.81	668.77	2.99	90.56
	36	6.25	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.00	8.75	105.63	654.82	2.93	88.38
	38	5.00	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.25	8.50	87.13	524.57	2.42	70.13
COMP.	40	5.25	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.25	8.50	89.25	537.36	2.48	72.25
DIAG.	42	5.25	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.25	8.25	87.94	514.34	2.44	71.19
	43	5.25	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	8.50	87.13	524.57	2.42	70.13
	45	5.25	8.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.25	8.25	89.25	538.75	2.48	72.25
	47	6.25	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.00	8.50	104.13	626.92	2.89	87.13
	49	6.00	8.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.00	8.75	105.00	669.92	2.92	87.50
	51	7.00	8.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.00	8.50	120.75	749.03	3.35	103.50
	53	7.00	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.00	8.50	119.00	716.48	3.31	102.00
	29	0.00	0.00	0.00	6.00	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	36.00	108.00	1.00	30.00
	31	0.00	0.00	0.00	6.25	5.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	35.94	99.02	1.00	30.19
	33	0.00	0.00	0.00	6.25	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	37.50	112.50	1.04	31.50
	35	0.00	0.00	0.00	6.25	6.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.06	127.16	1.09	32.81
	37	0.00	0.00	0.00	6.00	6.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	37.50	122.07	1.04	31.25
	39	0.00	0.00	0.00	6.25	6.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.06	127.16	1.09	32.81
COUNT.	41	0.00	0.00	0.00	6.25	6.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.06	127.16	1.09	32.81
	44	0.00	0.00	0.00	6.25	6.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.06	127.16	1.09	32.81
	46	0.00	0.00	0.00	6.25	6.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.06	127.16	1.09	32.81
	48	0.00	0.00	0.00	6.00	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	36.00	108.00	1.00	30.00
	50	0.00	0.00	0.00	6.00	5.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	34.50	95.05	0.96	28.75
	52	0.00	0.00	0.00	6.00	6.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.00	137.31	1.08	32.50
	54	0.00	0.00	0.00	6.00	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	36.00	108.00	1.00	30.00
	55	0.00	0.00	1.50	0.00	0.00	1.25	1.25	0.00	0.00	1.50	0.00	0.00	5.99	0.74	1.68	5.99
	56	0.00	0.00	1.50	0.00	0.00	1.00	1.00	0.00	0.00	1.50	0.00	0.00	5.10	0.59	1.43	5.10
	57	0.00	0.00	1.50	0.00	0.00	0.75	0.75	0.00	0.00	1.50	0.00	0.00	4.42	0.53	1.24	4.42
	58	0.00	0.00	1.50	0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.00	0.00	3.53	0.50	0.99	3.53
	59	0.00	0.00	1.38	0.00	0.00	0.00	0.00	0.00	0.00	1.38	0.00	0.00	2.97	0.35	0.83	2.97
	60	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	1.57	0.10	0.44	1.57
VERT.	- 61	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	1.57	0.10	0.44	1.57
	62	0.00	0.00	1.38	0.00	0.00	0.00	0.00	0.00	0.00	1.38	0.00	0.00	2.97	0.35	0.83	2.97
	63	0.00	0.00	1.50	0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.00	0.00	3.53	0.50	0.99	3.53
	64	0.00	0.00	1.50	0.00	0.00	0.75	0.75	0.00	0.00	1.50	0.00	0.00	4.42	0.53	1.24	4.42
	65	0.00	0.00	1.50	0.00	0.00	1.00	1.00	0.00	0.00	1.50	0.00	0.00	5.10	0.59	1.43	5.10
	66	0.00	0.00	1.50	0.00	0.00	1.25	1.25	0.00	0.00	1.50	0.00	0.00	5.99	0.74	1.68	5.99

no.	B: FORCES (LBS) DEAD LOAD FX	C T	MAX FY	MAX MZ	C: EVENTA : (0.60) H15 LIVE LOAD FX	C T	MAX FY	MAX MZ	EVENTB : (0.92) H15 LIVE LOAD FX	C T	MAX FY	MAX MZ	EVENTC : (1.00) H15 LIVE LOAD FX	C T	MAX FY	MAX MZ	D: ALLOWABLE STRESS (PSI) Ft Fc'	Fb'	Fv
1	23,020.6	T	426.6	1,998.8		T				T			9,053.5	T	124.2	15,275.5	750	78	1,260
2	42,002.2	T	419.0	1,998.9		T				T			16,238.2	T	620.0	60,980.0	750	78	1,260
3	57,122.0	T	455.3	4,597.8		T				T			23,949.4	T	2,458.2	241,381.8	750	78	1,260
4	68,440.4	T	412.1	4,597.8		T			25,816.0	T				T	9,915.2	978,192.9	750	78	1,260
5	75,908.6	T	449.0	9,134.4		T			25,831.0	T				T	5,962.6	978,193.2	750	78	1,260
6	79,696.3	T	441.3	9,134.3		T			25,831.0	T	6,209.3			T		711,077.3	750	78	1,260
7	79,598.4	T	494.8	15,717.1		T			25,831.0	T	4,807.4			T		761,699.6	750	78	1,260
8	79,598.3	T	484.3	15,717.1		T			25,831.0	T				T	4,608.1	829,917.1	750	78	1,260
9	75,919.2	T	419.9	6,616.2		T			25,831.0	T				T	5,320.9	956,249.5	750	78	1,260
10	68,410.3	T	416.8	5,445.3		T				T			25,709.1	T	9,692.6	956,249.2	750	78	1,260
11	57,092.5	T	457.1	4,644.8		T				T			22,847.4	T	2,402.1	235,941.4	750	78	1,260
12	41,974.5	T	417.3	1,964.7		T				T			15,151.3	T	605.2	59,517.5	750	78	1,260
13	23,001.9	T	426.3	1,964.6		T				T			8,554.5	T	121.3	14,925.3	750	78	1,260
14	0.0	C	420.3	10,850.6		C				C			0.2	C	51.6	6,344.5	673	78	1,260
15	23,020.7	C	406.3	10,850.7		C				C			9,053.6	C	287.4	29,057.9	673	78	1,260
16	42,002.2	C	340.9	1,722.4		C				C			16,237.8	C	1,207.4	119,451.8	673	78	1,260
17	57,122.0	C	338.7	1,454.3		C				C			23,949.9	C	4,865.7	479,025.5	673	78	1,260
18	68,440.5	C	362.1	2,238.4		C			25,816.0	C	3,056.7			C		479,025.6	673	78	1,260
19	75,908.6	C	352.1	2,238.4		C			25,831.0	C				C	2,414.9	340,349.2	673	78	1,260
20	79,696.4	C	382.8	6,011.7		C			25,831.0	C				C	2,081.3	359,141.1	673	78	1,260
21	75,919.2	C	377.3	6,011.6		C			25,831.0	C				C	2,163.0	396,247.9	673	78	1,260
22	68,410.4	C	342.4	818.0		C				C	3,067.6		25,709.1	C		468,301.0	673	78	1,260
23	57,092.5	C	333.5	818.0		C				C			22,847.5	C	4,756.4	468,301.0	673	78	1,260
24	41,974.6	C	341.5	1,804.4		C				C			15,151.2	C	1,179.4	116,733.2	673	78	1,260
25	23,001.8	C	405.4	10,820.0		C				C			8,554.7	C	280.0	28,338.2	673	78	1,260
26	0.0	C	420.1	10,820.0		C				C			0.6	C	59.2	7,283.1	673	78	1,260
27	855.6	C	0.0			C				C			51.2	C			728	78	
28	870.9	C	0.0			C				C			49.7	C			728	78	
30	41,183.2	C	206.5			C				C			16,077.4	C			728	78	
32	34,015.9	C	210.1			C				C			13,894.6	C			728	78	
34	27,120.4	C	184.3			C				C			16,312.0	C			728	78	
36	20,364.4	C	180.6			C				C			24,486.7	C			728	78	
38	13,480.7	C	149.0			C			17,284.9	C				C			728	78	
40	6,950.1	C	152.6		7,601.4	C				C				C			728	78	
42	394.7	C	150.4		427.9	C				C				C			728	78	
43	6,752.0	C	149.0		6,616.5	C				C				C			728	78	
45	13,558.2	C	152.6			C			17,446.3	C				C			728	78	
47	20,359.7	C	178.0			C				C			24,579.3	C			728	78	
49	27,109.9	C	179.5			C				C			15,558.1	C			728	78	
51	33,995.1	C	206.5			C				C			12,846.5	C			728	78	
53	41,145.3	C	203.5			C				C			15,191.1	C			728	78	
29	0.0	C	0.0			C				C			0.0	C			728	78	
31	0.0	C	0.0			C				C			0.0	C			728	78	
33	0.0	C	0.0			C				C			0.0	C			728	78	
35	0.0	C	0.0			C				C			0.0	C			728	78	
37	0.0	C	0.0			C				C			0.0	C			728	78	
39	0.0	C	0.0			C				C			0.0	C			728	78	
41	0.0	C	0.0			C				C			0.0	C			728	78	
44	0.0	C	0.0			C				C			0.0	C			728	78	
46	0.0	C	0.0			C				C			0.0	C			728	78	
48	0.0	C	0.0			C				C			0.0	C			728	78	
50	0.0	C	0.0			C				C			0.0	C			728	78	
52	0.0	C	0.0			C				C			0.0	C			728	78	
54	0.0	C	0.0			C				C			0.0	C			728	78	
55	32,014.1	T				T				T			13,158.3	T			20,000		
56	26,282.6	T				T				T			12,421.5	T			20,000		
57	20,636.8	T				T				T			9,180.9	T			20,000		
58	15,013.1	T				T				T			13,515.3	T			20,000		
59	9,505.7	T				T				T			3,606.7	T			20,000		
60	3,977.6	T				T				T			3,570.6	T			20,000		
- 61	3,580.4	T				T				T			3,666.0	T			20,000		
62	9,473.9	T				T			9,632.0	T				T			20,000		
63	15,041.7	T				T				T			13,568.2	T			20,000		
64	20,637.9	T				T				T			9,094.3	T			20,000		
65	26,300.3	T				T				T			11,755.5	T			20,000		
66	31,992.8	T				T				T			12,324.5	T			20,000		

no.	E: B/A DEAD LOAD STRESS (PSI) AXIAL FX	C T	L. SHEAR VL	BENDING MAX	F: D-E REMAINING STRENGTH (PSI) AXIAL FX	L. SHEAR VL	BENDING MAX	G: C/A LIVE LOAD STRESSES (PSI) AXIAL FX	C T	L. SHEAR VL	BENDING MAX	Member no.	H: (F/G)*15 RATING AXIAL FX	C T	L. SHEAR VL	BENDING MAX	COMMENTS	NDS REQUIREMENTS MZ & FX 3.9.1 -Ft (<1)	3.9.2 -Fc (<1)
1	119.9	T	3.3	4.2	630.1	74.7	1255.8	47.2	T	1.0	31.8	1	200.4	T	1154.4	591.9		0.25	
2	218.8	T	3.3	4.2	531.2	74.7	1255.8	84.6	T	4.8	127.0	2	94.2	T	231.4	148.3		0.51	
3	297.5	T	3.6	9.6	452.5	74.4	1250.4	124.7	T	19.2	502.9	3	54.4	T	58.1	37.3		0.97	
4	356.5	T	3.2	9.6	393.5	74.8	1250.4	134.5	T	77.5	2,037.9	4	43.9	T	14.5	[illegible]	combined bending and axial >1.0	2.28	
5	395.4	T	3.5	19.0	354.6	74.5	1241.0	134.5	T	46.6	2,037.9	5	39.5	T	24.0	[illegible]	combined bending and axial >1.0	2.34	
6	415.1	T	3.4	19.0	334.9	74.6	1241.0	134.5	T	48.5	1,481.4	6	37.3	T	23.1	[illegible]	combined bending and axial >1.0	1.92	
7	414.6	T	3.9	32.7	335.4	74.1	1227.3	134.5	T	37.6	1,586.9	7 LC	37.4	T	29.6	[illegible]	combined bending and axial >1.0	2.02	
8	414.6	T	3.8	32.7	335.4	74.2	1227.3	134.5	T	36.0	1,729.0	8	37.4	T	30.9	[illegible]	combined bending and axial >1.0	2.13	
9	395.4	T	3.3	13.8	354.6	74.7	1246.2	134.5	T	41.6	1,992.2	9	39.5	T	27.0	[illegible]	combined bending and axial >1.0	2.30	
10	356.3	T	3.3	11.3	393.7	74.7	1248.7	133.9	T	75.7	1,992.2	10	44.1	T	14.8	[illegible]	combined bending and axial >1.0	2.24	
11	297.4	T	3.6	9.7	452.6	74.4	1250.3	119.0	T	18.8	491.5	11	57.1	T	59.5	38.2		0.95	
12	218.6	T	3.3	4.1	531.4	74.7	1255.9	78.9	T	4.7	124.0	12	101.0	T	237.1	151.9		0.50	
13	119.8	T	3.3	4.1	630.2	74.7	1255.9	44.6	T	0.9	31.1	13	212.2	T	1181.5	605.9		0.25	
14	0.0	C	4.0	36.2	673.0	74.0	1223.8	0.0	C	0.5	21.2	14	8354940.0	C	2255.7	866.5			0.05
15	146.4	C	3.9	36.2	526.6	74.1	1223.8	57.6	C	2.7	97.0	15	137.2	C	405.6	189.2			0.20
16	267.1	C	3.3	5.8	405.9	74.7	1254.2	103.3	C	11.5	398.9	16	59.0	C	97.4	47.2			0.65
17	363.3	C	3.2	4.9	309.7	74.8	1255.1	152.3	C	46.4	1,599.6	17	30.5	C	24.2	[illegible]	combined bending and axial >1.0		2.02
18	435.2	C	3.5	7.5	237.8	74.5	1252.5	164.2	C	29.2	1,599.6	18	21.7	C	38.3	11.7	combined bending and axial >1.0		2.26
19	482.7	C	3.4	7.5	190.3	74.6	1252.5	164.3	C	23.0	1,136.5	19	17.4	C	48.6	16.5	combined bending and axial >1.0		1.98
20	506.8	C	3.7	20.1	166.2	74.3	1239.9	164.3	C	19.9	1,199.3	20 UC	15.2	C	56.2	15.5	combined bending and axial >1.0		2.12
21	482.8	C	3.6	20.1	190.2	74.4	1239.9	164.3	C	20.6	1,323.2	21	17.4	C	54.1	[illegible]	combined bending and axial >1.0		2.16
22	435.0	C	3.3	2.7	238.0	74.7	1257.3	163.5	C	29.3	1,563.8	22	21.8	C	38.3	[illegible]	combined bending and axial >1.0		2.22
23	363.1	C	3.2	2.7	309.9	74.8	1257.3	145.3	C	45.4	1,563.8	23	32.0	C	24.7	[illegible]	combined bending and axial >1.0		1.97
24	266.9	C	3.3	6.0	406.1	74.7	1254.0	96.4	C	11.3	389.8	24	63.2	C	99.7	48.3			0.63
25	146.3	C	3.9	36.1	526.7	74.1	1223.9	54.4	C	2.7	94.6	25	145.2	C	416.4	194.0			0.20
26	0.0	C	4.0	36.1	673.0	74.0	1223.9	0.0	C	0.6	24.3	26	2886252.0	C	1965.1	754.9			0.05
27	13.3	C	0.0		714.7	78.0		0.8	C			27 END	13513.9	C					
28	12.9	C	0.0		715.1	78.0		0.7	C			28 POST	14579.9	C					
30	397.9	C	3.0		330.1	75.0		155.3	C			30	31.9	C					
32	322.0	C	3.0		406.0	75.0		131.5	C			32	46.3	C					
34	299.5	C	3.1		428.5	74.9		180.1	C			34	35.7	C					
36	230.4	C	3.1		497.6	74.9		277.1	C			36	26.9	C					
38	192.2	C	3.2		535.8	74.8		246.5	C			38	32.6	C					
40	96.2	C	3.2		631.8	74.8		105.2	C			40 COMP.	90.1	C					
42	5.5	C	3.2		722.5	74.8		6.0	C			42 DIAG.	1802.9	C					
43	96.3	C	3.2		631.7	74.8		94.4	C			43	100.4	C					
45	187.7	C	3.2		540.3	74.8		241.5	C			45	33.6	C					
47	233.7	C	3.1		494.3	74.9		282.1	C			47	26.3	C					
49	309.8	C	3.1		418.2	74.9		177.8	C			49	35.3	C					
51	328.5	C	3.0		399.5	75.0		124.1	C			51	48.3	C					
53	403.4	C	3.0		324.6	75.0		148.9	C			53	32.7	C					
29	0.0	C	0.0		728.0	78.0		0.0	C			29	INACTIVE	C			INACTIVE		
31	0.0	C	0.0		728.0	78.0		0.0	C			31	INACTIVE	C			INACTIVE		
33	0.0	C	0.0		728.0	78.0		0.0	C			33	INACTIVE	C			INACTIVE		
35	0.0	C	0.0		728.0	78.0		0.0	C			35	INACTIVE	C			INACTIVE		
37	0.0	C	0.0		728.0	78.0		0.0	C			37	INACTIVE	C			INACTIVE		
39	0.0	C	0.0		728.0	78.0		0.0	C			39	INACTIVE	C			INACTIVE		
41	0.0	C	0.0		728.0	78.0		0.0	C			41 COUNT.	INACTIVE	C			INACTIVE		
44	0.0	C	0.0		728.0	78.0		0.0	C			44	INACTIVE	C			INACTIVE		
46	0.0	C	0.0		728.0	78.0		0.0	C			46	INACTIVE	C			INACTIVE		
48	0.0	C	0.0		728.0	78.0		0.0	C			48	INACTIVE	C			INACTIVE		
50	0.0	C	0.0		728.0	78.0		0.0	C			50	INACTIVE	C			INACTIVE		
52	0.0	C	0.0		728.0	78.0		0.0	C			52	INACTIVE	C			INACTIVE		
54	0.0	C	0.0		728.0	78.0		0.0	C			54	INACTIVE	C			INACTIVE		
55	5348.5	T			14651.5			2198.3	T			55	100.0	T					
56	5150.9	T			14849.1			2434.4	T			56	91.5	T					
57	4673.6	T			15326.4			2079.2	T			57	110.6	T					
58	4250.0	T			15750.0			3826.0	T			58	61.7	T					
59	3202.4	T			16797.6			1215.1	T			59	207.4	T					
60	2533.5	T			17466.5			2274.3	T			60	115.2	T					
- 61	2280.5	T			17719.5			2335.0	T			- 61 VERT.	113.8	T					
62	3191.7	T			16808.3			0.0	T			62	ERR	T					
63	4258.1	T			15741.9			3840.9	T			63	61.5	T					
64	4673.8	T			15326.2			2059.6	T			64	111.6	T					
65	5154.4	T			14845.6			2303.9	T			65	96.7	T					
66	5344.9	T			14655.1			2059.0	T			66	106.8	T					

Table 2

McCOLLY COVERED BRIDGE
FULL TRUSS
ALL COUNTERS AND SELECTED DIAGONALS INACTIVE
MEMBER PROPERTIES, FORCES, STRESSES AND RATING
STAAD FILES: PR19165 ETC TRUSSDL, BUSA & BUSB

FILE: SUMMARY.WB2
PAGE 4
R. Mattox , M. Killian
2-MAY-97

Member	no.	DIMENSIONS: outside width (w)	outside height (h)	outside rod diameter (d)	middle/outside width (w)	middle/outside height (h)	left rod diameter (d)	right rod diameter (d)	middle/inside width (w)	middle/inside height (h)	inside rod diameter (d)	inside width (w)	inside height (h)
	1	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00
	2	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00
	3	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00
	4	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00
	5	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00
	6	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00
LC	7	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00
	8	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00
	9	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00
	10	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00
	11	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00
	12	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00
	13	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00
	14	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25
	15	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25
	16	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25
	17	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25
	18	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25
	19	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25
UC	20	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25
	21	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25
	22	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25
	23	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25
	24	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25
	25	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25
	26	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25
END	27	4.00	8.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.50	7.00
POST	28	4.50	8.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.50	7.00
	30	7.00	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.00	8.75
	32	7.25	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.00	8.75
	34	6.25	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.25	8.75
	36	6.25	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.00	8.75
	38	5.00	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.25	8.50
COMP.	40	5.25	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.25	8.50
DIAG.	42	5.25	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.25	8.25
	43	5.25	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	8.50
	45	5.25	8.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.25	8.25
	47	6.25	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.00	8.50
	49	6.00	8.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.00	8.75
	51	7.00	8.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.00	8.50
	53	7.00	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.00	8.50
	29	0.00	0.00	0.00	6.00	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	31	0.00	0.00	0.00	6.25	5.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	33	0.00	0.00	0.00	6.25	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	35	0.00	0.00	0.00	6.25	6.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	37	0.00	0.00	0.00	6.00	6.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	39	0.00	0.00	0.00	6.25	6.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COUNT.	41	0.00	0.00	0.00	6.25	6.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	44	0.00	0.00	0.00	6.25	6.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	46	0.00	0.00	0.00	6.25	6.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	48	0.00	0.00	0.00	6.00	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	50	0.00	0.00	0.00	6.00	5.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	52	0.00	0.00	0.00	6.00	6.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	54	0.00	0.00	0.00	6.00	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	55	0.00	0.00	1.50	0.00	0.00	1.25	1.25	0.00	0.00	1.50	0.00	0.00
	56	0.00	0.00	1.50	0.00	0.00	1.00	1.00	0.00	0.00	1.50	0.00	0.00
	57	0.00	0.00	1.50	0.00	0.00	0.75	0.75	0.00	0.00	1.50	0.00	0.00
	58	0.00	0.00	1.50	0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.00	0.00
	59	0.00	0.00	1.38	0.00	0.00	0.00	0.00	0.00	0.00	1.38	0.00	0.00
	60	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
VERT.	- 61	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
	62	0.00	0.00	1.38	0.00	0.00	0.00	0.00	0.00	0.00	1.38	0.00	0.00
	63	0.00	0.00	1.50	0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.00	0.00
	64	0.00	0.00	1.50	0.00	0.00	0.75	0.75	0.00	0.00	1.50	0.00	0.00
	65	0.00	0.00	1.50	0.00	0.00	1.00	1.00	0.00	0.00	1.50	0.00	0.00
	66	0.00	0.00	1.50	0.00	0.00	1.25	1.25	0.00	0.00	1.50	0.00	0.00

no.	PROPERTIES: full area (in**2)	I (in**4)	weight (lb/inch)	A: joint area (in**2)	B: FORCES (LBS) DEAD LOAD FX	C/T	MAX FY	MAX MZ	C: BUSA : (0.80) 13 TON BUS FX	C/T	MAX FY	MAX MZ	BUSB : (1.0) 13 TON BUS FX	C/T	MAX FY	MAX MZ
1	240.00	2880.00	6.67	192.00	23,020.6	T	426.6	1,998.8		T			7,425.0	T	73.9	9,091.9
2	240.00	2880.00	6.67	192.00	42,002.2	T	419.0	1,998.9		T			13,604.9	T	99.1	9,091.9
3	240.00	2880.00	6.67	192.00	57,122.0	T	455.3	4,597.8		T			18,114.1	T	397.8	39,805.3
4	240.00	2880.00	6.67	192.00	68,440.4	T	412.1	4,597.8		T			22,491.8	T	1,349.6	126,841.3
5	240.00	2880.00	6.67	192.00	75,908.6	T	449.0	9,134.4		T			23,823.2	T	5,445.0	543,544.6
6	240.00	2880.00	6.67	192.00	79,696.3	T	441.3	9,134.3		T			23,823.2	T	3,958.1	543,544.1
7	240.00	2880.00	6.67	192.00	79,598.4	T	494.8	15,717.1		T			23,823.2	T	3,651.8	367,950.2
8	240.00	2880.00	6.67	192.00	79,598.3	T	484.3	15,717.1		T			23,823.2	T	4,236.3	530,847.1
9	240.00	2880.00	6.67	192.00	75,919.2	T	419.9	6,616.2		T			23,823.2	T	5,372.7	530,847.4
10	240.00	2880.00	6.67	192.00	68,410.3	T	416.8	5,445.3		T			23,135.6	T	1,317.2	129,994.3
11	240.00	2880.00	6.67	192.00	57,092.5	T	457.1	4,644.8		T			18,504.1	T	410.9	41,119.0
12	240.00	2880.00	6.67	192.00	41,974.5	T	417.3	1,964.7		T			13,835.4	T	102.4	10,248.4
13	240.00	2880.00	6.67	192.00	23,001.9	T	426.3	1,964.6		T			7,537.2	T	83.3	10,248.4
14	194.25	1385.04	5.40	157.25	0.0	C	420.3	10,850.6		C			0.1	C	12.8	1,578.5
15	194.25	1385.04	5.40	157.25	23,020.7	C	406.3	10,850.7		C			7,425.0	C	45.0	4,104.0
16	194.25	1385.04	5.40	157.25	42,002.2	C	340.9	1,722.4		C			13,605.0	C	175.8	17,993.5
17	194.25	1385.04	5.40	157.25	57,122.0	C	338.7	1,454.3		C			18,114.1	C	647.6	62,883.5
18	194.25	1385.04	5.40	157.25	68,440.5	C	362.1	2,238.4		C			22,491.7	C	2,646.3	263,833.6
19	194.25	1385.04	5.40	157.25	75,908.6	C	352.1	2,238.4		C			23,823.3	C	1,944.7	263,833.6
20	194.25	1385.04	5.40	157.25	79,696.4	C	382.8	6,011.7		C			23,823.2	C	1,654.8	171,780.0
21	194.25	1385.04	5.40	157.25	75,919.2	C	377.3	6,011.6		C			23,823.2	C	2,042.8	260,998.7
22	194.25	1385.04	5.40	157.25	68,410.4	C	342.4	818.0		C			23,135.6	C	2,645.4	260,998.8
23	194.25	1385.04	5.40	157.25	57,092.5	C	333.5	818.0		C			18,504.1	C	646.9	64,387.6
24	194.25	1385.04	5.40	157.25	41,974.6	C	341.5	1,804.4		C			13,835.3	C	170.5	17,474.8
25	194.25	1385.04	5.40	157.25	23,001.8	C	405.4	10,820.0		C			7,537.2	C	44.9	4,126.7
26	194.25	1385.04	5.40	157.25	0.0	C	420.1	10,820.0		C			0.1	C	11.9	1,461.7
27	64.50	315.80	1.79	64.50	855.6	C	0.0			C			12.8	C		
28	67.50	320.63	1.88	67.50	870.9	C	0.0			C			10.9	C		
30	120.75	749.03	3.35	103.50	41,183.2	C	206.5			C			13,185.3	C		
32	122.88	761.82	3.41	105.63	34,015.9	C	210.1			C			12,071.6	C		
34	107.81	668.77	2.99	90.56	27,120.4	C	184.3			C			10,226.2	C		
36	105.63	654.82	2.93	88.38	20,364.4	C	180.6			C			11,039.0	C		
38	87.13	524.57	2.42	70.13	13,480.7	C	149.0			C			15,590.4	C		
40	89.25	537.36	2.48	72.25	6,950.1	C	152.6		7,713.7	C				C		
42	87.94	514.34	2.44	71.19	394.7	C	150.4		427.9	C				C		
43	87.13	524.57	2.42	70.13	6,752.0	C	149.0		8,196.4	C				C		
45	89.25	538.75	2.48	72.25	13,558.2	C	152.6			C			15,611.1	C		
47	104.13	626.92	2.89	87.13	20,359.7	C	178.0			C			11,348.7	C		
49	105.00	669.92	2.92	87.50	27,109.9	C	179.5			C			10,426.9	C		
51	120.75	749.03	3.35	103.50	33,995.1	C	206.5			C			12,250.1	C		
53	119.00	716.48	3.31	102.00	41,145.3	C	203.5			C			13,384.7	C		
29	36.00	108.00	1.00	30.00	0.0	C	0.0			C			0.0	C		
31	35.94	99.02	1.00	30.19	0.0	C	0.0			C			0.0	C		
33	37.50	112.50	1.04	31.50	0.0	C	0.0			C			0.0	C		
35	39.06	127.16	1.09	32.81	0.0	C	0.0			C			0.0	C		
37	37.50	122.07	1.04	31.25	0.0	C	0.0			C			0.0	C		
39	39.06	127.16	1.09	32.81	0.0	C	0.0			C			0.0	C		
41	39.06	127.16	1.09	32.81	0.0	C	0.0			C			0.0	C		
44	39.06	127.16	1.09	32.81	0.0	C	0.0			C			0.0	C		
46	39.06	127.16	1.09	32.81	0.0	C	0.0			C			0.0	C		
48	36.00	108.00	1.00	30.00	0.0	C	0.0			C			0.0	C		
50	34.50	95.05	0.96	28.75	0.0	C	0.0			C			0.0	C		
52	39.00	137.31	1.08	32.50	0.0	C	0.0			C			0.0	C		
54	36.00	108.00	1.00	30.00	0.0	C	0.0			C			0.0	C		
55	5.99	0.74	1.68	5.99	32,014.1	T				T			10,303.9	T		
56	5.10	0.59	1.43	5.10	26,282.6	T				T			9,869.9	T		
57	4.42	0.53	1.24	4.42	20,636.8	T				T			9,208.3	T		
58	3.53	0.50	0.99	3.53	15,013.1	T				T			7,132.6	T		
59	2.97	0.35	0.83	2.97	9,505.7	T				T			8,589.8	T		
60	1.57	0.10	0.44	1.57	3,977.6	T			4,645.9	T				T		
- 61	1.57	0.10	0.44	1.57	3,580.4	T			4,784.3	T				T		
62	2.97	0.35	0.83	2.97	9,473.9	T				T			8,702.2	T		
63	3.53	0.50	0.99	3.53	15,041.7	T				T			7,213.4	T		
64	4.42	0.53	1.24	4.42	20,637.9	T				T			9,354.0	T		
65	5.10	0.59	1.43	5.10	26,300.3	T				T			10,036.7	T		
66	5.99	0.74	1.68	5.99	31,992.8	T				T			11,073.2	T		

no.	D: ALLOWABLE STRESS (PSI) Ft'/Fc'	Fv'	Fb'	E=B/A: DEAD LOAD STRESS (PSI) AXIAL FX	C/T	L. SHEAR VL	BENDIN MAX.	F=D-E: EMAINING STRENGTH (PSI AXIAL FX	L. SHEAR VL	BENDIN MAX.	G=C/A: LIVE LOAD STRESSES (PSI) AXIAL FX	C/T	L. SHEAR VL	BENDIN MAX.	Member no.	H=[F/G]*13: RATING AXIAL FX	C/T	L. SHEAR VL	BENDING MAX.	COMMENTS	NDS REQUIREME MZ &FX 3.9.1 -Ft (<1)	3.9.2 -Fc (<1)
1	750	78	1,260	119.9	T	3.3	4.2	630.1	74.7	1,255.8	38.7	T	0.6	18.9	1	211.8	T	1,680.8	861.9		0.23	
2	750	78	1,260	218.8	T	3.3	4.2	531.2	74.7	1,255.8	70.9	T	0.8	18.9	2	97.5	T	1,254.5	861.9		0.40	
3	750	78	1,260	297.5	T	3.6	9.6	452.5	74.4	1,250.4	94.3	T	3.1	82.9	3	62.4	T	311.4	196.0		0.60	
4	750	78	1,260	356.5	T	3.2	9.6	393.5	74.8	1,250.4	117.1	T	10.5	264.3	4	43.7	T	92.2	61.5		0.85	
5	750	78	1,260	395.4	T	3.5	19.0	354.6	74.5	1,241.0	124.1	T	42.5	1,132.4	5	37.2	T	22.8	14.2	combined bending and axial >1.0	[illegible]	
6	750	78	1,260	415.1	T	3.4	19.0	334.9	74.6	1,241.0	124.1	T	30.9	1,132.4	6	35.1	T	31.3	14.2	combined bending and axial >1.0	[illegible]	
7	750	78	1,260	414.6	T	3.9	32.7	335.4	74.1	1,227.3	124.1	T	28.5	766.6	7 LC	35.1	T	33.8	20.8	combined bending and axial >1.0	[illegible]	
8	750	78	1,260	414.6	T	3.8	32.7	335.4	74.2	1,227.3	124.1	T	33.1	1,105.9	8	35.1	T	29.2	14.4	combined bending and axial >1.0	[illegible]	
9	750	78	1,260	395.4	T	3.3	13.8	354.6	74.7	1,246.2	124.1	T	42.0	1,105.9	9	37.2	T	23.1	14.6	combined bending and axial >1.0	[illegible]	
10	750	78	1,260	356.3	T	3.3	11.3	393.7	74.7	1,248.7	120.5	T	10.3	270.8	10	42.5	T	94.4	59.9		0.86	
11	750	78	1,260	297.4	T	3.6	9.7	452.6	74.4	1,250.3	96.4	T	3.2	85.7	11	61.1	T	301.4	189.7		0.60	
12	750	78	1,260	218.6	T	3.3	4.1	531.4	74.7	1,255.9	72.1	T	0.8	21.4	12	95.9	T	1,214.8	764.7		0.41	
13	750	78	1,260	119.8	T	3.3	4.1	630.2	74.7	1,255.9	39.3	T	0.7	21.4	13	208.7	T	1,491.2	764.7		0.23	
14	673	78	1,260	0.0	C	4.0	36.2	673.0	74.0	1,223.8	0.0	C	0.1	5.3	14	**********	C	7,859.4	3,018.2			0.03
15	673	78	1,260	146.4	C	3.9	36.2	526.6	74.1	1,223.8	47.2	C	0.4	13.7	15	145.0	C	2,244.4	1,160.9			0.12
16	673	78	1,260	267.1	C	3.3	5.8	405.9	74.7	1,254.2	86.5	C	1.7	60.1	16	61.0	C	579.3	271.4			0.33
17	673	78	1,260	363.3	C	3.2	4.9	309.7	74.8	1,255.1	115.2	C	6.2	210.0	17	35.0	C	157.4	77.7			0.70
18	673	78	1,260	435.2	C	3.5	7.5	237.8	74.5	1,252.5	143.0	C	25.2	881.0	18	21.6	C	38.4	18.5	combined bending and axial >1.0		1.54
19	673	78	1,260	482.7	C	3.4	7.5	190.3	74.6	1,252.5	151.5	C	18.5	881.0	19	16.3	C	52.3	18.5	combined bending and axial >1.0		1.70
20	673	78	1,260	506.8	C	3.7	20.1	166.2	74.3	1,239.9	151.5	C	15.8	573.6	20 UC	14.3	C	61.2	28.1	combined bending and axial >1.0		1.50
21	673	78	1,260	482.8	C	3.6	20.1	190.2	74.4	1,239.9	151.5	C	19.5	871.5	21	16.3	C	49.6	18.5	combined bending and axial >1.0		1.71
22	673	78	1,260	435.0	C	3.3	2.7	238.0	74.7	1,257.3	147.1	C	25.2	871.5	22	21.0	C	38.5	18.8	combined bending and axial >1.0		1.54
23	673	78	1,260	363.1	C	3.2	2.7	309.9	74.8	1,257.3	117.7	C	6.2	215.0	23	34.2	C	157.6	76.0			0.70
24	673	78	1,260	266.9	C	3.3	6.0	406.1	74.7	1,254.0	88.0	C	1.6	58.4	24	60.0	C	597.4	279.4			0.33
25	673	78	1,260	146.3	C	3.9	36.1	526.7	74.1	1,223.9	47.9	C	0.4	13.8	25	142.9	C	2,250.1	1,154.6			0.12
26	673	78	1,260	0.0	C	4.0	36.1	673.0	74.0	1,223.9	0.0	C	0.1	4.9	26	**********	C	8,488.2	3,259.6			0.03
27	728	78		13.3	C	0.0		714.7	78.0		0.2	C			27 END	46,711.3	C					
28	728	78		12.9	C	0.0		715.1	78.0		0.2	C			28 POST	57,358.2	C					
30	728	78		397.9	C	3.0		330.1	75.0		127.4	C			30	33.7	C					
32	728	78		322.0	C	3.0		406.0	75.0		114.3	C			32	46.2	C					
34	728	78		299.5	C	3.1		428.5	74.9		112.9	C			34	49.3	C					
36	728	78		230.4	C	3.1		497.6	74.9		124.9	C			36	51.8	C					
38	728	78		192.2	C	3.2		535.8	74.8		222.3	C			38	31.3	C					
40	728	78		96.2	C	3.2		631.8	74.8		106.8	C			40 COMP.	76.9	C					
42	728	78		5.5	C	3.2		722.5	74.8		6.0	C			42 DIAG.	1,562.5	C					
43	728	78		96.3	C	3.2		631.7	74.8		116.9	C			43	70.3	C					
45	728	78		187.7	C	3.2		540.3	74.8		218.8	C			45	32.1	C					
47	728	78		233.7	C	3.1		494.3	74.9		130.3	C			47	49.3	C					
49	728	78		309.8	C	3.1		418.2	74.9		119.2	C			49	45.6	C					
51	728	78		328.5	C	3.0		399.5	75.0		118.4	C			51	43.9	C					
53	728	78		403.4	C	3.0		324.6	75.0		131.2	C			53	32.2	C					
29	728	78		0.0	C	0.0		728.0	78.0		0.0	C			29	INACTIVE	C			INACTIVE		
31	728	78		0.0	C	0.0		728.0	78.0		0.0	C			31	INACTIVE	C			INACTIVE		
33	728	78		0.0	C	0.0		728.0	78.0		0.0	C			33	INACTIVE	C			INACTIVE		
35	728	78		0.0	C	0.0		728.0	78.0		0.0	C			35	INACTIVE	C			INACTIVE		
37	728	78		0.0	C	0.0		728.0	78.0		0.0	C			37	INACTIVE	C			INACTIVE		
39	728	78		0.0	C	0.0		728.0	78.0		0.0	C			39	INACTIVE	C			INACTIVE		
41	728	78		0.0	C	0.0		728.0	78.0		0.0	C			41 COUNT.	INACTIVE	C			INACTIVE		
44	728	78		0.0	C	0.0		728.0	78.0		0.0	C			44	INACTIVE	C			INACTIVE		
46	728	78		0.0	C	0.0		728.0	78.0		0.0	C			46	INACTIVE	C			INACTIVE		
48	728	78		0.0	C	0.0		728.0	78.0		0.0	C			48	INACTIVE	C			INACTIVE		
50	728	78		0.0	C	0.0		728.0	78.0		0.0	C			50	INACTIVE	C			INACTIVE		
52	728	78		0.0	C	0.0		728.0	78.0		0.0	C			52	INACTIVE	C			INACTIVE		
54	728	78		0.0	C	0.0		728.0	78.0		0.0	C			54	INACTIVE	C			INACTIVE		
55	20,000			5348.5	T			14,651.5			1821.7	T			55	104.6	T					
56	20,000			5150.9	T			14,849.1			1934.3	T			56	99.8	T					
57	20,000			4673.6	T			15,326.4			2085.4	T			57	95.5	T					
58	20,000			4250.0	T			15,750.0			2019.1	T			58	101.4	T					
59	20,000			3202.4	T			16,797.6			2893.9	T			59	75.5	T					
60	20,000			2533.5	T			17,466.5			2959.2	T			60	76.7	T					
- 61	20,000			2280.5	T			17,719.5			3047.3	T			- 61 VERT.	75.6	T					
62	20,000			3191.7	T			16,808.3			2931.7	T			62	74.5	T					
63	20,000			4258.1	T			15,741.9			2042.0	T			63	100.2	T					
64	20,000			4673.8	T			15,326.2			2118.4	T			64	94.1	T					
65	20,000			5154.4	T			14,845.6			1967.0	T			65	98.1	T					
66	20,000			5344.9	T			14,655.1			1850.0	T			66	103.0	T					

Table 3

2.4 Member Capacity with Piers

At the request of the Logan County Engineer's office, an additional interaction analysis was performed to determine the allowable load capacity of the rehabilitated bridge if piers were added. Our STAAD III input was subsequently revised to assume truss supports at Joints 3 and 12.

Results of the interaction analysis for this condition indicate the rehabilitated bridge can support a full H15 loading. Table 5 provides the member ratings and interaction values at this load level if two pier supports are added. It should be noted that tension rods for Members 56 and 65 experience compression when pier supports are added at Joints 3 and 12. These members would require replacement if piers are added.

McCOLLY COVERED BRIDGE
FULL TRUSS
SELECTED MEMBERS INACTIVE FOR EACH LOADING
MEMBER PROPERTIES, FORCES, STRESSES AND RATING
STAAD FILES PR19165 ETC DLPIERS, H15PIERS & H15PIA

FILE: SUMMARY WB2
PAGE 6
R. Mattox
2-JUN-97

McCOLLY COVERED BRIDGE
FULL TRUSS
ALL COUNTERS AND MEMBERS 40, 42 & 43 INACTIVE
MEMBER PROPERTIES, FORCES, STRESSES AND RATI
STAAD FILES: PR19165 ETC DLLGHT & PROP

Member	no.	DIMENSIONS outside width (w)	outside height (h)	outside rod diameter (d)	middle /outside width (w)	middle /outside height (h)	left rod diameter (d)	right rod diameter (d)	middle /inside width (w)	middle /inside height (h)	inside rod diameter (d)	inside width (w)	inside height (h)	PROPERTIES full area (in**2)
	1	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00	240.00
	2	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00	240.00
	3	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00	240.00
	4	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00	240.00
	5	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00	240.00
	6	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00	240.00
LC	7	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00	240.00
	8	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00	240.00
	9	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00	240.00
	10	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00	240.00
	11	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00	240.00
	12	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00	240.00
	13	5.00	12.00	0.00	5.00	12.00	0.00	0.00	5.00	12.00	0.00	5.00	12.00	240.00
	14	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25	194.25
	15	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25	194.25
	16	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25	194.25
	17	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25	194.25
	18	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25	194.25
	19	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25	194.25
UC	20	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25	194.25
	21	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25	194.25
	22	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25	194.25
	23	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25	194.25
	24	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25	194.25
	25	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25	194.25
	26	5.25	9.25	0.00	5.25	9.25	0.00	0.00	5.25	9.25	0.00	5.25	9.25	194.25
END	27	4.00	8.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.50	7.00	64.50
POST	28	4.50	8.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.50	7.00	67.50
	30	7.00	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.00	8.75	120.75
	32	7.25	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.00	8.75	122.88
	34	6.25	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.25	8.75	107.81
	36	6.25	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.00	8.75	105.63
	38	5.00	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.25	8.50	87.13
COMP.	40	5.25	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.25	8.50	89.25
DIAG.	42	5.25	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.25	8.25	87.94
	43	5.25	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	8.50	87.13
	45	5.25	8.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.25	8.25	89.25
	47	6.25	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.00	8.50	104.13
	49	6.00	8.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.00	8.75	105.00
	51	7.00	8.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.00	8.50	120.75
	53	7.00	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.00	8.50	119.00
	29	0.00	0.00	0.00	6.00	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	36.00
	31	0.00	0.00	0.00	6.25	5.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	35.94
	33	0.00	0.00	0.00	6.25	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	37.50
	35	0.00	0.00	0.00	6.25	6.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.06
	37	0.00	0.00	0.00	6.00	6.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	37.50
	39	0.00	0.00	0.00	6.25	6.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.06
COUNT.	41	0.00	0.00	0.00	6.25	6.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.06
	44	0.00	0.00	0.00	6.25	6.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.06
	46	0.00	0.00	0.00	6.25	6.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.06
	48	0.00	0.00	0.00	6.00	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	36.00
	50	0.00	0.00	0.00	6.00	5.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	34.50
	52	0.00	0.00	0.00	6.00	6.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.00
	54	0.00	0.00	0.00	6.00	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	36.00
	55	0.00	0.00	1.50	0.00	0.00	1.25	1.25	0.00	0.00	1.50	0.00	0.00	5.99
	56	0.00	0.00	1.50	0.00	0.00	1.00	1.00	0.00	0.00	1.50	0.00	0.00	5.10
	57	0.00	0.00	1.50	0.00	0.00	0.75	0.75	0.00	0.00	1.50	0.00	0.00	4.42
	58	0.00	0.00	1.50	0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.00	0.00	3.53
	59	0.00	0.00	1.38	0.00	0.00	0.00	0.00	0.00	0.00	1.38	0.00	0.00	2.97
	60	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	1.57
VERT.	- 61	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	1.57
	62	0.00	0.00	1.38	0.00	0.00	0.00	0.00	0.00	0.00	1.38	0.00	0.00	2.97
	63	0.00	0.00	1.50	0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.00	0.00	3.53
	64	0.00	0.00	1.50	0.00	0.00	0.75	0.75	0.00	0.00	1.50	0.00	0.00	4.42
	65	0.00	0.00	1.50	0.00	0.00	1.00	1.00	0.00	0.00	1.50	0.00	0.00	5.10
	66	0.00	0.00	1.50	0.00	0.00	1.25	1.25	0.00	0.00	1.50	0.00	0.00	5.99

Member no.	PROPERTIES I (in**4)	weight (lb/inch)	A: joint area (in**2)	B: FORCES (LBS) DEAD LOAD FX	C/T	MAX FY	MAX MZ	C: (1.0) H15 LIVE LOAD FX	C/T	MAX FY	MAX MZ	D: ALLOWABLE STRESS (PSI) Ft' / Fc'	Fv'	Fb'
1	2,880.00	6.67	192.00	0.0	C	536.0	15,456.2	4,129.1	C	230.2	28,315.4	673	78	1,260
2	2,880.00	6.67	192.00	2,219.1	C	1,106.2	70,134.6	5,077.7	C	523.7	42,313.6	673	78	1,260
3	2,880.00	6.67	192.00	7,097.5	T	1,080.2	70,134.6	4,158.6	T	506.7	42,313.6	750	78	1,260
4	2,880.00	6.67	192.00	18,319.4	T	561.6	12,260.3	8,438.9	T	191.9	24,249.0	750	78	1,260
5	2,880.00	6.67	192.00	25,585.3	T	471.0	6,345.4	13,054.7	T	384.3	37,615.3	750	78	1,260
6	2,880.00	6.67	192.00	29,116.3	T	434.6	4,099.3	14,911.3	T	1,584.1	18,466.4	750	78	1,260
7	2,880.00	6.67	192.00	29,116.3	T	427.2	4,099.3	14,911.3	T	2,804.3	23,141.5	750	78	1,260
8	2,880.00	6.67	192.00	29,116.4	T	418.2	2,028.6	14,911.3	T	1,891.1	23,141.5	750	78	1,260
9	2,880.00	6.67	192.00	25,536.9	T	466.7	5,877.5	12,454.9	T	443.3	44,911.6	750	78	1,260
10	2,880.00	6.67	192.00	18,236.0	T	556.9	12,151.9	8,243.3	T	223.8	25,041.8	750	78	1,260
11	2,880.00	6.67	192.00	6,986.7	T	1,071.5	69,173.5	3,890.2	T	467.6	42,861.9	750	78	1,260
12	2,880.00	6.67	192.00	2,270.5	C	1,085.8	69,173.5	5,836.2	C	533.7	42,861.9	673	78	1,260
13	2,880.00	6.67	192.00	0.0	C	523.4	13,912.6	4,733.2	C	200.3	24,639.4	673	78	1,260
14	1,385.04	5.40	157.25	2,219.1	T	332.6	58.8	948.6	T	78.1	9,611.8	750	78	1,260
15	1,385.04	5.40	157.25	7,286.4	T	550.1	26,868.5	9,482.5	T	206.0	15,730.6	750	78	1,260
16	1,385.04	5.40	157.25	7,286.4	T	511.5	26,868.5	9,482.5	T	124.1	15,730.6	750	78	1,260
17	1,385.04	5.40	157.25	7,097.5	C	332.5	4,807.8	6,732.1	C	64.2	6,472.2	673	78	1,260
18	1,385.04	5.40	157.25	18,319.4	C	352.6	4,759.0	11,510.6	C	187.4	18,763.7	673	78	1,260
19	1,385.04	5.40	157.25	25,585.3	C	349.3	2,235.4	14,575.1	C	755.0	74,096.0	673	78	1,260
20	1,385.04	5.40	157.25	29,116.4	C	341.2	1,245.6	16,286.9	C	1,296.7	85,401.4	673	78	1,260
21	1,385.04	5.40	157.25	25,536.9	C	324.1	2,219.7	14,724.3	C	844.8	85,401.4	673	78	1,260
22	1,385.04	5.40	157.25	18,236.0	C	351.0	4,539.8	11,433.5	C	180.2	18,511.9	673	78	1,260
23	1,385.04	5.40	157.25	6,986.7	C	334.8	4,874.8	6,548.5	C	66.2	6,914.0	673	78	1,260
24	1,385.04	5.40	157.25	7,429.7	T	506.8	26,363.6	10,980.9	T	129.0	16,358.2	750	78	1,260
25	1,385.04	5.40	157.25	7,429.7	T	539.5	25,363.6	10,981.0	T	214.3	16,358.2	750	78	1,260
26	1,385.04	5.40	157.25	2,270.5	T	339.1	859.7	1,103.0	T	81.3	10,002.9	750	78	1,260
27	315.80	1.79	64.50	2,527.6	T	0.0		1,314.0	T			810	78	
28	320.63	1.88	67.50	2,609.5	T	0.0		1,537.2	T			810	78	
30	749.03	3.35	103.50	0.0	C	0.0		5,979.9	C			728	78	
32	761.82	3.41	105.63	0.0	C	0.0		0.0	T			810	78	
34	668.77	2.99	90.56	25,813.6	C	184.3		15,791.7	C			728	78	
36	654.82	2.93	88.38	20,192.9	C	180.6		14,965.5	C			728	78	
38	524.57	2.42	70.13	13,121.5	C	149.0		13,398.1	C			728	78	
40	537.36	2.48	72.25	6,494.4	C	152.6		8,613.0	C			728	78	
42	514.34	2.44	71.19	0.0	C	0.0		3,537.0	C			728	78	
43	524.57	2.42	70.13	6,575.0	C	149.0		7,879.3	C			728	78	
45	538.75	2.48	72.25	13,189.0	C	152.6		12,526.8	C			728	78	
47	626.92	2.89	87.13	20,237.9	C	178.0		14,114.1	C			728	78	
49	669.92	2.92	87.50	25,864.2	C	179.5		14,987.4	C			728	78	
51	749.03	3.35	103.50	0.0	T	0.0		0.0	T			810	78	
53	716.48	3.31	102.00	0.0	T	0.0		5,510.2	C			728	78	
29	108.00	1.00	30.00	4,031.0	C	61.6		1,684.6	C			728	78	
31	99.02	1.00	30.19	9,088.7	C	61.5		7,822.1	C			728	78	
33	112.50	1.04	31.50	0.0	T	0.0		174.0	C			728	78	
35	127.16	1.09	32.81	0.0	T	0.0		137.5	C			728	78	
37	122.07	1.04	31.25	0.0	T	0.0		432.4	C			728	78	
39	127.16	1.09	32.81	0.0	T	0.0		1,334.4	C			728	78	
41	127.16	1.09	32.81	0.0	T	0.0		1,924.4	C			728	78	
44	127.16	1.09	32.81	0.0	T	0.0		1,397.8	C			728	78	
46	127.16	1.09	32.81	0.0	T	0.0		746.5	C			728	78	
48	108.00	1.00	30.00	0.0	T	0.0		165.4	C			728	78	
50	95.05	0.96	28.75	0.0	T	0.0		240.0	C			728	78	
52	137.31	1.08	32.50	9,259.5	C	66.7		9,136.1	C			728	78	
54	108.00	1.00	30.00	4,122.3	C	61.6		1,958.6	C			728	78	
55	0.74	1.68	5.99	6,275.3	T			8,870.6	T			20,000		
56	0.59	1.43	5.10	1,662.1	C			4,011.6	C			20,000		
57	0.53	1.24	4.42	19,720.6	T			13,146.4	T			20,000		
58	0.50	0.99	3.53	14,887.8	T			12,544.2	T			20,000		
59	0.35	0.83	2.97	9,162.3	T			10,403.0	T			20,000		
60	0.10	0.44	1.57	3,697.8	T			8,385.7	T			20,000		
- 61	0.10	0.44	1.57	3,747.8	T			7,011.9	T			20,000		
62	0.35	0.83	2.97	9,214.7	T			9,326.7	T			20,000		
63	0.50	0.99	3.53	14,936.6	T			11,822.6	T			20,000		
64	0.53	1.24	4.42	19,769.7	T			12,449.9	T			20,000		
65	0.59	1.43	5.10	1,646.9	C			3,326.0	C			20,000		
66	0.74	1.68	5.99	6,413.7	T			8,202.2	T			20,000		

E=B/A: DEAD LOAD STRESS (PSI) AXIAL FX	C/T	L. SHEAR VL	BENDING MAX.	F=D-E: EMAINING STRENGTH (PSI) AXIAL FX	L. SHEAR VL	BENDING MAX.	G=C/A: LIVE LOAD STRESSES (PSI) AXIAL FX	C/T	L. SHEAR VL	BENDING MAX.	Member no.	H=[F/G]*15: RATING (H15) AXIAL FX	C/T	L. SHEAR VL	BENDING MAX.	COMMENTS	NDS REQUIREMEN MZ &FX 3.9.1 -Ft (<1)	3.9.2 -Fc (<1)
0.0	C	4.2	32.2	673.0	73.8	1,227.8	21.5	C	1.8	59.0	1	469.4	C	615.6	312.2	stress reversal	0.10	
11.6	C	8.6	146.1	661.4	69.4	1,113.9	26.4	C	4.1	88.2	2	375.2	C	254.3	189.5	stress reversal	0.24	
37.0	T	8.4	146.1	713.0	69.6	1,113.9	21.7	T	4.0	88.2	3	493.8	T	263.6	189.5		0.26	
95.4	T	4.4	25.5	654.6	73.6	1,234.5	44.0	T	1.5	50.5	4	223.4	T	736.4	366.5		0.25	
133.3	T	3.7	13.2	616.7	74.3	1,246.8	68.0	T	3.0	78.4	5	136.1	T	371.3	238.6		0.34	
151.6	T	3.4	8.5	598.4	74.6	1,251.5	77.7	T	12.4	38.5	6	115.6	T	90.4	487.9		0.34	
151.6	T	3.3	8.5	598.4	74.7	1,251.5	77.7	T	21.9	48.2	7 LC	115.6	T	51.1	389.4		0.35	
151.6	T	3.3	4.2	598.4	74.7	1,255.8	77.7	T	14.8	48.2	8	115.6	T	75.9	390.7		0.35	
133.0	T	3.6	12.2	617.0	74.4	1,247.8	64.9	T	3.5	93.6	9	142.7	T	322.0	200.0		0.35	
95.0	T	4.4	25.3	655.0	73.6	1,234.7	42.9	T	1.7	52.2	10	228.8	T	631.8	355.0		0.25	
36.4	T	8.4	144.1	713.6	69.6	1,115.9	20.3	T	3.7	89.3	11	528.3	T	285.9	187.4		0.26	
11.8	C	8.5	144.1	661.2	69.5	1,115.9	30.4	C	4.2	89.3	12	326.3	C	250.1	187.4	stress reversal	0.25	
0.0	C	4.1	29.0	673.0	73.9	1,231.0	24.7	C	1.6	51.3	13	409.5	C	708.4	359.7	stress reversal	0.10	
14.1	T	3.2	0.2	735.9	74.8	1,259.8	6.0	T	0.7	32.1	14	1,829.8	T	1,505.8	588.8	stress reversal		0.03
46.3	T	5.2	89.7	703.7	72.8	1,170.3	60.3	T	2.0	52.5	15	175.0	T	555.3	334.2	stress reversal		0.14
46.3	T	4.9	89.7	703.7	73.1	1,170.3	60.3	T	1.2	52.5	16	175.0	T	926.3	334.2	stress reversal		0.14
45.1	C	3.2	16.1	627.9	74.8	1,243.9	42.8	C	0.6	21.6	17	220.0	C	1,832.3	863.4			0.05
116.5	C	3.4	15.9	556.5	74.6	1,244.1	73.2	C	1.8	62.7	18	114.0	C	626.4	297.8			0.14
162.7	C	3.3	7.5	510.3	74.7	1,252.5	92.7	C	7.2	247.4	19	82.6	C	155.5	75.9			0.36
185.2	C	3.3	4.2	487.8	74.7	1,255.8	103.6	C	12.4	285.2	20 UC	70.7	C	90.6	66.1			0.43
162.4	C	3.1	7.4	510.6	74.9	1,252.6	93.6	C	8.1	285.2	21	81.8	C	139.4	65.9			0.39
116.0	C	3.3	15.2	557.0	74.7	1,244.8	72.7	C	1.7	61.8	22	114.9	C	651.3	302.1			0.14
44.4	C	3.2	16.3	628.6	74.8	1,243.7	41.6	C	0.6	23.1	23	226.4	C	1,776.7	808.0			0.05
47.2	T	4.8	88.0	702.8	73.2	1,172.0	69.8	T	1.2	54.6	24	151.0	T	891.7	321.8	stress reversal		0.14
47.2	T	5.1	84.7	702.8	72.9	1,175.3	69.8	T	2.0	54.6	25	151.0	T	534.5	322.7	stress reversal		0.14
14.4	T	3.2	2.9	735.6	74.8	1,257.1	7.0	T	0.8	33.4	26	1,573.1	T	1,445.8	564.5	stress reversal		0.03
39.2	T	0.0		770.8	78.0		20.4	T	0.0		27 END	567.6	T			stress reversal		
38.7	T	0.0		771.3	78.0		22.8	T	0.0		28 POST	508.0	T			stress reversal		
0.0	C	0.0		728.0	78.0		57.8	C	0.0		30	189.0	C			inactive, deadload only		
0.0	C	0.0		810.0	78.0		0.0	T	0.0		32	INACTIVE	T			inactive, all loads		
285.0	C	3.1		443.0	74.9		174.4	C	0.0		34	38.1	C					
228.5	C	3.1		499.5	74.9		169.3	C	0.0		36	44.2	C					
187.1	C	3.2		540.9	74.8		191.1	C	0.0		38	42.5	C					
89.9	C	3.2		638.1	74.8		119.2	C	0.0		40 COMP.	80.3	C					
0.0	C	0.0		728.0	78.0		49.7	C	0.0		42 DIAG.	219.8	C			inactive, deadload only		
93.8	C	3.2		634.2	74.8		112.4	C	0.0		43	84.7	C					
182.5	C	3.2		545.5	74.8		173.4	C	0.0		45	47.2	C					
232.3	C	3.1		495.7	74.9		162.0	C	0.0		47	45.9	C					
295.6	C	3.1		432.4	74.9		171.3	C	0.0		49	37.9	C					
0.0	T	0.0		810.0	78.0		0.0	T	0.0		51	INACTIVE	T			inactive, all loads		
0.0	T	0.0		728.0	78.0		54.0	C	0.0		53	202.1	C			inactive, deadload only		
134.4	C	3.1		593.6	74.9		56.2	C	0.0		29	158.6	C					
301.1	C	3.1		426.9	74.9		259.1	C	0.0		31	24.7	C					
0.0	T	0.0		728.0	78.0		5.5	C	0.0		33	1,977.0	C			inactive, deadload only		
0.0	T	0.0		728.0	78.0		4.2	C	0.0		35	2,606.3	C			inactive, deadload only		
0.0	T	0.0		728.0	78.0		13.8	C	0.0		37	789.3	C			inactive, deadload only		
0.0	T	0.0		728.0	78.0		40.7	C	0.0		39	268.5	C			inactive, deadload only		
0.0	T	0.0		728.0	78.0		58.6	C	0.0		41 COUNT.	186.2	C			inactive, deadload only		
0.0	T	0.0		728.0	78.0		42.6	C	0.0		44	256.3	C			inactive, deadload only		
0.0	T	0.0		728.0	78.0		22.7	C	0.0		46	480.0	C			inactive, deadload only		
0.0	T	0.0		728.0	78.0		5.5	C	0.0		48	1,980.5	C			inactive, deadload only		
0.0	T	0.0		728.0	78.0		8.3	C	0.0		50	1,308.3	C			inactive, deadload only		
284.9	C	3.1		443.1	74.9		281.1	C	0.0		52	23.6	C					
137.4	C	3.1		590.6	74.9		65.3	C	0.0		54	135.7	C					
1,048.4	T			18,951.6			1,482.0	T			55	191.8	T					
325.7	C			19,674.3			786.2	C			56	375.4	C			rods in compression		
4,466.1	T			15,533.9			2,977.2	T			57	78.3	T					
4,214.5	T			15,785.5			3,551.1	T			58	66.7	T					
3,086.7	T			16,913.3			3,504.7	T			59	72.4	T					
2,355.3	T			17,644.7			5,341.2	T			60	49.6	T					
2,387.1	T			17,612.9			4,466.1	T			- 61 VERT.	59.2	T					
3,104.4	T			16,895.6			3,142.1	T			62	80.7	T					
4,228.3	T			15,771.7			3,346.8	T			63	70.7	T					
4,477.2	T			15,522.8			2,819.5	T			64	82.6	T					
322.8	C			19,677.2			651.8	C			65	452.8	C			rods in compression		
1,071.5	T			18,928.5			1,370.3	T			66	207.2	T					

Table 5

3.0 RECOMMENDATIONS

To support an H15 loading, the following repairs are necessary:

- Clean and paint existing floor system.
- Replace timber decking.
- Replace broken or deteriorated siding boards. Boards in good condition would be reused.
- Replace deteriorated, rotted, or insect infested members located in Figures 1 and 2.
- Supplement vertical rods 56 and 65 with compression members.
- Install tension rods on each side of lower chords.
- Restore original configuration of end post and first panel of left truss.
- Provide tension connection for end posts.
- Add pier supports.
- Repaint structure.
- Cover members with fire retardant.
- Replace bearings.
- Remove shingles and replace metal roof with new metal roof.

Based on the best cost data we have at this time, we estimate the construction cost to perform these repairs would range from $210,000 to $245,000.

Burgess & Niple recommends the above repairs be performed if the rehabilitated bridge is to carry the H15 loading (Figure 3) or the lesser weighing school bus loading (Figure 4). Without the addition of piers, the maximum load which could be supported by the rehabilitated bridge is only 8 tons.