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<th>SUBJECT.</th>
<th>NO.</th>
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<td>10A.11</td>
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</tbody>
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10A-1 INTRODUCTION TO RATING TRUSS BRIDGES

This section covers the general policies and guidelines for rating all truss bridges. Due to the fact that the majority of truss bridges are structural steel, this section also covers the details necessary to rate steel truss bridges.

Steel truss members shall be rated using the policy and guidelines in subsections 10A-2 and 10A-3.

Steel stringer and floor beam members shall be rated using the policy and guidelines in subsections 10A-2 and 10A-3, along with the applicable policy and guidelines in Section 10.

Timber truss bridges shall be rated using the pertinent policies and guidelines in this section and Section 13.

Bridge decks shall be rated in accordance with Section 3.

Subsections 10A-3 and 10A-4 give guidelines and examples for rating steel truss bridges with the BARS computer program.

The types of bridges covered in detail by this section are:

A. SDT - Steel D Deck Truss
B. SLT - Steel Low Truss
C. STT - Steel Through Truss
10A.2 POLICIES AND GUIDELINES FOR RATING TRUSS BRIDGES

I. GENERAL

A. All truss bridge ratings shall be performed in accordance with Sections 1 of this manual, and the AASHTO code except where amended within this manual.

B. All structural steel members (truss members, floor beams, and stringers) shall be rated with the BARS computer program.

C. Treated timber members shall be rated using the applicable portions of this section and Section 13. Hand computations will be acceptable for rating timber truss members and timber floor beams.

D. Structural steel stringers and floor beams shall be rated using the applicable portions of this section and Section 10.

E. Members designed by the working stress method shall be rated by the working stress method.

F. When design plans are available, giving design stresses, use the applicable inventory and operating stresses. Otherwise, the default values used in the BARS program for the applicable year of construction may be used. It is possible that the year of construction and the year of steel member fabrication are not coincident; e.g., when salvaged members have been utilized. In this case, the year of steel fabrication shall be used in determining allowable stresses.

G. Truss members shall be identified on all rating material using the standard notation as shown in the BARS Users’ Manual and in the AASHTO MANUAL FOR MAINTENANCE INSPECTION OF BRIDGES.

H. The reduction in capacity of steel compression members with batten plate construction, as stipulated in the AASHTO MANUAL FOR MAINTENANCE INSPECTION OF BRIDGES, shall be used. However, this reduction does not need to be used due to the presence of lacing, perforated plates, or tie plates when lacing connects the flanges between the tie Plates.

II. MEMBERS REQUIRING RATING

A. Truss Members - A rating is required for all members that make up a truss, even though only the critical truss member is recorded on the Rating Summary Sheet. When a truss is symmetrical about its midspan centerline, then all the members on only one side of the centerline require a rating. A rating is not required for portal, or sway bracing, members.

B. Interior Floor Beams - A rating is required for the critical interior floor beam. In order to determine the critical floor beam, more than one interior floor beam may require analysis due to variations in cross-sectional size, grade of material, loads, or any other determining factor.

C. End Floor Beams - A rating is required for an end floor beam when its cross-sectional size is different from that used for the interior floor beams, or when it will give a lower rating value than an interior floor beam.
D. Interior Stringers - A rating is required for the critical interior stringer. In order to determine the critical stringer, more than one interior stringer may require analysis due to variations in cross-sectional size, grade of material, span length, loads, or any other determining factor.

E. Exterior Stringers - A rating is required for an exterior stringer when its cross-sectional size is different from that used for the interior stringers, or when it will give a lower rating value than interior stringer.

III. CALCULATIONS

A. A set of calculations, separate from computer output, shall be submitted with each rating. These calculations shall include: a diagram of the truss as modeled for analysis, with members labeled; derivations for member section properties, with supporting sketches; derivation of dead loads; derivation of live load distribution factors; and any other calculations or assumptions used for rating.

B. Live load distribution factors shall be calculated using the vehicle placement guidelines stipulated in Section 1.

C. Dead Loads

1. The final sum of all the individual weight components for dead load calculations may be rounded up to the next 5 pounds.

2. Dead loads supported by stringers, and applied after a cast-in-place concrete deck has cured, shall be distributed equally to all stringers. Possible examples include asphalt and curbs.

3. Dead loads supported by stringers, and applied before a cast-in-place concrete deck has cured (or applied when the deck is not cast-in-place concrete), shall be distributed to the applicable individual supporting stringer. Examples include stringer weight and deck, but not necessarily overlay weight.

4. The method for applying dead loads due to utilities is left to the rater’s discretion.

IV. REPORTING RATINGS

A. The rater and checker shall complete the rating documentation as described in Section 1 of this manual. In addition to Section 1, the following items shall be observed when filling out the Rating Summary Sheet.

1. Comment on the allowable stress used for inventory if different from the AASHTO allowable.

2. In the truss portion of the rating summary sheet the rating for only the most critical truss member shall be recorded. The critical truss member for one rating value (inventory, operating, posting, or color code) may be different from the truss member that is critical for another rating value. Therefore, the rater shall designate the most critical member and its rating, as appropriate, for each truss rating value entered on the Rating Summary Sheet.
10A-3GUIDELINES FOR USING THE BARS RATING PROGRAM

To effectively use BARS the rater must become familiar with the Data Preparation Instructions Manual, hereafter referred to as the BARS Manual. The following information for coding the BARS input forms is meant only to supplement the BARS Manual. The discussion for data input is arranged in the order which each card type should appear in the input file.

I. BARS INPUT

A. When creating a BARS input file all references to member descriptions, section codes, and span lengths shall be consistent amongst all card types.

1. For member descriptions and section codes, 01 (zero one) is not the same as bl (blank one). For example, if a member is identified as LOIUIOI on card type 64, this designation (LOIUIOI) must be used on all other applicable card types, whereas the designations LblUbl, LlbUOl, or any other combination inconsistent with LOIUIOI, are not to be used.

2. For a given span length, the method used to input feet and inches must be consistent so that the decimal portion of the length is exactly the same on all card types in which the span length is referenced.

B. Card Type 01 - One card type 01 is required for each BATCH I.D. Leave columns 3 through 8 blank. Columns 9 through 14 CANNOT be left blank.

C. Card Type 03 - Got required for all ratings

1. Card type 03 is required when an Interstate structure requires a posting analysis. In this case, the Interstate posting vehicles shall be coded on card type 03 and referred to as "I3", "I3S2", and "I3-2" in columns 10 13. These load names must also be coded in columns 46 57 of card type 01.

2. Card type 03 is ignored if the operating rating for all bridge members being rated is greater than or equal to 36.0 tons (the HS 20 gross weight), unless this program decision is overridden on card type 01.

D. Card Type 02 - Structure Header and Description

1. The year of construction defines the allowable stresses the program will use. Code in a value that produces the appropriate allowable stresses. If this value is different than the actual year of construction, note the actual year on card type 06.

2. The width entered in columns 59-68 is actual roadway width and may not be greater than the span length of any floor beam member which is being rated.

3. Columns 71-80 should be ignored if the HS 20 vehicle is used for determining the inventory and operating ratings.

E. Card Type 05 - Structure Location and Permanent Identification Factors.

1. Fill in columns 3 - 20.

2. Columns 66 - 73 shall contain the highway number.

3. Columns 74 - 80 shall contain the direction of traffic carried by the bridge if traffic is going in only one direction.
F. Card Type 06 - Comments. This card is used for comments and the following information is required. (see Rating Examples).

1. Project number and feature intersected.

2. Thickness and type of surfacing on deck. Note which legal loading applies. Colorado or Interstate Loading.

3. If a new bridge is being rated, note the structure number of the bridge being replaced; nearest city or town; parallel structure number, and note "SIMILAR" if the parallel structure is identical insofar as the rating for one structure is identical to the rating of the parallel structure.

4. Identify stringer and beam members chosen for rating; e.g., "BO1 = INT. BEAM (W36x150)". Truss members do not need to be identified. Note if yield stresses used were other than those built into the program. Note the actual year of construction if different from the year entered on card type 02.

G. Card Type 08 through Card Type 12 - Flexural Members

1. Designate floor beams and stringers by coding in column 9 a "B" or an "S", respectively. Stringers may not be coded as continuous members.

2. On card type 08, when entering data for a floor beam, code in the center-to-center spacing of floor beams for the value of "S" in columns 61 - 65. If it is an end floor beam, code an "X" in column 66. For stringers, code the distribution factor-as computed from the AASHTO manual for the value of "E" in columns 61 - 65.

3. For more information on card types 08 through 12, see subsection 10-3.

H. Card Type 60 - General Specifications For Truss Analysis

1. In some cases, it may be necessary to use columns 10 - 19 to override the allowable stresses designated by the date on card type 02. If so, the BARS rating output shall contain the correct operating allowable stresses. This output does not need to be corrected for the true inventory allowable stresses. However, the inventory stresses used in this case shall be noted on the Rating Summary Sheet under the comments section.

2. Do not enter the center-to-center truss spacing to allow the program to compute the truss live load distribution factor. Instead, calculate the distribution factor (E) as shown in subsection 1-3 and enter it directly in columns 30 _ 34.

3. Formally a rating is required for all truss members, even though only the critical member is recorded on the Rating Summary Sheet. When a truss is symmetrical about its midspan centerline, then all the members on only one side of the centerline require a rating.

I. Card Type 61 - Truss Geometry

1. For the purposes of column 14, a through truss is any truss where the bottom chord directly supports the bridge deck, and a deck truss is any truss where the top chord directly supports the bridge deck.
2. To prevent errors in processing, be certain that the sum of the panel lengths is exactly equal to the overall span length (or one-half overall span for a symmetrical truss) entered on card type 61, without any rounding errors.

J. Card Type 63 and 64 - Truss Member Section Properties

1. Card type 63 is used when the overall section properties of all truss members are known. Card type 64 is used when the overall section properties are not known, and the rater decides to have the program compute them. The input data for section properties shall be shown on the hand calculation sheets submitted with the rating.

2. The reduction of section properties due to bolt and rivet holes must be taken into account when analyzing members subject to tensile stresses. Therefore, the effective area of bolt and rivet holes, as computed according to AASHTO Specifications, shall be used when calculating a member’s net area on card type 63, or shall be entered as one of the member’s cross sectional elements on card type 64. Bolt and rivet holes do not affect gross sectional properties. Consequently, they do not reduce a member’s capacity for compression.

3. Defects, or reductions in a member’s cross-section, usually due to corrosion or collision damage, reduce both gross and net section properties. Therefore, the effect of defects shall be taken into account for all members in which they occur. The section properties of defects shall be used when computing all of the member's section properties shown on card type 63. Or, on card type 64, the defects shall be entered as elements of the member’s cross-section.

4. The BARS program considers all members to have pinned end conditions for all calculations, except when determining the effective length factor (K). The entry in column 49 and 60 on card types 63 and 64, respectively, will only be used for determining "K". If the end of a member is restrained by only pin friction, then enter an "X" in column 49 or 60, and "K" will be set equal to 0.875. If the end of a member is partially restrained by a bolted or riveted connection, leave column 49 or 60 blank, and "K" will be set equal to 0.75. See Appendix of AASHTO Standard Specifications for Highway Bridges for columns.

5. The value of "F" is used to take into account the reduced strength of batten plate columns (see AASHTO Manual for Maintenance Inspection of Bridges - Formulas For Steel Columns). It only applies when members are subject to compressive forces. The governing center-to-center spacing of the batten plates, i.e. tie plates, on one or both sides of a member should be used in determining "F". It is not necessary to apply this reduction due to the presence of lacing bars, perforated plates, or the tie plates which have lacing between them. In these cases, the value of "F" should be left blank.

K. Card Type 65 - Superimposed Dead Loads on Trusses

1. When the unloaded chords (the chords that are not directly supporting the deck) of the trusses on each side of the bridge are not interconnected with portals, or sway bracing, it is acceptable to apply all of the bridge’s dead load as point loads at the panel points on the loaded chord.
II. BARS OUTPUT

A. The impact values for tension and compression assigned to a truss member are the result of the program applying the appropriate portion of the span length, as determined from the member’s influence diagram, into the AASHTO impact formula. When LC is the length of the influence diagram that applies to compression, and LT is the length of the influence diagram that applies to tension, LC plus LT equal the total span length of the truss. LC is used in the impact formula for determining the value of impact for compression, and LT is used for determining the impact for tension.

B. The HS 20 inventory and operating rating values assigned to structural members on the BARS output are the result of the program multiplying the rating factors by 20 to give ratings relative to the HS 20 designation. The rating values to be entered on the Rating Summary Sheet must be in tons. Therefore, the HS 20 ratings reported by the program must be multiplied by 1.8 (where 36/20 = 1.8 and 36 = gross weight of HS 20 vehicle in tons) to obtain the corresponding ratings in tons; i.e., (HS 20 rating) X 1.8 = (rating in tons).
TRUSS BRIDGE RATING EXAMPLE (SLT)
Page Intentionally Left Blank
STAFF BRIDGE DESIGN
WORK SHEET (01200) 30
REV JULY, 1981

PARALLEL STRUCTURE NUMBER ____________________
STRUCTURE TYPE SLT

STATE HWY NO. 69
STRUCTURE NO. N-16-L
BATCH I.D. 075-085

COLORADO LEGAL LOADS
RATING SUMMARY (TONS)

<table>
<thead>
<tr>
<th></th>
<th>TRUSS</th>
<th>30 W/108</th>
<th>INT.</th>
<th>STEEL</th>
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<tr>
<td></td>
<td>12-13</td>
<td>20.4</td>
<td>37.1</td>
<td>12.8</td>
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<tr>
<td>HS 20 (36 TONS) INVENTORY</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12-13</td>
<td>38.0</td>
<td>55.0</td>
<td>46.8</td>
</tr>
<tr>
<td>HS 20 (36 TONS) OPERATING</td>
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<td></td>
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<tr>
<td>TYPE 3 (27 TONS) OPERATING</td>
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<td></td>
<td></td>
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<tr>
<td>TYPE 3S2 (42.5 TONS) OPERATING</td>
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<tr>
<td>TYPE 3-2 (42.5 TONS) OPERATING</td>
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<td>Overload Color Code</td>
<td>SEC Subsection 200-6</td>
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</tbody>
</table>

COMMENTS:

5" ASPHALT OVERLAY

PROJECT NO. S-0038(10) ______________________

DATE: ____________________  RATER: ____________________
CHECKER'S SIGNATURE: ____________________

DATE: ____________________  RATER: ____________________
CHECKER'S SIGNATURE: ____________________

10A.11
DESIGN COMPUTATIONS

ALL TRUSS MEMBERS ~ OLD
3/4" RIVETS

SECTION CODE FOR "BARS"

L
12'-0" L1
12'-0" L2
30'-0"

USED 1965 & 1920 AISC MANUALS FOR SECTIONS

TRUSS

25'-9"

6"x2"-7M. CORRUGATED STEEL FLANK

30-WF108 (new)
A = 9.22
Iy = 25.6
L = 5.00"

ALL BEAMS ~ NEW

25'-9" 30-WF108 BEAM INCL. & EXCL.

USFD PROJECT #S-0038 (10) AS-CONSTRUCTED PLANS - 1965. NEW MEMBERS PER PROJECT #S-0038 (10). OLD MEMBERS SALVAGED - COULD NOT FIND ANY PLANS. THEREFORE, TRUSS DATA FROM FIELD SURVEY - 10/2/85 CONDUCTED BY RON AKIN AND MARK LEONARD.

BEAMS ENTRY DATA - CARD TYPE 64

SECTION (1)

2 - C10x20: A = .566" Iy = .800" Iy = 2.86"" DISTANCE FROM OUTSIDE WEB TO CENTER: D = .657""

Dx = 8.5 / 2 + 0.61 = 4.86"

Dy = 10 / 2 = 5"

14" x 7/16" R: A = .373" Iy = 14(7/16)^3/12 = .036"

Dy = 10 - .5/32 = 10.16"

H = 10 1/16 = 10.31"

AREA REDUCTION: NO NEED FOR COMPRESSION MEMBER. BOTTOM FLANGES CONNECTED WITH LACING.

STAFF BRIDGE DESIGN

COLORADO DIVISION OF HIGHWAYS

By: All Date 10/29/84 Project No. S-0038 (10) RATING

Chk'd: Date 11-2-85 Structure No. N-16-L 075-025

10A.12
**DESIGN COMPUTATIONS**

**BARS ENTRY DATA - CARD TYPE 64** (cont.)

**SECTION (2)**

2 - C10 x 20 : SAME AS SECTION (1) EXCEPT \( H = 10'' \)

AREA REDCTN: \( 4 \) HOLES \( \frac{3}{4}'' + \frac{1}{8}'' \) \( \frac{5}{16} = 1.53 \text{ in}^2 \)

\( 7\frac{1}{16}'' = 2\frac{1}{2}'' \) GAGE

\( 14'' \times 6'' \) BATTEN R's - NO REDUCTION REQUIRED - TENSION MEMBER

**SECTION (3)**

\( \frac{2}{3}'' x \frac{5}{8}'' \): \( A = 1.78 \) \( I_x = 2.2 \) \( I_y = 0.94 \)

\( D_x = 8.25 - 0.45 = 7.80'' \)

\( D_y = 3.5 + 1.14 = 4.64'' \)

\( 7\frac{1}{8}'' \times 7\frac{3}{16}'' \): \( A = 2.34 \) \( I_x = 7.5 \) \( I_y = \frac{7.5}{2} = 3.75'' \)

\( D_x = 10.99 \) \( D_y = 3.5 + 3.25 = 6.75'' \)

AREA REDCTN: \( 8 \) HOLES \( \frac{3}{4}'' + \frac{1}{8}'' \) \( \frac{5}{16} = 2.19 \text{ in}^2 \)

\( H = 2(3.5 ) + 5\frac{1}{16} = 7.31'' \)

**SECTION (4)**

\( 4 - \frac{4}{3}'' x \frac{7}{16}'' \): \( A = 2.09 \) \( I_x = 3.4 \) \( I_y = 1.7 \)

\( D_x = 8.42 - 0.48 = 7.94'' \)

\( D_y = 2.5 + 1.26 = 3.76'' \)

\( H = 4 + 5\frac{1}{8} + 4 = 8.39'' \)

AREA REDCTN: \( 4 \) HOLES \( \frac{3}{4}'' + \frac{1}{8}'' \) \( \frac{5}{16} = 1.09 \text{ in}^2 \)

\( 7\frac{1}{8}'' \times 5\frac{1}{16}'' \) BATTEN R's SPG + 3\' \Rightarrow 3(2)/2.31 \Rightarrow 4.33 H = SPA. \( \therefore \) \( F = 5 \)

**SECTION (5)**

\( 2 - \frac{3}{4}'' x 2\frac{1}{2}'' x \frac{5}{16}'' \): \( A = 1.62 \) \( I_x = 1.42 \) \( I_y = 0.99 \)

\( D_x = 8.82 - 0.69 = 8.13'' \)

\( D_y = 3 - 0.88 = 2.07'' \)

\( H = 3'' \)

AREA REDCTN: \( 2 \) HOLES \( \frac{3}{4}'' + \frac{1}{8}'' \) \( \frac{5}{16} = 0.55 \text{ in}^2 \)

EITHER IN FLANGE OR WEB

7\frac{1}{8}'' \times 5\frac{1}{16}'' \times 1\frac{3}{4}'' BATTEN R'S - NO REDUCTION REQUIRED - TENSION MEMBER

**ALLOWABLE STRESSES:**

**TRUSS & OLD STRINGERS - UNKNOWN. PLAQUE ON TRUSS DATED 1920 - FROM FIELD SURVEY. \( \therefore \) ASSUME 1920 - DATE OF FABRICATION FROM BARS STRESS TABLE: ALLOW STEEL STRESS = 16.0 ksi IN\( ^2 \) & 22.5 ksi OPR.**

**BEAMS ** STEEL 18ksi IN\( ^2 \) (from 500380) PLATE & 24.5 ksi OPR.

---

**STAFF BRIDGE DESIGN**

**COLORADO DIVISION OF HIGHWAYS**

Sheet 2 of 3

By: MI Date: 10/29/94 Project No.: RATING S-0038(10)

Chk'd: MG Date: 11/2-95 Structure No.: N-16-L

10A.13
SUPERIMPOSED DEAD LOAD (NOTE: GUARD RAIL ON TRUSSES) (5" ASPHALT OVERLAY):

DECK: 6"x3" 74¢. Corrg. Steel Plank = 10.7 ksf (PER ARMCO CATALOG)
ASPHALT FILLER = 144 (1") lane /12 = 12 ksf
PLANK + FILLER = 22.7 ksf

INT. STRINGER: 12 I 31.8
OVERLAY = (5/12)(31/12) 144 = 15.5
DECK = 22.7 (31/12) = 5.9
L.L. D.F. = 31/(12) = 0.574
SWAY BRACING SUPPORTED @ MID-SPAN BY STRINGERS EF;
HOWEVER, RESULTING POINT LOAD IS NEGLIGIBLE.

EXT. STRINGER: 12 I 31.8
OVERLAY = (5/12)(31/12 + 45/12) 144 = 100
DECK = 22.7(31/12 + 10.5/12) = 49.2
CURB = 6 (6) 50 /144 = 12.5
L.L. D.F. = (31-19.5) / 31 = 0.371
INT. EXT. STRINGER - SAME SIZE. INT. STRINGER CONTROLS.
" NO NEED TO RATE EXT. STRINGER.

INT. BEAM: 30 W=108
P = (2.14 + 31.8) 12' / INT. STRINGER = 2.9 k / INT. BEAM
= (162 + 31.8) / EXT. STRINGER = 2.3 k / EXT. BEAM

EXT. BEAM: 30 W=108
SAME SIZE AS INT. BEAM. INT. BEAM CONTROLS.
" NO NEED TO RATE EXT. BEAM.

TRUSS:
INT. STRINGERS = 2(14) 12' (4) STRUNGERS 5 EAX = 51.4 k
EXT. STRINGERS = 162 12' (1) STRINGER 5 BAY = 9.7
PER 50038{(10) PLAN}
NEW STEEL = 43.530 /2 = 21.8
96.15 = 19.2 k / INT. PANEL POINT
96.1 k / TRUSS

P = WHEEL LOAD
CP = CENTROID OF WHEEL LOADS
L.L. D.F. = 4(25.75 + 10) / 25.75
= 2.155

075-085
## CORRUGATED STEEL PLANK RATING

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>INPUT</th>
<th>UNITS</th>
<th>CARD IMAGE COLS.</th>
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<tbody>
<tr>
<td>STRUCTURE NUMBER</td>
<td>N, 1, 16, L</td>
<td></td>
<td>1 - 7</td>
</tr>
<tr>
<td>RATER</td>
<td>M, A, L</td>
<td></td>
<td>8 - 10</td>
</tr>
<tr>
<td>STATE HIGHWAY NUMBER</td>
<td>6, 9</td>
<td></td>
<td>11 - 13</td>
</tr>
<tr>
<td>BATCH I.D.</td>
<td>D, 7, 5, 0, 8, 5</td>
<td></td>
<td>14 - 19</td>
</tr>
<tr>
<td>COMMENTS</td>
<td>U, TURKEY, CREEK</td>
<td></td>
<td>20 - 40</td>
</tr>
<tr>
<td>SPAN LENGTH</td>
<td>2600</td>
<td>IN</td>
<td>41 - 44</td>
</tr>
<tr>
<td>SECTION MODULUS</td>
<td>162</td>
<td>IN3/IN</td>
<td>45 - 48</td>
</tr>
<tr>
<td>WEIGHT OF PLANK</td>
<td>107</td>
<td>PSF</td>
<td>49 - 51</td>
</tr>
<tr>
<td>INVENTORY STRESS</td>
<td>200</td>
<td>KSI</td>
<td>52 - 54</td>
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<tr>
<td>OPERATING STRESS</td>
<td>270</td>
<td>KSI</td>
<td>55 - 57</td>
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<tr>
<td>ASPHALT THICKNESS</td>
<td>600</td>
<td>IN</td>
<td>58 - 61</td>
</tr>
</tbody>
</table>

[Diagram showing a section of a corrugated steel plank with annotations for span length and asphalt thickness.]
STEEL BRIDGE PLANK RATING

DATE: 05/03/14.

STRUCTURE NO: N-16-L
RATER: MAL
BATCH ID: D75085
STATE HWY NO: 69
COMMENT: OVER TURKEY CREEK

NET SPAN LENGTH (IN) = 26.00
SECTION MODULUS (IN3/IN) = .162
PLANK WEIGHT (PSF) = 10.7
INVENTORY STRESS (KSI) = 20.0
OPERATING STRESS (KSI) = 27.0
ASPHALT THICKNESS (IN) = 6.00

LL+1 MOMENT (IN-K) = 3.328
(LL MOMENT BASED ON A WHEELPRINT 20IN X 20IN)
DL MOMENT (IN-K) = .039
INVENTORY LL+1 MOMENT CAPACITY (IN-K) = 3.201
OPERATING LL+1 MOMENT CAPACITY (IN-K) = 4.335

INVENTORY RATING (TONS) = 34.63
OPERATING RATING (TONS) = 46.89
### Bridge Rating System

#### Batch Specifications

<table>
<thead>
<tr>
<th>CARD TYPE</th>
<th>DATE</th>
<th>RATING ANALYST IDENTIFICATION</th>
<th>INV. LOAD NAME</th>
<th>OPER. LOAD NAME</th>
<th>POSTING</th>
<th>FILE REQUESTS AND OUTPUT DATA EXCEPTIONS</th>
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July 1995
# Bridge Rating System

## Structure Header and Description

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## Structure Location and Permanent Identification Factors

| Card Type | Batch ID | Structure Data | Structure Number | District | County | Abutement | Section | Station | Design Plans | Computations | Correlation | Key Route ID | Marked Abutement |
|-----------|---------|----------------|------------------|---------|--------|-----------|---------|---------|--------------|---------------|--------------|--------------|-----------------|------------------|
| 05        | 0.75085 | 100            | N-16-L-1          | 03      | 91     | 21         | 55      | 57      | 15           | 57            | 69           | 76           | 91              |                  |

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### BRIDGE RATING SYSTEM

#### SECTION RANGE SPECIFICATIONS

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**Table:**

- **SECTION RANGE:**
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  - RANGE NO.
  - HINGE LENGTH
- **HINGE LOCATION:**
  - FIRST HINGE DISTANCE FROM LEFT
  - SECOND HINGE DISTANCE FROM LEFT
- **UNIT:**
  - FEET
  - IN.
  - 1/16

---

**Note:**

- This table outlines the section range specifications and hinge locations for a bridge rating system. The data includes the section range, hinge length, and hinge location details for various spans.

---

**Additional Information:**

- The data is presented in a clear and organized manner, facilitating easy reference and analysis.

---

**Reference:**

- The table is sourced from a manual or report, denoted as "CDOT BRIDGE RATING MANUAL."
### BRIDGE RATING SYSTEM

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**Legend:**
- **CARD ID:** Unique identifier for the card.
- **BRIDGE ID:** Identifier for the bridge.
- **SERIAL NUMBER:** Serial number for the panel.
- **PANEL NUMBER:** Number of the panel.
- **PANEL CODE:** Code for the panel.
- **TOTAL PANELS:** Total number of panels.
- **SPAN LENGTH L:** Span length in feet and inches.
- **END POST HGT. H_0:** End post height in feet and inches.
- **FULL PANEL LGT. P_1:** Full panel length in feet and inches.
- **SUBD. PANEL LGT. P'_1:** Subdivided panel length in feet and inches.
- **VERTICAL HGT. h_1:** Vertical height in feet and inches.
## BRIDGE RATING SYSTEM

### SECTION PROPERTIES - STRUCTURAL STEEL TRUSS MEMBERS

#### DETAILED DESCRIPTION

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#### Properties of i<sup>th</sup> element
- A<sup>i</sup> - Area
- I<sub>x</sub><sup>i</sup> - Inertia about x
- I<sub>y</sub><sup>i</sup> - Inertia about y

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X ref. axis

Y ref. axis

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**BIDGE ANALYSIS AND RATING SYSTEM**

(C) COPYRIGHT 1994 BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, INC.

HIGHWAY AND TRANSPORTATION OFFICIALS, INC.

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THE FOLLOWING STRUCTURES WERE SELECTED

D75085

1

MAIN -- NEW STRUCTURE I.D. = D75-085

0*** ERROR 2500700 *** STRUCTURE ID D75-085
TRUSS ID U TRUSS MEMBER ID U 2U 3
ERROR OPENING UNIT 51. IT IS THE UNFORMATTED BINARY FILE HOLDING THE ERROR MESSAGE TEXT.

0*** WARNING 4404500 *** STRUCTURE ID D75-085
MEMBER ID B 1

0*** WARNING 4404500 *** STRUCTURE ID D75-085
MEMBER ID S 1

1

STRUCTURE I.D. = D75-085
**STRUCTURE HEADER AND DESCRIPTION**

*100-- 2  MARK LEONARD  EA/1/O/P -  FILE REQUESTS AND OUTPUT DATA EXCEPTIONS  
TYPE =  SLY  YEAR =  20  LEN =  61.83 FT.  WIDTH =  24.00 FT.  1 SPANS SP.Load =  INV.LL.TRK. =  OP.LL.TRK.*

**STRUCTURE LOCATION AND PERMANENT IDENTIFICATION FACTORS**

*200-- 5  BRIDGE=N-16-L  DIST./CO.-  2  055  CONST. ROUTE =  CONST. SECT. =  CONST. STA. =  D+ .  
MICROFILM REEL NO.  DESIGN PLAN=  COMPUTATIONS=  CORRESPONDENCE=  ROUTE I.D. =  SR-69  MARKED ROUTE =  *

**COMMENTS**

300-- 6  1  PROJECT NO.  S-0038(10), ACTUAL YEAR OF CONSTRUCTION 1965  
400-- 6  2  TRUSSES AND MOST STRINGERS SALVAGED FROM BEAVER CREEK  
500-- 6  3  ASSUME SALVAGED STEEL FABRICATED 1920 FOR ALLW. STRESSES  
700-- 6  5  RATED WITH 6 INCHES ASPHALT OVERLAY AND COLORADO TRUCKS  
800-- 6  6  OVER TURKEY CREEK NEAR FARISITA  

**MEMBER SPECIFICATIONS AND REQUIRED ANALYSIS-GIRDER, STRINGER AND FLOOR BEAM**

**SECTION RANGE SPECIFICATIONS**

**SECTION PROPERTIES (STEEL OR TIMBER) - GIRDERS STRINGERS, FLOOR BEAMS**

**GENERAL SPECIFICATIONS FOR TRUSS ANALYSIS**

**ALLOWABLE STRESS**

C-C TRUSSES  *E* TO BE RATED  

**LIVE LOAD DISTRIBUTION**

MEMBER I.D.  MEMBER I.D.  MEMBER I.D.  MEMBER I.D.  MEMBER I.D.  MEMBER I.D.  

---

10A.31
**TRUSS GEOMETRY**

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**SECTION PROPERTIES—STRUCTURAL STEEL TRUSS MEMBERS DETAILED DESCRIPTION**

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**SUPERIMPOSED DEAD LOAD—TRUSS**

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**SUPERIMPOSED LIVE LOAD—TRUSS**

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**SUPERIMPOSED TOTAL LOAD—TRUSS**

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10A.32
SUMMARY OF RATING CALCULATIONS

INVENTORY AND/OR OPERATING ANALYSIS

INPUT CODING --

STRUCTURE N-16-L

D/P STR. I.D.-- D75-085

DATE 8/7/95

INVENTORY OPERATING

BY MARK LEONARD

LIVE LOAD RATING

LIVE LOAD RATING

HS20 HS 11.34 HS20 HS 21.13

STRUCTURE DESCRIPTION --

LOCATION --

MICROFILM REEL NUMBERS --

TYPE SLT

COUNTY 055

DESIGN PLANS

COMPLOTIONS

DISTRICT 2

CONSTR. RTE.

CORRESPONDENCE

YEAR OF CONSTR. 1920

KEY RTE. SH-69

CONSTR. STA. 0+

MARKED RTE.

ANALYST REMARKS --

PROJECT NO. S-0038(10), ACTUAL YEAR OF CONSTRUCTION 1965

TRUSSES AND MOST STRINGERS SALVAGED FROM BEAVER CREEK

ASSUME SALVAGED STEEL FABRICATED 1920 FOR ALL W. STRESSES

STRINGER 1 INT. I12X31.8 (REUSED), FLOOR BEAM B01 W30X108 (NEW)

RATED WITH 6 INCHES ASPHALT OVERLAY AND COLORADO TRUCKS

OVER TURKEY CREEK NEAR FARISITA

INVENTORY RATING SUMMARY --

OPERATING RATING SUMMARY --

TRUSS ID. 1

TRUSS ID. 1

CRITICAL MEMBER ID. L 2 L 3

CRITICAL MEMBER ID. L 2 L 3

LIVE LOAD DESIGNATION HS20

LIVE LOAD DESIGNATION HS20

AXIAL FORCE

AXIAL FORCE

(KIPS)

(KIPS)

MEMBER CAPACITY 163.0

MEMBER CAPACITY 229.3

DL EFFECT 86.4

DL EFFECT 86.4

CAPACITY FOR (LL+I) 76.6

CAPACITY FOR (LL+I) 142.9

ACTUAL (LL+I) 135.2

ACTUAL (LL+I) 135.2

INVENTORY RATING HS 11.34

OPERATING RATING HS 21.13
**SUMMARY OF RATING CALCULATIONS-----STRUCTURE MEMBER B 1**

**INVENTORY AND/OR OPERATING ANALYSIS**

**INPUT CODING ---**

**DATE** 8/ 7/95

**BY** MARK LEONARD

**LIVE LOAD RATING**

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**LIVE LOAD RATING**

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**STRUCTURE DESCRIPTION --**

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**LOCATION --**

| DISTRICT | 2 |
| COUNTY   | 055 |
| CONSTR. RTE. | SH-69 |
| CONSTR. STA. | 0+ . |
| KEY RTE. | MARKED RTE. |

**ANALYST REMARKS --**

PROJECT NO. S-0038(10), ACTUAL YEAR OF CONSTRUCTION 1965
TRUSSES AND MOST STRINGERS SALVAGED FROM BEAVER CREEK
ASSUME SALVAGED STEEL FABRICATED 1920 FOR ALL W. STRESSES
STRINGER 1 INT. I12X31.8 (REUSED), FLOOR BEAM B01 W30X108 (NEW)
RATED WITH 6 INCHES ASPHALT OVERLAY AND COLORADO TRUCKS
OVER TURKEY CREEK NEAR FARISITA

**INVENTORY RATING SUMMARY -**

| MEMBER ID. | B 1 |
| CRITICAL C.P. DIST. | 11.8 FEET |
| LIVE LOAD DESIGNATION | HS20. |
| SHEAR (KIPS) | 448.0 |
| DL EFFECT | 107.2 |
| CAPACITY FOR (LL+I) | 340.7 |
| ACTUAL (LL+I) | 330.9 |
| INVENTORY RATING | HS 20.59 |

**OPERATING RATING SUMMARY**

| MEMBER ID. | B 1 |
| CRITICAL C.P. DIST. | 11.8 FEET |
| LIVE LOAD DESIGNATION | HS20 |
| SHEAR (KIPS) | 610.9 |
| DL EFFECT | 107.2 |
| CAPACITY FOR (LL+I) | 503.6 |
| ACTUAL (LL+I) | 330.9 |
| OPERATING RATING | HS 30.44 |
SUMMARY OF RATING CALCULATIONS

INVENTORY AND/OR OPERATING ANALYSIS

INPUT CODING --

STRUCTURE N-16-L

DATE 8/7/95

INVENTORY

BY MARK LEONARD

OPERATING

LIVE LOAD RATING

LIVE LOAD RATING

HS20 HS 23.71 HS20 HS 34.60

ANALYST REMARKS --

PROJECT NO. S-0038(10), ACTUAL YEAR OF CONSTRUCTION 1965

TRUSSES AND MOST STRINGERS SALVAGED FROM BEAVER CREEK

ASSUME SALVAGED STEEL FABRICATED 1920 FOR ALL W. STRESSES

STRINGER 1 INT. I12X31.8 (REUSED), FLOOR BEAM B01 W30X108 (NEW)

RATED WITH 6 INCHES ASPHALT OVERLAY AND COLORADO TRUCKS

OVER TURKEY CREEK NEAR FARISITA

INVENTORY RATING SUMMARY --

MEMBER ID. S 1

SPAN 1

CRITICAL C.P. DIST. 6.0 FEET

LIVE LOAD DESIGNATION HS20

SHEAR (KIPS)

MEMBER CAPACITY 48.

DL EFFECT 5.5

CAPACITY FOR (LL+I) 42.5

ACTUAL (LL+I) 35.8

INVENTORY RATING HS 23.71

OPERATING RATING SUMMARY --

MEMBER ID. S 1

SPAN 1

CRITICAL C.P. DIST. 6.0 FEET

LIVE LOAD DESIGNATION HS20

SHEAR (KIPS)

MEMBER CAPACITY 67.5

DL EFFECT 5.5

CAPACITY FOR (LL+I) 62.0

ACTUAL (LL+I) 35.8

OPERATING RATING HS 34.60

10A.35
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<tr>
<td>Type</td>
<td>County</td>
<td>Computations</td>
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<td>Constr. RTE.</td>
<td>Correspondence</td>
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**Analyst Remarks:**

PROJECT NO. S-0038(10), Actual Year of Construction 1965
Trusses and most stringers salvaged from Beaver Creek
Assume salvaged steel fabricated 1920 for all. Stresses
Stringer 1 Int. 112k31.8 (reused), floor beam 801 W30x108 (new)
Rated with 6 inches asphalt overlay and Colorado trucks
over Turkey Creek near Farisita.

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<th><strong>Operating Rating Summary</strong></th>
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**Axial Force**

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<table>
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<tr>
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<th>Operating Rating</th>
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<tbody>
<tr>
<td>HS 11.34</td>
<td>HS 21.13</td>
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</table>
1

DETAIL TRUSS DATA

DATE 08/07/95

D/P STRUCTURE I.D. D75-085
TRUSS I.D. 1

SPAN LENGTH (FT.) 60.000
C-C TRUSS = 0.000 FT. LL DIST. FACT. = 2.155

TRUSS GEOMETRY

y-ORDINATE

0.00 1.20 0.00

POS AREA 36.00

LOAD ON X-DIST (FT.) 0.00 12.00 60.00

NEG AREA 0.00

UPPER CHORD = 0.0 LBS/FT.

LOWER CHORD = 0.0 LBS/FT.

12.000 12.000 10.00 12.000 0.000 8.000 0.000 12.000 19.200 10.19

36.000 19.200 5.00 0.00 3.41 0.8

TRUSS MEMBER I.D. L00U01

DATE 08/07/95

D/P STRUCTURE I.D. D75-085
TRUSS I.D. 1
TRUSS MEMBER I.D. L00U01

1

DETAIL TRUSS MEMBER DATA

INVENTORY HS20

OPERATING 22500. 15875. 146.1

14.422 14.422 10.31 16.09 241 353 3.91 4.69 16.09 241 353 3.91 0.00 0.8

10A.37
CDOT BRIDGE RATING MANUAL

July 1995

**ALLOWABLE STRESS / MEMBER CAPACITY / AXIAL FORCE ON MEMBER DUE TO DEAD LOAD / AVAILABLE CAPACITY FOR LL+IMPACT**

**UPPER CHORD**

**Y-ORDINATE**

**0.00**

**1.20**

**0.00**

**NEG AREA**

**0.00**

**POS AREA**

**48.1**

**12.000**

**12.000**

**10.00**

**11.72**

**157**

**282**

**5.00**

**3.66**

**4.91**

**10.19**

**156**

**282**

**5.00**

**0.00**

**R**

**0.8**

**---**

**ALLOWABLE STRESS / MEMBER CAPACITY / AXIAL FORCE ON MEMBER DUE TO DEAD LOAD / AVAILABLE CAPACITY FOR LL+IMPACT**

**LOAD ON**

**X-DIST (FT.)**

**0.00**

**12.00**

**60.00**

**POS AREA**

**36.00**

**NEG AREA**

**0.00**

**---**

**LIVE LOAD AND RATING CALCULATIONS---IMPACT FACTOR = 0.000 (COMP.) = 0.270 (TENS.)**

**INVENTORY**

**16000.**

**12938.**

**163.0**

**151.6**

**57.6**

**105.4**

**209.2**

**12.000**

**12.000**

**10.00**

**11.72**

**157**

**282**

**5.00**

**3.66**

**4.91**

**10.19**

**156**

**282**

**5.00**

**0.00**

**R**

**0.8**

**---**

**LIVE LOAD AND RATING CALCULATIONS---IMPACT FACTOR = 0.000 (COMP.) = 0.270 (TENS.)**

**INVENTORY**

**16000.**

**12938.**

**163.0**

**151.6**

**86.4**

**76.6**

**238.0**

**12.000**

**12.000**

**10.00**

**11.72**

**157**

**282**

**5.00**

**3.66**

**4.91**

**10.19**

**156**

**282**

**5.00**

**0.00**

**R**

**0.8**

**---**

**LIVE LOAD AND RATING CALCULATIONS---IMPACT FACTOR = 0.000 (COMP.) = 0.270 (TENS.)**

**INVENTORY**

**16000.**

**12938.**

**163.0**

**151.6**

**57.6**

**105.4**

**209.2**

**14.422**

**14.422**

**3.00**

**3.24**

**2**

**37**

**0.93**

**0.94**

**3.40**

**2.69**

**2**

**37**

**0.93**

**0.00**

**R**

**0.8**

10A.38
### Member Influence Lines

<table>
<thead>
<tr>
<th>LOAD ON</th>
<th>X-DIST (FT.)</th>
<th>0.00</th>
<th>24.00</th>
<th>36.00</th>
<th>60.00</th>
<th>POS AREA</th>
<th>10.82</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOWER CHORD Y-ORDINATE</td>
<td>0.00</td>
<td>0.72</td>
<td>-0.72</td>
<td>0.00</td>
<td>NEG AREA</td>
<td>10.82</td>
<td></td>
</tr>
</tbody>
</table>

### Allowable Stress / Member Capacity / Axial Force on Member Due to Dead Load / Available Capacity for LL+IMP

| INVENTORY | 16000. | 0. | 45.0 | 0.0 | 43.0 | 0.0 |
| OPERATING | 22500. | 60.5 | 0.0 | 60.5 | 0.0 |

### Live Load and Rating Calculations—Impact Factor = 0.300 (TENS.)

<table>
<thead>
<tr>
<th>LOAD ON</th>
<th>X-DIST (FT.)</th>
<th>0.00</th>
<th>24.00</th>
<th>36.00</th>
<th>60.00</th>
<th>POS AREA</th>
<th>10.82</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOWER CHORD Y-ORDINATE</td>
<td>0.00</td>
<td>0.72</td>
<td>-0.72</td>
<td>0.00</td>
<td>NEG AREA</td>
<td>10.82</td>
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### Live Load and Rating Calculations—Impact Factor = 0.300 (TENS.)

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<tr>
<th>LOAD ON</th>
<th>X-DIST (FT.)</th>
<th>0.00</th>
<th>24.00</th>
<th>36.00</th>
<th>60.00</th>
<th>POS AREA</th>
<th>10.82</th>
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</thead>
<tbody>
<tr>
<td>LOWER CHORD Y-ORDINATE</td>
<td>0.00</td>
<td>0.72</td>
<td>-0.72</td>
<td>0.00</td>
<td>NEG AREA</td>
<td>10.82</td>
<td></td>
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### Member Influence Lines

### 14.422 14.422 8.31 8.36 30 94 4.16 1.90 3.16 7.27 27 94 3.94 0.00 R 0.8

### Member Properties

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<tr>
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<tr>
<td>D/P STRUCTURE I.D.</td>
<td>D75-085</td>
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</table>

### Detail Truss Member Data

**Cdot Bridge Rating Manual**

July 1995
UPPER CHORD  Y-ORDINATE  0.00  -1.80  0.00                           NEG AREA  54.00
LOAD  ON   X-DIST (FT.)  0.00  24.00  60.00                           POS AREA  0.00
LOWER CHORD  Y-ORDINATE  0.00  -1.80  0.00                           NEG AREA  54.00
LOAD  ON   X-DIST (FT.)  0.00  24.00  60.00                           POS AREA  0.00

1

DETAIL TRUSS MEMBER DATA

***** MEMBER PROPERTIES

----- EFFECT ----- EFFECT ----- H ----- AREA ----- IX ----- IY ----- DY ----- RX ----- RY ----- AREA ----- IX ----- IY ----- DY ----- E(Y) ----- END ----- FACT.
LENS.-X  LEYS.-Y  GROSS SECTION  NET SECTION
FT.  FT.  IN.  SQ.IN.  IN**4  IN**4  IN.  IN.  IN.  SQ.IN.  IN**4  IN**4  IN.  IN.
12.000  12.000  10.31  16.09  241  353  3.91  3.88  4.69  16.09  241  353  3.91  0.00  R  0.8

***** MEMBER INFLUENCE LINES

LOAD ON   X-DIST (FT.)  0.00  24.00  60.00                           POS AREA  0.00
LOWER CHORD  Y-ORDINATE  0.00  -1.80  0.00                           NEG AREA  54.00
LOAD ON   X-DIST (FT.)  0.00  24.00  60.00                           POS AREA  0.00
UPPER CHORD  Y-ORDINATE  0.00  -1.80  0.00                           NEG AREA  54.00

***** ALLOWABLE STRESS / MEMBER CAPACITY / AXIAL FORCE ON MEMBER DUE TO DEAD LOAD / AVAILABLE CAPACITY FOR LL+IMPACT

---
TENS  COMP  TENS  COMP  TENS  COMP  TENS  COMP
PSI  PSI  KIPS  KIPS  KIPS  KIPS  KIPS  KIPS
INVENTORY 16000.  13000.  257.4  209.2  86.4  343.8  122.8
OPERATING 22500.  15938.  163.6  118.3  360.0  448.4  170.0

***** LIVE LOAD AND RATING CALCULATIONS--IMPACT FACTOR = 0.270 (COMP.) = 0.000 (TENS.)

----- EFFECT ----- EFFECT ----- H ----- AREA ----- IX ----- IY ----- DY ----- RX ----- RY ----- AREA ----- IX ----- IY ----- DY ----- E(Y) ----- END ----- FACT.
LENS.-X  LEYS.-Y  GROSS SECTION  NET SECTION
FT.  FT.  IN.  SQ.IN.  IN**4  IN**4  IN.  IN.  IN.  SQ.IN.  IN**4  IN**4  IN.  IN.
8.000  8.000  7.31  9.46  20  95  3.65  1.48  3.17  7.27  20  95  3.65  0.00  R  0.8

***** MEMBER PROPERTIES

----- EFFECT ----- EFFECT ----- H ----- AREA ----- IX ----- IY ----- DY ----- RX ----- RY ----- AREA ----- IX ----- IY ----- DY ----- E(Y) ----- END ----- FACT.
LENS.-X  LEYS.-Y  GROSS SECTION  NET SECTION
FT.  FT.  IN.  SQ.IN.  IN**4  IN**4  IN.  IN.  IN.  SQ.IN.  IN**4  IN**4  IN.  IN.

***** MEMBER INFLUENCE LINES

LOAD ON   X-DIST (FT.)  0.00  24.00  60.00                           POS AREA  6.00
LOWER CHORD  Y-ORDINATE  0.00  -0.40  0.00                           NEG AREA  6.00
LOAD ON   X-DIST (FT.)  0.00  12.00  24.00                           POS AREA  1.50
UPPER CHORD  Y-ORDINATE  0.00  -0.40  0.00                           NEG AREA  13.50

***** ALLOWABLE STRESS / MEMBER CAPACITY / AXIAL FORCE ON MEMBER DUE TO DEAD LOAD / AVAILABLE CAPACITY FOR LL+IMPACT

---
TENS  COMP  TENS  COMP  TENS  COMP  TENS  COMP
PSI  PSI  KIPS  KIPS  KIPS  KIPS  KIPS  KIPS
INVENTORY 16000.  12500.  116.3  118.3  0.0  116.3  118.3
OPERATING 22500.  15375.  153.9  145.4  163.6  145.4

***** LIVE LOAD AND RATING CALCULATIONS--IMPACT FACTOR = 0.300 (COMP.) = 0.000 (TENS.)

----- EFFECT ----- EFFECT ----- H ----- AREA ----- IX ----- IY ----- DY ----- RX ----- RY ----- AREA ----- IX ----- IY ----- DY ----- E(Y) ----- END ----- FACT.
LENS.-X  LEYS.-Y  GROSS SECTION  NET SECTION
FT.  FT.  IN.  SQ.IN.  IN**4  IN**4  IN.  IN.  IN.  SQ.IN.  IN**4  IN**4  IN.  IN.

***** MEMBER PROPERTIES

----- EFFECT ----- EFFECT ----- H ----- AREA ----- IX ----- IY ----- DY ----- RX ----- RY ----- AREA ----- IX ----- IY ----- DY ----- E(Y) ----- END ----- FACT.
LENS.-X  LEYS.-Y  GROSS SECTION  NET SECTION
FT.  FT.  IN.  SQ.IN.  IN**4  IN**4  IN.  IN.  IN.  SQ.IN.  IN**4  IN**4  IN.  IN.

***** MEMBER INFLUENCE LINES

LOAD ON   X-DIST (FT.)  0.00  24.00  60.00                           POS AREA  6.00
LOWER CHORD  Y-ORDINATE  0.00  -0.40  0.00                           NEG AREA  6.00
LOAD ON   X-DIST (FT.)  0.00  12.00  24.00                           POS AREA  1.50
UPPER CHORD  Y-ORDINATE  0.00  -0.40  0.00                           NEG AREA  13.50

***** ALLOWABLE STRESS / MEMBER CAPACITY / AXIAL FORCE ON MEMBER DUE TO DEAD LOAD / AVAILABLE CAPACITY FOR LL+IMPACT

---
TENS  COMP  TENS  COMP  TENS  COMP  TENS  COMP
PSI  PSI  KIPS  KIPS  KIPS  KIPS  KIPS  KIPS
INVENTORY 16000.  12500.  116.3  118.3  0.0  116.3  118.3
OPERATING 22500.  15375.  153.9  145.4  163.6  145.4

***** LIVE LOAD AND RATING CALCULATIONS--IMPACT FACTOR = 0.300 (COMP.) = 0.000 (TENS.)

----- EFFECT ----- EFFECT ----- H ----- AREA ----- IX ----- IY ----- DY ----- RX ----- RY ----- AREA ----- IX ----- IY ----- DY ----- E(Y) ----- END ----- FACT.
LENS.-X  LEYS.-Y  GROSS SECTION  NET SECTION
FT.  FT.  IN.  SQ.IN.  IN**4  IN**4  IN.  IN.  IN.  SQ.IN.  IN**4  IN**4  IN.  IN.

***** MEMBER PROPERTIES

----- EFFECT ----- EFFECT ----- H ----- AREA ----- IX ----- IY ----- DY ----- RX ----- RY ----- AREA ----- IX ----- IY ----- DY ----- E(Y) ----- END ----- FACT.
LENS.-X  LEYS.-Y  GROSS SECTION  NET SECTION
FT.  FT.  IN.  SQ.IN.  IN**4  IN**4  IN.  IN.  IN.  SQ.IN.  IN**4  IN**4  IN.  IN.

***** MEMBER INFLUENCE LINES

LOAD ON   X-DIST (FT.)  0.00  24.00  60.00                           POS AREA  6.00
LOWER CHORD  Y-ORDINATE  0.00  -0.40  0.00                           NEG AREA  6.00
LOAD ON   X-DIST (FT.)  0.00  12.00  24.00                           POS AREA  1.50
UPPER CHORD  Y-ORDINATE  0.00  -0.40  0.00                           NEG AREA  13.50

***** ALLOWABLE STRESS / MEMBER CAPACITY / AXIAL FORCE ON MEMBER DUE TO DEAD LOAD / AVAILABLE CAPACITY FOR LL+IMPACT

---
TENS  COMP  TENS  COMP  TENS  COMP  TENS  COMP
PSI  PSI  KIPS  KIPS  KIPS  KIPS  KIPS  KIPS
INVENTORY 16000.  12500.  116.3  118.3  0.0  116.3  118.3
OPERATING 22500.  15375.  153.9  145.4  163.6  145.4

***** LIVE LOAD AND RATING CALCULATIONS--IMPACT FACTOR = 0.300 (COMP.) = 0.000 (TENS.)

----- EFFECT ----- EFFECT ----- H ----- AREA ----- IX ----- IY ----- DY ----- RX ----- RY ----- AREA ----- IX ----- IY ----- DY ----- E(Y) ----- END ----- FACT.
LENS.-X  LEYS.-Y  GROSS SECTION  NET SECTION
FT.  FT.  IN.  SQ.IN.  IN**4  IN**4  IN.  IN.  IN.  SQ.IN.  IN**4  IN**4  IN.  IN.

***** MEMBER PROPERTIES

----- EFFECT ----- EFFECT ----- H ----- AREA ----- IX ----- IY ----- DY ----- RX ----- RY ----- AREA ----- IX ----- IY ----- DY ----- E(Y) ----- END ----- FACT.
LENS.-X  LEYS.-Y  GROSS SECTION  NET SECTION
FT.  FT.  IN.  SQ.IN.  IN**4  IN**4  IN.  IN.  IN.  SQ.IN.  IN**4  IN**4  IN.  IN.
### Upper Chord

**Y-Ordinate**
- 0.00, -0.72, 0.72, 0.00

**Neg Area**
- 10.82

**Load On**
- X-Dist (ft.)
- 0.00, 24.00, 36.00, 60.00

**Pos Area**
- 10.82

### Lower Chord

**Y-Ordinate**
- 0.00, -0.72, 0.72, 0.00

**Neg Area**
- 10.82

**Load On**
- X-Dist (ft.)
- 0.00, 24.00, 36.00, 60.00

**Pos Area**
- 10.82

---

### Allowable Stress / Member Capacity / Axial Force on Member Due to Dead Load / Available Capacity for LL+Impact

#### Tensile
- Comp
- Tensile Comp

#### PSI
- Kips
- Kips

#### Inventory
- 16000.0
- 43.0
- 0.0

#### Operating
- 22500.0
- 60.5
- 0.0

---

### Live Load and Rating Calculations

**Impact Factor**
- 0.000 (Comp.)
- 0.300 (Tens.)

**Live Load**
- Kips
- Ft.

**Load on**
- X-Dist (ft.)
- 0.00, 24.00, 36.00, 60.00

**Pos Area**
- 0.00

---

### Member Properties

#### Truss Member I.D.
- U02U03

#### Date
- 08/07/95

#### Detail Truss Member Data

---

### Allowable Stress / Member Capacity / Axial Force on Member Due to Dead Load / Available Capacity for LL+Impact

#### Tensile
- Comp
- Tensile Comp

#### PSI
- Kips
- Kips

#### Inventory
- 16000.0
- 43.0
- 0.0

#### Operating
- 22500.0
- 60.5
- 0.0

---

### Live Load and Rating Calculations

**Impact Factor**
- 0.070 (Comp.)
- 0.000 (Tens.)

**Live Load**
- Kips
- Ft.

**Load on**
- X-Dist (ft.)
- 0.00, 24.00, 36.00, 60.00

**Pos Area**
- 0.00

---

### Member Properties

#### Truss Member I.D.
- U03L03

#### Date
- 08/07/95

#### Detail Truss Member Data

---

### Allowable Stress / Member Capacity / Axial Force on Member Due to Dead Load / Available Capacity for LL+Impact

#### Tensile
- Comp
- Tensile Comp

#### PSI
- Kips
- Kips

#### Inventory
- 16000.0
- 12500.0
- 116.3
- 118.3

#### Operating
- 22500.0
- 15957.5
- 163.6
- 145.4

---
***** LIVE LOAD AND RATING CALCULATIONS--IMPACT FACTOR = 0.300 (COMP.) - 0.300 (TENS.)

<table>
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<tr>
<th>LIVE LOAD</th>
<th>LL+IMP</th>
<th>LL</th>
<th>LOC.NO.</th>
<th>DIR</th>
<th>LL+IMP</th>
<th>LL</th>
<th>LOC CONC</th>
<th>RATING FACT.</th>
<th>CAPACITY</th>
<th>VALUE</th>
<th>SAFE LOAD</th>
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<tr>
<td>INV HS20 T</td>
<td>25.4</td>
<td>19.5</td>
<td>64.000</td>
<td>R</td>
<td>19.9</td>
<td>15.3</td>
<td>36.000</td>
<td>4.579</td>
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<td>HS 91.6</td>
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<tr>
<td>C</td>
<td>25.4</td>
<td>19.5</td>
<td>-4.000</td>
<td>L</td>
<td>19.9</td>
<td>15.3</td>
<td>24.000</td>
<td></td>
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<td></td>
<td></td>
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</table>

OPER HS20 T 25.4 19.5 64.000 R 19.9 15.3 36.000 6.440 231.8 HS128.8
C 25.4 19.5 -4.000 L 19.9 15.3 24.000

DETAIL DATA FOR FLEXURAL MEMBER

DATE 08/07/95

D/P STRUCTURE I.D. D75-085
MEMBER I.D.--B01
MATERIAL--RS

LL DIST. FACT. = 12.000

CODE DL DUE TO SUPERIMPOSED DISTRIBUTED DL(S)
S MEM. WEIGHT LENGTH DISTRIBUTED**************
NO. FT. NO. FT. LT RT P B LBS/FT LBS/FT NO. LBS/FT LBS/FT FT. FT. NO. KIPS FT.
1 25.000 1 25.000 01 01 108.1 108.1
1 2.3 0.875
1 3.3 3.458
1 3.3 6.042
1 3.3 8.625
1 3.3 11.208
1 3.3 13.792
1 3.3 16.375
1 3.3 18.958
1 3.3 21.542
1 2.3 24.125

CHECK POINTS RATED--
1

DETAIL DATA FOR FLEXURAL MEMBER

DATE 08/07/95

D/P STRUCTURE I.D. D75-085

MEMBER I.D.--SS1

MATERIAL--SS

NOT SYMMETRICAL

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<th>VAR</th>
<th>SUPERIMPOSED DISTRIBUTED DL(S)</th>
<th>SUPERIMPOSED CONCENTRATED DL(S)</th>
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<tr>
<td></td>
<td>LL DIST. FACT. = 0.574</td>
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| NO. SPANS = 1

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<p>| CHECK POINTS RATED-- |</p>
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<th>SPAN</th>
<th>DIS FIRM FUNC</th>
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<td>1</td>
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DETAIL DATA AT MOMENT CHECK POINT FOR STRUCTURAL STEEL FLEXURAL MEMBER

DATE 08/07/95

D/P STRUCTURE I.D. D75-085

MEMBER I.D.--SS1

C.P. LOCATION

1.47

***** SECTION PROPERTIES IN RANGE 1 OF SPAN 1

--- NET AREA ---

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<th>IX</th>
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<th>H AREA</th>
<th>BEND</th>
<th>BEND</th>
<th>+ BEND - BEND (BOT)</th>
<th>+ BEND - BEND</th>
<th>+ BEND - BEND</th>
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<tbody>
<tr>
<td>IN. SQ.IN.</td>
<td>IN. SQ.IN.</td>
<td>IN. SQ.IN.</td>
<td>IN**4</td>
<td>IN**4</td>
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<tr>
<td>31.77</td>
<td>31.77</td>
<td>31.77</td>
<td>4461.0</td>
<td>4461.0</td>
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<td>POST VEH2</td>
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<tr>
<td>POST VEH3</td>
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<table>
<thead>
<tr>
<th>TOTAL DL</th>
<th>AVAIL. CAPAC. FOR LL+IMPACT</th>
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</thead>
<tbody>
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1

DETAIL DATA AT MOMENT CHECK POINT FOR STRUCTURAL STEEL FLEXURAL MEMBER

DATE 08/07/95

D/P STRUCTURE I.D. D75-085

MEMBER I.D.--SS1

C.P. LOCATION

1.47

***** SECTION PROPERTIES IN RANGE 1 OF SPAN 1

--- NET AREA ---

<table>
<thead>
<tr>
<th>GROSS</th>
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### Section Properties in Range 1 of Span 1

<table>
<thead>
<tr>
<th>Gross</th>
<th>IX</th>
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<th>C</th>
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</thead>
<tbody>
<tr>
<td>H</td>
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### Influence Line (Simple Span)

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<tr>
<th>X-DIST (FT.)</th>
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<th>GIRDER MODULUS</th>
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### Allowable Moment Capacity

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<tr>
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<th>Bottom</th>
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<tbody>
<tr>
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<td>FT-KIPS</td>
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### Ordinates of and Areas Under Influence Line (Continuous Span)

<table>
<thead>
<tr>
<th>Span</th>
<th>Post Veh 1</th>
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<th>Post Veh 3</th>
<th>Post Spec</th>
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### Live Load and Rating Calculations

<table>
<thead>
<tr>
<th>Membrane</th>
<th>Span</th>
<th>Dis Frm L</th>
<th>DL</th>
<th>SDL</th>
<th>LL+IMP</th>
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<th>Dir</th>
<th>AXLE</th>
<th>LL+IMP</th>
<th>LOC.COMC</th>
<th>LOC.COMC</th>
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<th>Rating</th>
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