

SECTION 9B

POST-TENSIONED CONCRETE GIRDER BRIDGES

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9B-1 INTRODUCTION TO RATING POST-TENSIONED CONCRETE GIRDER BRIDGES

This section, with section 1, presents the policies and guidelines for rating post-tensioned concrete girder bridges.

The types of girders covered by this section include cast-in-place, post-tensioned girders as described below:

- A. CBGP - Concrete Box Girder Prestressed
- B. CSGCP - Concrete Slab and Girder Continuous Prestressed
- C. CSGP - Concrete Slab and Girder Prestressed
- D. CBGCP - Concrete Box Girder Continuous
Prestressed

9B-2 POLICIES AND GUIDELINES FOR RATING POST-TENSIONED CONCRETE GIRDER BRIDGES

I. GENERAL

- A. It is recommended that the rater use the FRAME computer program (CALFRAME) also called BDS to analyze post-tensioned girders. Refer to subsection 9-3 and the FRAME (BDS) users' manual for guidelines on the use of this program.
- B. The rater will be responsible for determining whether stress-relieved or low-relaxation strands were used in the bridge. If it is not possible to determine what type of strand was used, then the rater is to assume that stress-relieved strands were used prior to December, 1983, and low-relaxation strands thereafter. Post-tensioned concrete girder bridges with considerable horizontal curvature, skew, or other influences which increases the amount of stress/strain on the structure, may be modeled as simple, straight beams on pin or roller supports. The FRAME program (or BDS) output results can then be supplemented by hand calculations to account for these effects, as necessary.

II. GIRDERS REQUIRING RATING

- A. Interior Girders - A rating is required for the critical interior girder. More than one interior girder may require an analysis due to variation in span length, girder size, girder spacing, number of post-tensioning strands, differences in loads or moments, etc.
- B. Exterior Girders - An exterior girder shall be rated under the following guidelines.
 - 1. When the section used for an exterior girder is different from the section used for an interior girder.
 - 2. When the overhang is greater than $S/2$.
 - 3. When the rater determines the rating would be advantageous in analyzing the overall condition of a structure.
- C. In lieu of rating individual girders, the rater may use the entire superstructure cross-section for the rating analysis.

III. CALCULATIONS

- A. A set of calculations, separate from computer output, shall be submitted with each rating. These calculations shall include derivations for dead loads, derivations for live load distribution factors, and any other calculations or assumptions used for rating. The rater may also indicate whether stress-

relieved or low-relaxation strands were used in the rating calculations.(may not make much difference except for balanced cantilever segmental).

The examples in Section 9B-5 of this manual show the minimum calculations required to rate a post-tensioned concrete girder bridge. These calculation sheets are to be filed in the structure folder.

B. 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 applied after a cast-in-place concrete deck has cured shall be distributed equally to all girders and, when applicable, treated as composite dead loads. Examples include asphalt curbs, sidewalks, railing, etc.
3. Use 7 psf (or as appropriate per Colo. Standard Specs & Design manual)for the unit weight of formwork for a distance equal to center-to-center of exterior girder measured along the top slab it is for stay in place forms. For closed cell construction, such as cast-in-place concrete box girders. No additional weight will be used for stay-in-place steel deck forms.
4. Dead loads applied before a cast-in-place concrete deck has cured shall be distributed to the applicable individual supporting girders and treated as noncomposite loads. Examples of this type of dead load are deck slabs, girders, diaphragms, and fillets. In the case of continuous shoring these dead loads are typically applied at the time of the post-tensioning.
5. The method of applying dead loads due to utilities is left to the rater's discretion.

C. Continuous Bridges

Secondary moment effects due to post-tensioning shall be included in rating calculations.

IV. REPORTING RATINGS

The rater and checker shall complete the rating documentation as described in Section 2, of this manual. The rater shall include the Batch I.D, computer runs and all relevant information for the structure being rated.

9B-3 GUIDELINES FOR USING STAFF BRIDGE COMPUTER PROGRAMS

- I. CODING FRAME (CALFRAME "BDS")
 - A. Composite dead loads are coded as "Trial 01" loads.
 - B. Noncomposite dead loads are coded as "Trial 00" loads except that the program will calculate dead load moments due to slabs and girders from the coded structure geometry.
 - C. When using FRAME and coding prestressed data, the jacking force shown on the plans is to be entered into the P-JACK columns of card type 600 (7315 for the old FRAME program) when rating the entire cross-section. Additionally, a note similar to the following may appear in the plans, P-JACK SPECIFIED AT THE JACKING ENDS INCLUDES FRICTION AND ELASTIC SHORTENING LOSSES AND PROVISIONS FOR AN ADDITIONAL XX KSI IN LONG TERM LOSS IN STRESS". The value XX from this note should be coded into the LOSSES column of card type 600 (7315). For the long term losses, the rater has the option to use AASHTO's lump sum losses or calculate them based on AASHTO's loss equations.

NOTE:

Cal-Frame (BDS) program uses your input numbers for sorting purposes, therefore (0.00 is not taken as equal to 00.00 or 6.0 and 6.00 may not be interpreted the same) it may produce errors in the output when a consistent decimal format is not followed. Specific data should be repeated for each member on each input card when it is different from default values.

II. CONTINUOUS BRIDGES

When using FRAME, the secondary moment(s) should be calculated using the program output as shown in the examples.

9B.4 RATING POST TENSIONED CONCRETE GIRDER BRIDGES DESIGNED By
LOAD FACTOR

All POSTENSIONED structures should be checked for serviceability requirements at the inventory level and checked for strength requirements for both inventory and operating levels, All as stated in the AASHTO Design Specifications (Article 9.17). The inventory rating value shall be the smaller of the serviceability or the strength requirement rating results. The operating shall be $5/3$ of the strength requirement rating for all LFD operating ratings When checking the serviceability limit state the DL and the LL are unfactored in the rating equation.

9B-5 POST-TENSIONED CONCRETE GIRDER BRIDGE RATING EXAMPLES

This section includes examples for rating of the Post-Tensioned bridges that are already under service. The examples are structures located on interstate 76 and 70.

9B-5a CSGCP EXAMPLE

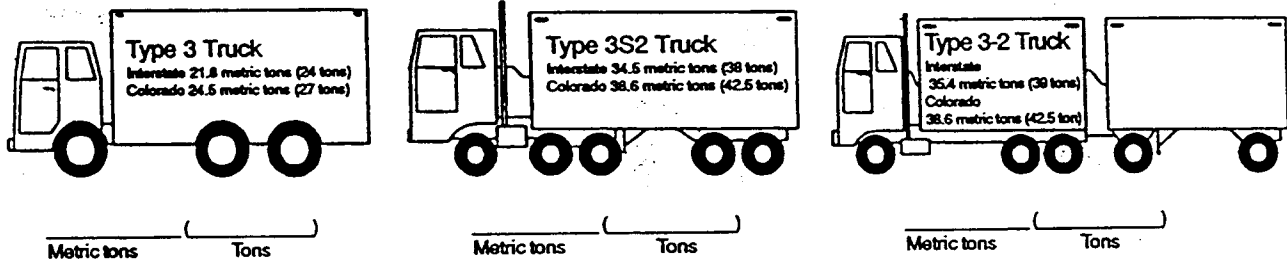
This is a 3 span Concrete Slab Girder Continuous Post-Tensioned structure. It consists of three horizontal members and two vertical members. Members have left and right end joint associated with them and are connected together by specifying the appropriate joint numbers. BDS or the new version of California Frame program is used to model the structure. The Colorado Permit Truck with (8) Axles for a total of 192,000 lbs (96 tons) is utilized for the purpose of Color coding of this structure and as a means to provide an example.

COLORADO DEPARTMENT OF TRANSPORTATION LOAD FACTOR RATING SUMMARY	Structure # E-16-IN
	State highway # 76
Rated using Asphalt thickness: 101.6 mm (4 in.) <input type="checkbox"/> Colorado legal loads <input checked="" type="checkbox"/> Interstate legal loads	Batch I.D. J83005
	Structure type CSGCP
	Parallel structure # E-16-10

Structural member	GIRDER	SLAB		
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Metric tons (Tons)

Inventory	34.0 (37.5)	34.4 (37.9)	()	()
Operating	59.4 (65.5)	57.4 (63.2)	()	()
Type 3 truck	()	()	()	()
Type 3S2 truck	()	()	()	()
Type 3-2 truck	()	()	()	()
Permit truck	87.8 (96.8)	()	()	()



Comments

PROJ I76-1(84)

Designated color for overload map: WHITE

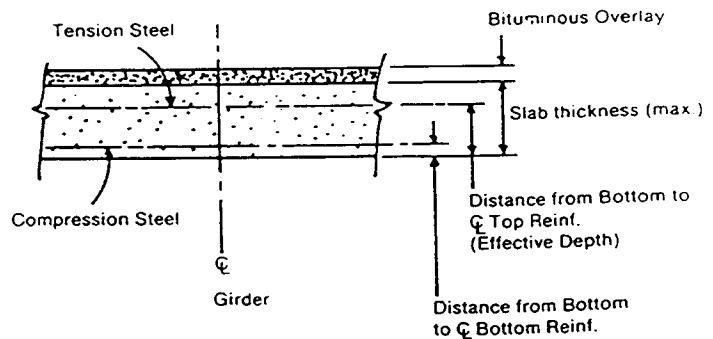
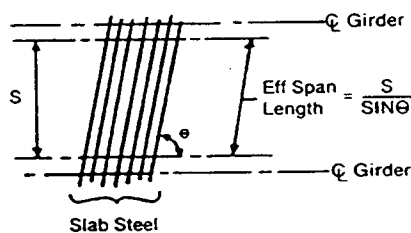
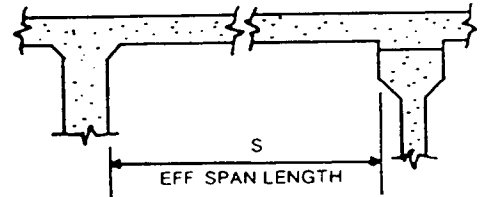
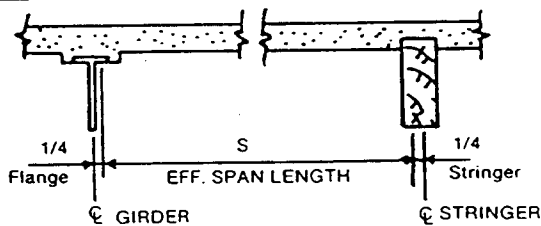
Based on rating for the permit Truck @ operating.

Rated by Rater's Signature	Date Date	Checked by Checker's Signature	Date Date
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DEPARTMENT OF HIGHWAYS
 DIVISION OF HIGHWAYS
 STATE OF COLORADO
 DOH Form 709
 July, 1985

CONCRETE SLAB RATING

DESCRIPTION	INPUT	UNITS	CARD IMAGE COLS.
LOAD TYPE: 1 = Colo. Trucks 2 = Interstate			1
STRUCTURE NUMBER:	E-16-IN		2 - 8
RATER:	M.M.		9 - 11
HIGHWAY NUMBER:	76		12 - 14
BATCH I.D.:	I 83005		15 - 20
COMMENTS:	E-16-ID PAR & SIMILAR		21 - 41
EFFECTIVE SPAN LENGTH:	92.00	FEET	42 - 46
ACTUAL SLAB THICKNESS:	8.500	INCHES	47 - 51
EFFECTIVE DEPTH:	5.625	INCHES	52 - 56
TOP STEEL AREA:	0.96	In ² /Ft	57 - 59
ASPHALT OVERLAY:	4.00	INCHES	60 - 63
INV Fc (f'c load factor):	45.00	P.S.I.	64 - 67
INV Fs (Fy load factor):	40.000	P.S.I.	68 - 72
INV MODULAR RATIO: (load factor method: leave blank)		Es/Ec	73 - 74
DEPTH TO BOTT. REIN.:	1.38	INCHES	75 - 77
BOTT. STEEL AREA:	0.96	In ² /Ft	78 - 80



SLAB RATING Version 1.0
DATE: 95/02/24

STRUCTURE NO. E-16-IN RATER: MM STATE HWY NO. = 76
BATCH ID= I83005 DESCRIPTION: E-16-IO PAR & SIMILAR
LOAD FACTOR RATING-COMP STEEL NOT USED---LOAD FACTOR RATING-COMP STEEL NOT USED

INPUT DATA

EFF. SPAN(FT)= 9.200 EFF. DEPTH(IN)= 5.625
REINF. (SQ.IN)= .96
SLAB TK(IN)= 8.500 WEARING SURFACE(IN)= 4.00
CONC. STRENGTH(PSI) INV= 4500. OPER= 4500.
STEEL YIELD (PSI) INV= 40000. OPER= 40000.
N= 8.
D1= 1.38 ASI= .96

DEAD LOAD MOMENT 1.31 K-FT
LL+I MOMENT 5.82 K-FT
GROSS WEIGHT 36.0 TONS

INVENTORY OPERATING
ACTUAL CONCRETE STRESS (PSI) 1222.95 1895.24
ACTUAL REINF. STEEL STRESS (PSI) 19365.92 30011.93
ACTUAL COMP. STEEL STRESS (PSI) 5264.52 8158.58
MEMBER CAPACITY (K-FT) 15.00 15.00
MEMBER CAPACITY (LL+I) (K-FT) 13.30 13.30

RATING (TONS) 37.94 63.23

Rater's Signature
& Date
Checker's Signature
& DATE

COLORADO DEPARTMENT OF TRANSPORTATION
DESIGN COMPUTATIONS

SUPER STRUCTURE INPUT TO CAL FRAME (BDS)

NON COMPOSITE DEAD LOAD

ASPHALT:

$$(38) \left(\frac{4}{12}\right) (144 \text{ lb/ft}^3) = 1824 \text{ lb/ft}$$

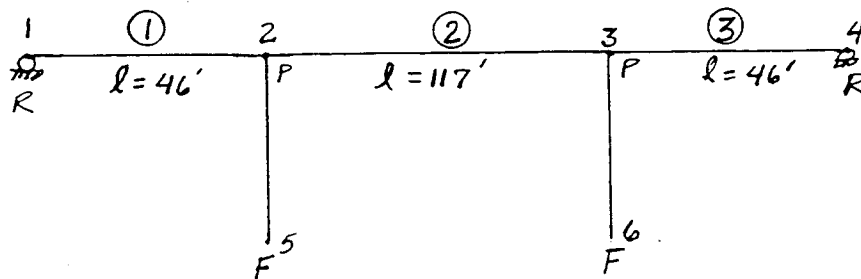
RAIL (TYPE 4B):

$$(2) \left(0.109 \text{ yd}^3/\text{ft}\right) \left(\frac{3 \text{ ft}}{1 \text{ yd}}\right)^3 (150 \text{ lb/ft}^3) = 882.9 \text{ lb/ft}$$

TOTAL DL N.C. : $1824 + 882.9 = \underline{\underline{2.707}} \text{ KLF.}$

FRAME DESCRIPTION:

* STRESS RELIEVED STRANDS



$E_c = w^{1.5} \cdot 33 \sqrt{f'_c}$
 $w = 145 \text{ lb/ft}^3$; $f'_c = 4500 \text{ PSI}$
 $E_c = 3865 \text{ KSI}$ ←

AASHTO

LLDF

$\frac{\# \text{ GIR} \times \text{GIR SPACING}}{12} = \frac{3.33}{12}$ ← CONTROLS
 or
 $\frac{\text{CURB-CURB}}{12} = \frac{38}{12} = 3.17$

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COLORADO DEPARTMENT OF TRANSPORTATION
DESIGN COMPUTATIONS

INVENTORY RATING (STRESSES):

STRESSES FROM CALFRAM (BDS) RUN PG. 14, 16, 38, 46

$$RATING = \frac{CAP - A_1 DL}{A_2 (LL+I)} \quad A_1 = A_2 = 1$$

$$+CAP = 0.4 f'_c = 0.4 (4500) = 1800 \text{ PSI} \quad \left\{ \begin{array}{l} \text{AASHTO} \\ 9.15.2.2 \end{array} \right.$$

$$-CAP = 6 \sqrt{f'_c} = 6 \sqrt{4500} = -402 \text{ PSI}$$

	POINT	MOM	PSI			TON
			LL+I _{HS20}	DL+P	CAPACITY	RATING INV.
TOP	2.5	(+)	+452	+727	+1800	85.5
BOTT.	2.5	(+)	-1255	+904	-402	37.5

$$INV_{TOP} = \frac{1800 - 727}{452} * 36 = 85.5 \text{ TON.}$$

$$INV_{BOT} = \frac{-402 - 904}{-1255} * 36 = 37.5 \text{ TON}$$

	POINT	MOM	PSI			TON
			LL+I _{HS20}	DL+P	CAPACITY	RATING INV.
TOP	3.0	(-)	-303	+441	-402	100.0
BOTT.	3.0	(-)	+735	+949	+1800	41.7

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COLORADO DEPARTMENT OF TRANSPORTATION
DESIGN COMPUTATIONS

$$INV_{TOP} = \frac{-402 - 441}{-303} * 36 = 100.0 \text{ TONS.}$$

$$INV_{BOT.} = \frac{1800 - 949}{735} * 36 = 41.7 \text{ TONS.}$$

INVENTORY & OPERATING RATINGS (LOAD FACTOR MOMENTS):

FROM CALFRAME (BDS) PG. 8, 11, 14, 16, 30.

RATING @ 2.5 LOCATION

$$A_s^* = 33.9 \text{ in}^2$$

$$A_s \text{ in bottom half of section} = 7.4 \text{ in}^2$$

$$A_s \text{ in top half of section} = 27.3 \text{ in}^2$$

$$M_s = P_j * (\text{DEM's ; from calframe \& interpolate for each point})$$

$$M_{s_{2.5}} = 6865 * 0.813 = 5,581.2 \text{ k-ft}$$

$$M_{s_{3.0}} = 6865 * 0.813 = 5,581.2 \text{ k-ft}$$

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COLORADO DEPARTMENT OF TRANSPORTATION
DESIGN COMPUTATIONS

POINT	K-ft				in.		TON	
	MDLØ	MDL1	MLL+I _{HBO}	M _S	d	b	INV.	OPR.
2.5	+3831	+1463	+3236	+5581.2	38	492	70.1	116.8
3.0	-8385	-3169	-4716	+5581.2	60	60	38.3	63.8

AT 2.5 Check Point

$$F_{su}^* = f'_s * \left\{ 1 - 0.5 \left[(A_s^* * f'_s) - (A_{s_TOP} - A_{s_BOT}) * f_y \right] / (f'_c * b * d) \right\}$$

$$F_{su}^* = 270 \left\{ 1 - 0.5 \left[(33.9 * 270) - (27.3 - 7.4) * 60 \right] / (4.5 * 492 * 38) \right\}$$

$$F_{su}^* = 257.23 \text{ KSI}$$

$$a = \left[F_{su}^* * A_s^* - (A_{s_TOP} - A_{s_BOT}) * f_y \right] / (0.85 f'_c b) \leq (0.3d / \beta = 13.82)$$

$$a = \left[257.23 * 33.9 - (27.3 - 7.4) * 60 \right] / (4.5 * 8.5 * 492)$$

$$a = 4.0" < 8.5" < 0.3d / \beta = 13.82$$

$$M_n = \left[A_s^* * F_{su}^* + (A_{s_BOT} * f_y) \right] * \left[d - \frac{a}{2} \right]$$

$$M_n = \left[(33.9 * 257.23) + (7.4 * 60) \right] * \left[38 - \frac{4.0}{2} \right] \div 12$$

$$M_n = 27,492.3 \text{ K-ft} \leftarrow$$

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COLORADO DEPARTMENT OF TRANSPORTATION
DESIGN COMPUTATIONS

$$INV = \frac{0.95 M_n - 1.3 (MDL\phi + MDL I) \pm 1.0 * M_S}{(2.16667 * M_{LL+I})} * 36$$

$$INV = \frac{0.95 * 27492.3 - 1.3 (3831 + 1463) - 5581.2}{2.16667 * 3236} * 36$$

INV = 70.1 TON

OPR = 5/3 (INV) = 116.8 TON

AT 3.0 check point

$$F_{su}^* = 270 \left\{ 1 - 0.5 \left[\frac{(33.9 * 270) + (27.3 - 7.4) * 60}{(4.5 * 60 * 60)} \right] \right\}$$

$F_{su}^* = 188.3 \text{ KSI}$

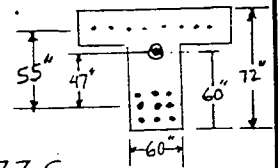
$$a = \frac{[188.2 * 33.9 + (27.3 - 7.4) * 60]}{(4.5 * 0.85 * 60)}$$

$a = 33.0 > 0.3d/\beta = 21.82 \text{ OVERREINFORCED.}$

UTILIZING COMP. STEEL & AASHTO Eq 9.22 :

$$M_n = [A_s * f_y * (d - d')] + [(0.36\beta_1 - 0.08\beta_1^2) f_c' b d^2]$$

$$M_n = [7.4 * 60 * 55] + [(0.2425) * 4.5 * 60 * 60^2] = 21,677.5 \text{ K-ft}$$



$$INV = \frac{(0.95 * 21,385.6) - 1.3 (8385 + 3169) + 5581.2}{2.1667 * 4716} * 36$$

INV = 39.3 TON ←

OPR = 5/3 * INV = 65.5 TON ← CONTROLS

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COLORADO DEPARTMENT OF TRANSPORTATION
DESIGN COMPUTATIONS

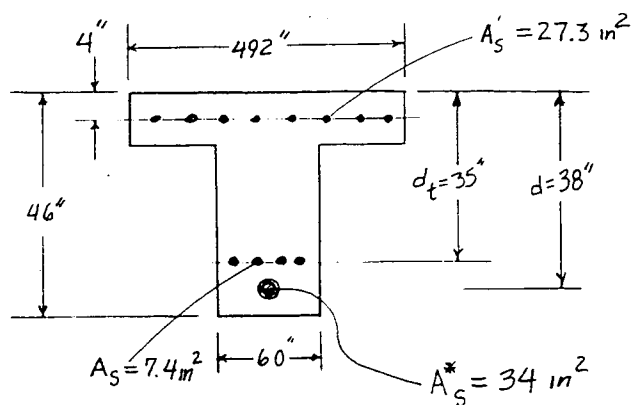
Rechecking location 2.5 (using AASHTO sections 9.17, 9.18 and 9.19)

-For flexural strength:

$$\rho^* = \frac{34}{492 \times 38} = 0.001819$$

$$\rho = \frac{7.4}{492 \times 35} = 0.00043$$

$$\rho' = \frac{27.3}{492 \times 34} = 0.001632$$



$$f'_c = 4500 \text{ PSI}$$

$$f_{sy} = f_y = 60 \text{ KSI}$$

$$f'_s = 270 \text{ KSI}$$

$$\gamma^* = 0.40 \text{ for stress relieved.}$$

$$\beta_1 = 0.85 - 0.05(f'_c - 4.0)$$

$$\beta_1 = 0.825, \quad \phi = 0.95$$

$$F_{su}^* = f'_s \left[1 - \frac{\gamma}{\beta_1} \left(\frac{\rho^* f'_s}{f'_c} + \frac{dt}{d} \rho \frac{f_y}{f'_c} \right) \right]; \quad (A_s^* f_{su}^* + A_s f_{sy}) / (0.85 f'_c b) < t \text{ OK}$$

$$F_{su}^* = 270 \left[1 - \frac{0.4}{0.825} \left(\frac{0.001819 \times 270}{4.5} + \frac{35}{38} \times 0.00043 \times \frac{60}{4.5} \right) \right] = 255.0 \text{ KSI}$$

Use non-prestress reinf. per AASHTO (9-24):

$$\left\{ \left(\frac{\rho f_{sy}}{f'_c} \right) \frac{dt}{d} + \left(\frac{\rho^* f_{su}^*}{f'_c} \right) - \left(\frac{\rho' f_y}{f'_c} \right) \leq 0.36 \beta_1 = 0.30 \right\} \Rightarrow 0.0879 < 0.3 \text{ OK}$$

$$\phi M_n = \phi \left\{ A_s^* F_{su}^* d \left[1 - 0.6 \left(\frac{\rho^* f_{su}^*}{f'_c} + \frac{dt}{d} \frac{\rho f_{sy}}{f'_c} \right) \right] + A_s f_{sy} d_t \left[1 - 0.6 \left(\frac{dt}{d} \frac{\rho^* f_{su}^*}{f'_c} + \frac{\rho f_{sy}}{f'_c} \right) \right] \right\} \text{ AASHTO 9-13a}$$

$$M_u = \phi M_n = 25530 \text{ K-ft}$$

$$\text{@ 2.5 } M_{DL} = 3831 + 1463 = 5294.0 \text{ K-ft}$$

$$M_{sec} = 5581.2 \text{ K-ft}$$

$$M_{LL+I} = 3236 \text{ K-ft}$$

$$R_{INV} = \frac{25530.0 - 1.3(5294.0) - 5581.2}{2.1667 \times 3236} \times 36 = 67.0 \text{ TON}$$

$$R_{OPR} = (67.0) \times \frac{5}{3} = 111.8 \text{ TON}$$

* ANSWERS CLOSE TO THE FIRST RESULTS.

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COLORADO DEPARTMENT OF TRANSPORTATION
DESIGN COMPUTATIONS

Rating @ 3.6 will similarly be:

$$R_{ENV} = 47 \text{ TON} \quad \& \quad R_{OPR} = 91 \text{ TON}$$

Permit truck Rating: (LL #4 BDS, Cal frame run page 29 & 31)

$$(LL+I) @ 2.5 = +5266 \text{ k-ft}$$

$$(LL+I) @ 3.0 = -9220 \text{ k-ft}$$

@ 2.5

$$R_{OPR} = \frac{25530 - 1.3(5294.0) - 5581.2}{1.3 * 5266} * 96 = 180.9 \text{ TON}$$

@ 3.0

$$R_{OPR} = \frac{20,593.6 - 1.3(11,554) + 5581.2}{1.3 * 9220} * 96 = 89.36 \text{ TON}$$

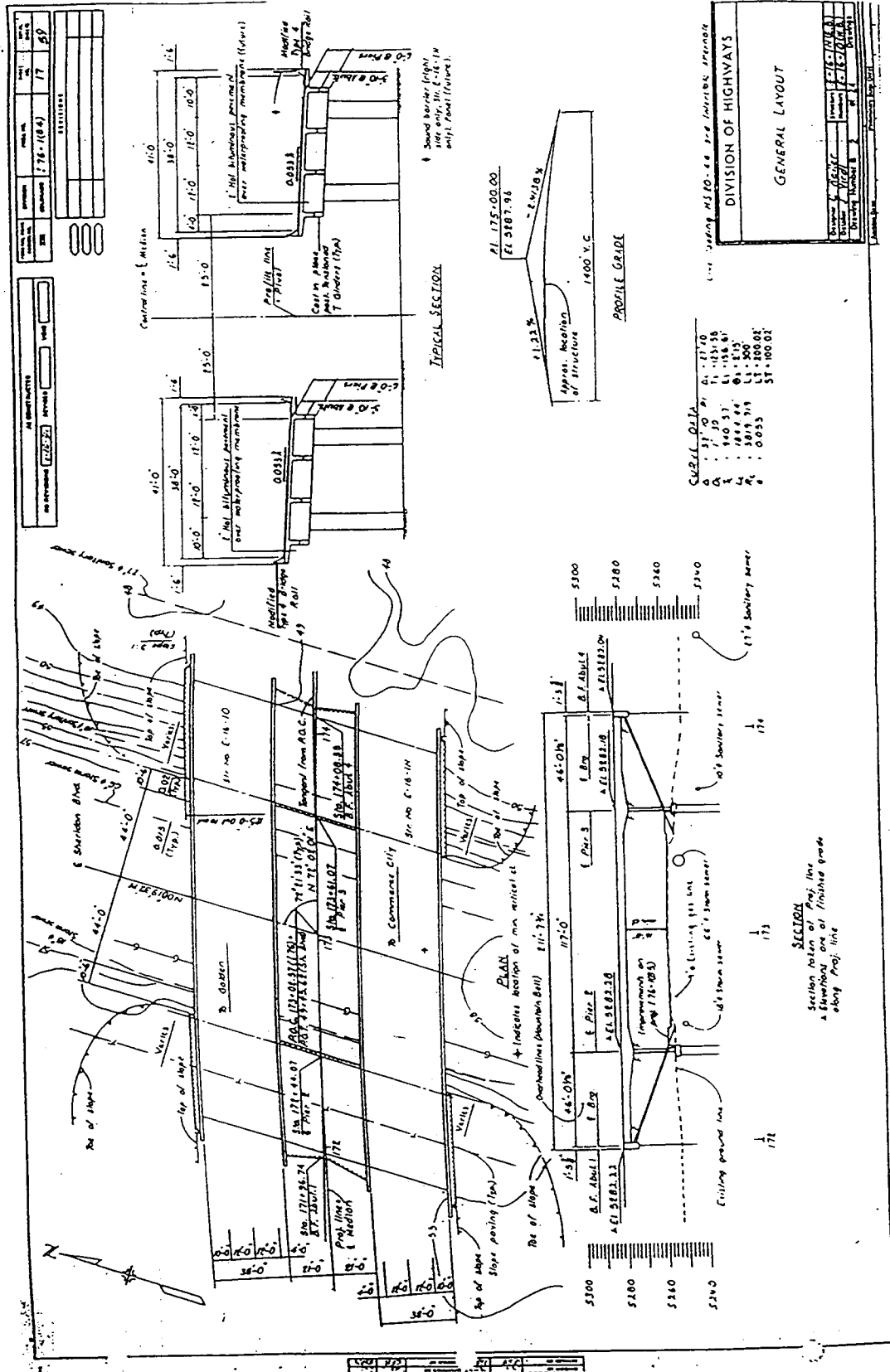
When single lane distribution applied to the permit load:

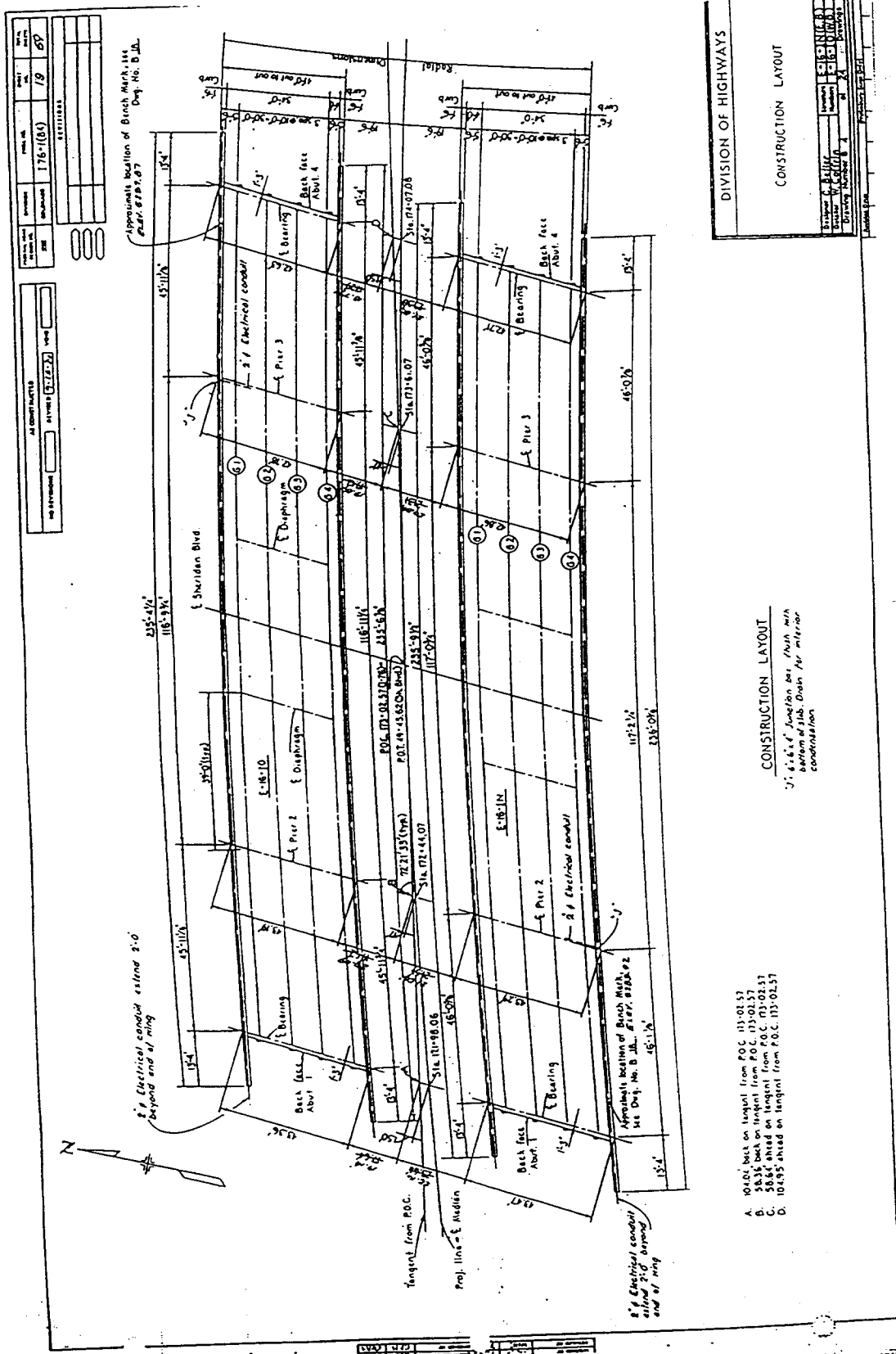
$$R_{OPR} = 89.36 * \frac{6.5}{6.0} = 96.8 \text{ TONS}$$

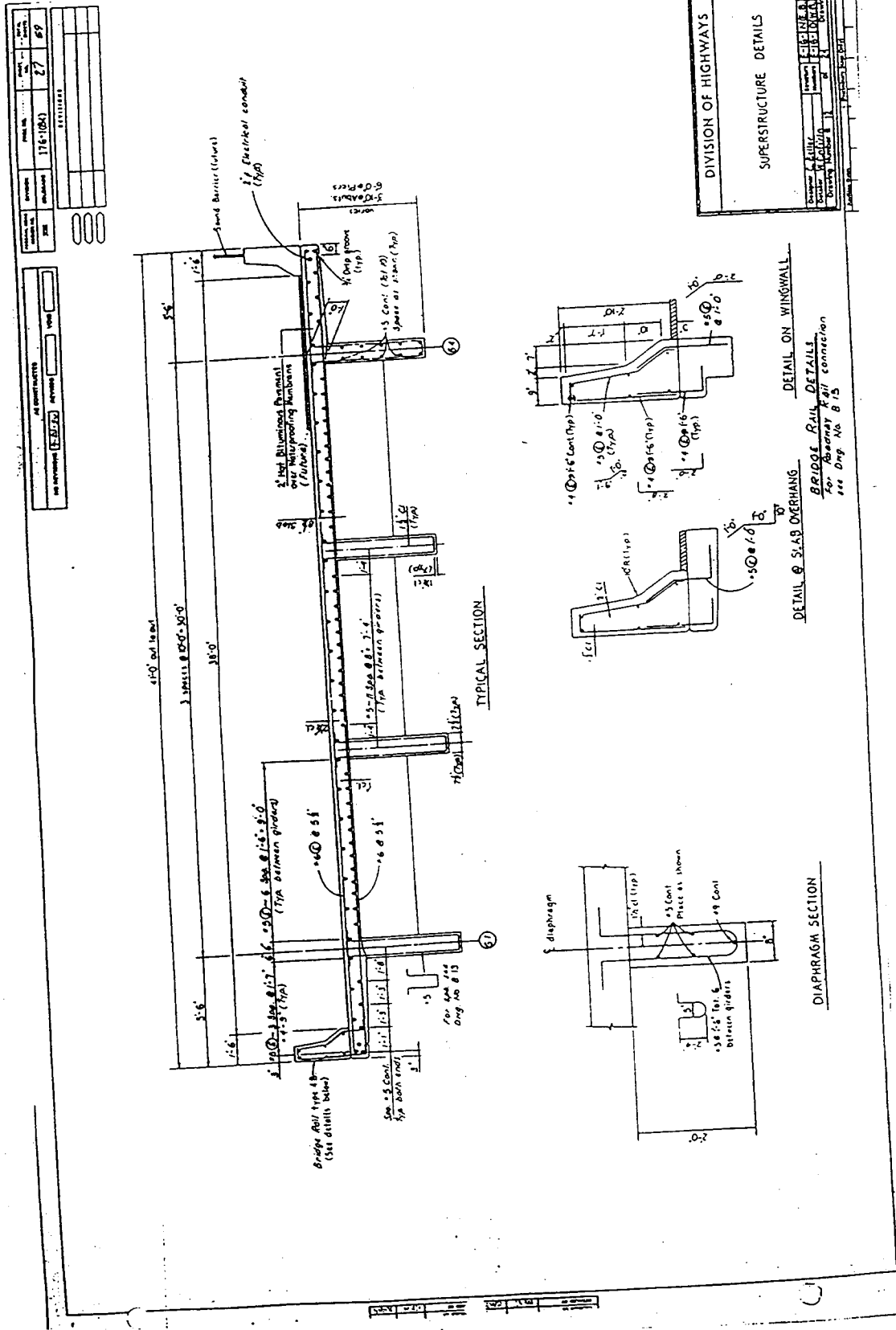
COLOR = WHITE

* note: Location 3.0 can also be rated similar to procedure used to rate location 2.5 (using AASHTO sections 9.17, 9.18, 9.19). non prestressed steel (only in compression) was added to reflect actual conditions & increase rating.

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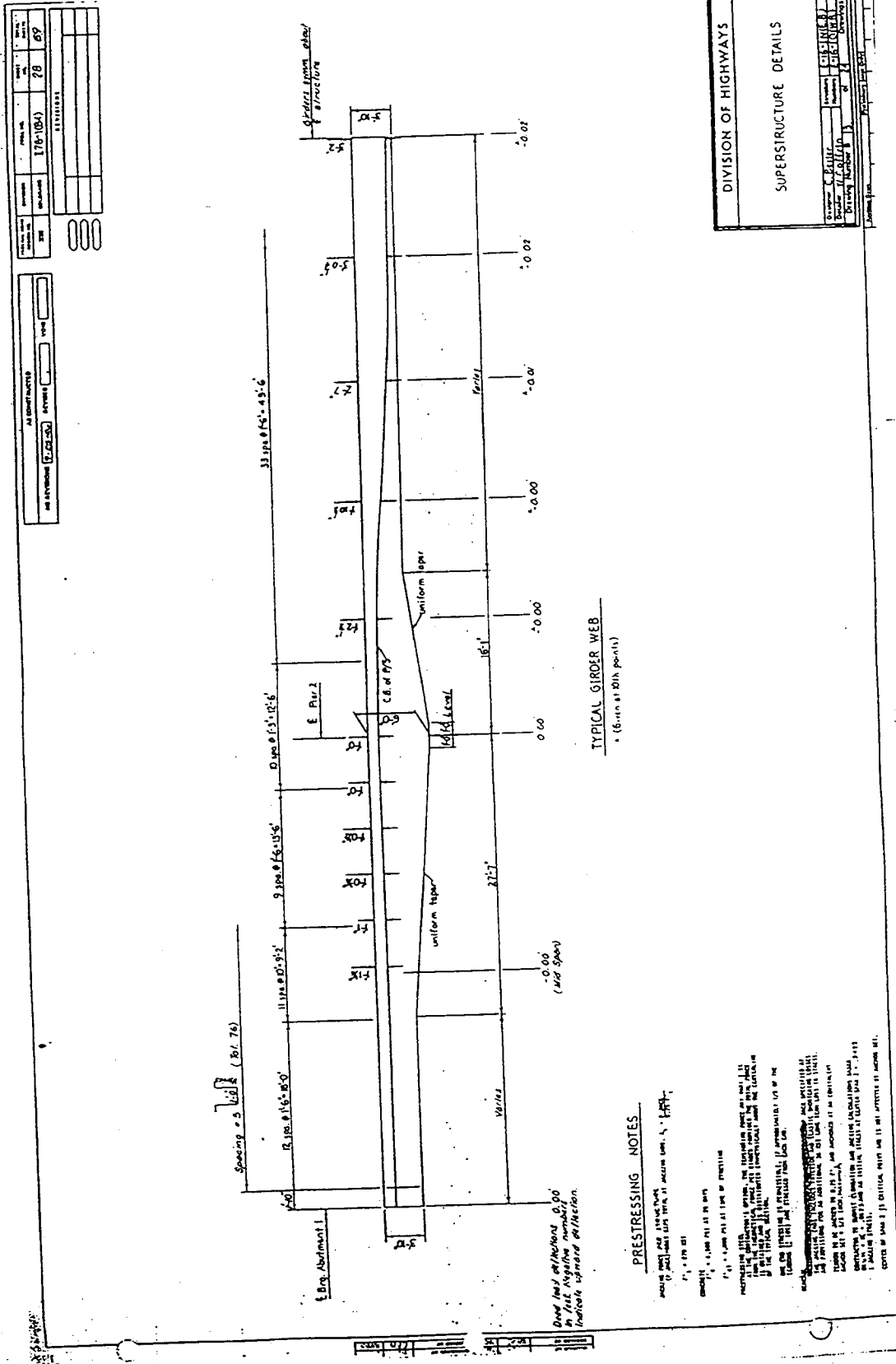






PROJECT NO.	176-106A	DATE	27 89
DESIGNER		CHECKED	
DRAWN		APPROVED	
SCALE			

DIVISION OF HIGHWAYS	
SUPERSTRUCTURE DETAILS	
DESIGNED BY	
CHECKED BY	
DRAWN BY	
DATE	



PROJECT NO.	170-10A	DATE	8/8
CONTRACT NO.	170-10A	DESIGNED BY	679
SECTION NO.		CHECKED BY	
DATE		APPROVED BY	

DIVISION OF HIGHWAYS	
SUPERSTRUCTURE DETAILS	
PROJECT NO.	170-10A
SECTION NO.	
DATE	

TYPICAL GIRDER WEB
* (Center at 10th point)

PRESTRESSING NOTES

- 1. All prestressing tendons shall be installed in accordance with the specifications for Prestressing Steel, AASHTO M 31-90.
- 2. The tendons shall be installed in the girder web in accordance with the specifications for Prestressing Steel, AASHTO M 31-90.
- 3. The tendons shall be installed in the girder web in accordance with the specifications for Prestressing Steel, AASHTO M 31-90.
- 4. The tendons shall be installed in the girder web in accordance with the specifications for Prestressing Steel, AASHTO M 31-90.
- 5. The tendons shall be installed in the girder web in accordance with the specifications for Prestressing Steel, AASHTO M 31-90.
- 6. The tendons shall be installed in the girder web in accordance with the specifications for Prestressing Steel, AASHTO M 31-90.
- 7. The tendons shall be installed in the girder web in accordance with the specifications for Prestressing Steel, AASHTO M 31-90.
- 8. The tendons shall be installed in the girder web in accordance with the specifications for Prestressing Steel, AASHTO M 31-90.
- 9. The tendons shall be installed in the girder web in accordance with the specifications for Prestressing Steel, AASHTO M 31-90.
- 10. The tendons shall be installed in the girder web in accordance with the specifications for Prestressing Steel, AASHTO M 31-90.

Input Forms

COMMENTS : 000 FORM

ACCOUNT		SORT NO.	
01	02	03	04
05	06	07	08
09	10	11	12
13	14	15	16
17	18	19	20
21	22	23	24
25	26	27	28
29	30	31	32
33	34	35	36
37	38	39	40
41	42	43	44
45	46	47	48
49	50	51	52
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61	62	63	64
65	66	67	68
69	70	71	72
73	74	75	76
77			

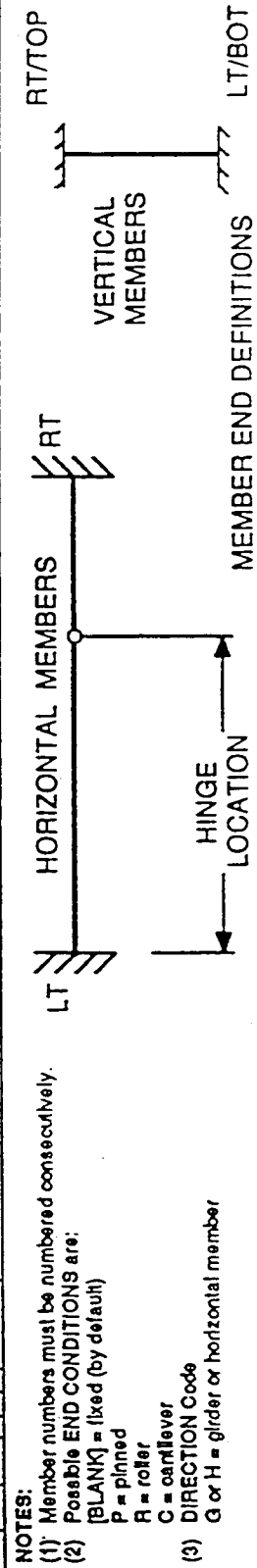
01 02 03 04 05 06 07 08
 09 10 11 12 13 14 15 16
 17 18 19 20 21 22 23 24
 25 26 27 28 29 30 31 32
 33 34 35 36 37 38 39 40
 41 42 43 44 45 46 47 48
 49 50 51 52 53 54 55 56
 57 58 59 60 61 62 63 64
 65 66 67 68 69 70 71 72
 73 74 75 76 77

STRUCTURE E-1161N is SIGCIB is SIB-76 is REPORTED I-76(1)(B4) is M.M.A.H.S.E.M.I. 2-9-95.

NOTES:
 (1) First line of comments will appear at the top of each page of output
 (2) Additional lines may be used if required

FRAME DESCRIPTION : 100 FORM

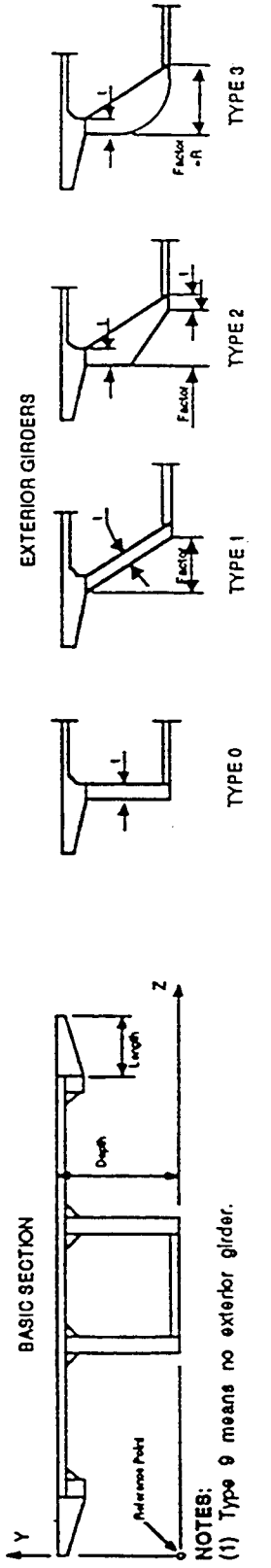
MEMBER NO.	END JOINT NO.		NO. OF CONDITION	LENGTH FT	MN I _{zz} FT	HINGE LOC. OR SUPPORT WIDTH FT	E PSI	DEAD LOAD		MEMBER PROPERTIES				RECALL		DL SIDESWAY					
	LT	RT						UNIFORM	UNIT WT	K	C	MEMBERS	REVERSE	DEFLECTIONS							
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)						(11)	(12)	(13)	(14)	(15)	(16)	(17)
01	01	02	R	460			31805		150												11010
02	02	03	H	1170																	71 72 73
03	03	04	RH	460																	74 75 76 77
04	05	02	P	200																	
05	06	03																			
06																					
07																					
08																					
09																					
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75																					
76																					
77																					



NOTES:
 (1) Member numbers must be numbered consecutively.
 (2) Possible END CONDITIONS are:
 (BLANK) = fixed (by default)
 P = pinned
 R = roller
 C = cantilever
 (3) DIRECTION CODE
 G or H = girder or horizontal member

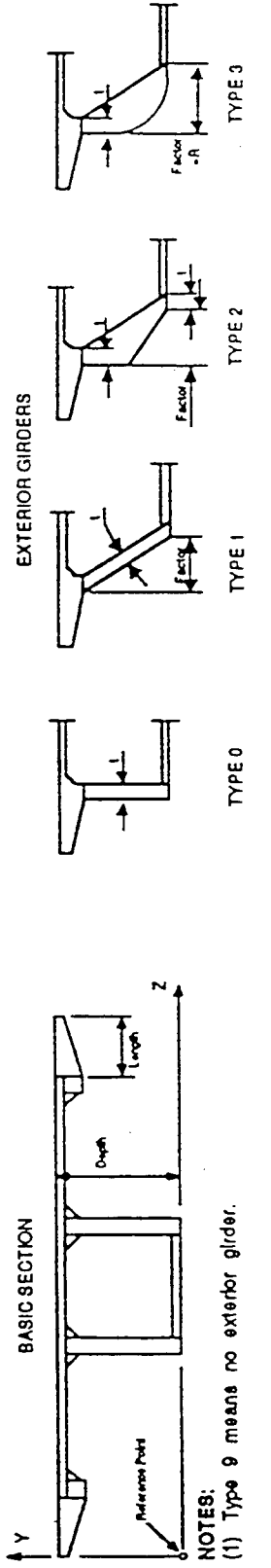
ACCOUNT SUPERSTRUCTURE DATA : 200 FORM

ACCOUNT		REF. POINT COORD.		SS. DATA		SLAB DATA		INT. GIRDERS		EXTERIOR GIRDERS						OVERHANGS						STORE SECTION					
MEMBER NO.	CROSS SEC. LOC.	X	Y	WIDTH ED-ED	DEPTH	TOP THICK.	BOTTOM THICK.	NUMBER	WEB THICK.	LEFT		RIGHT		LENGTH	LEFT		RIGHT		INT. THICK.	EXT. THICK.	LENGTH	INT. THICK.	EXT. THICK.	LENGTH	INT. THICK.	EXT. THICK.	
										TYPE	FACTOR	TYPE	FACTOR		TYPE	FACTOR	TYPE	FACTOR									TYPE
01	100	11	10	410	38	1850	000	2150	150	150	000	150	000	49	912	49	912	49	912	01	01	71	70	70	71	71	
01	18401	11	11																								
01	450	11	11	410	60	1850	000	2150	150	150	000	150	000	49	912	49	912	49	912	02	02	71	71	71	72	72	
01	46002	11	11																								
02	10002	11	11																								
02	11002	11	11																								
02	16101	11	11																								
02	100901	11	11																								
02	116002	11	11																								
02	117002	11	11																								



SUPERSTRUCTURE DATA : 200 FORM

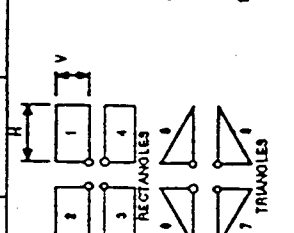
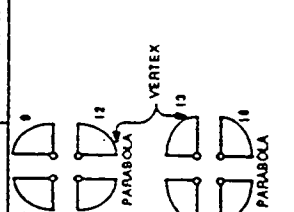
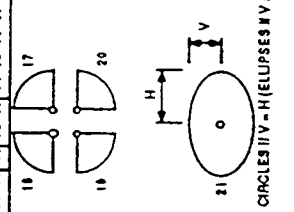
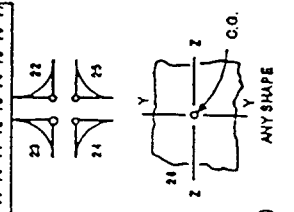
ACCOUNT			SORT NO.																																																											
E-1161-11M2			2, 0, 1, 0																																																											
01 02 03 04 05 06 07 08			78 79 80																																																											
MEMBER NO.	CROSS SEC. LOC.	REF. POINT COORD.	SS. DATA		SLAB DATA		INT. GIRDERS		EXTERIOR GIRDERS				OVERHANGS				STORE SECTION																																													
			Z	Y	WIDTH ED-ED	DEPTH	TOP THICK.	BOTTOM THICK.	NUMBER (INT. ONLY)	WEB THICK.	TYPE	WEB THICK.	FACTOR	TYPE	WEB THICK.	FACTOR			LENGTH	EXT. THICK.	INT. THICK.	LENGTH	EXT. THICK.	INT. THICK.																																						
		FT.		FT.		N.		N.		N.		N.		N.		N.		N.		N.																																										
03	101002	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77
03	11002	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77
03	127601	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77
03	46001	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77



NOTES:
 (1) Type 9 means no exterior girder.

PARTS DATA : 201 FORM

ACCOUNT		PART DIMENSION		REF. PT. COORD.			ANY SHAPE				STORE SECTION	SORT NO.
MEMBER NO.	CROSS SEC. LOC. X	RECALL	VERTICAL V OR DEPTH D	HORIZ. H	Z	Y	AREA	I2Z	E			
01 02 03 04 05 06 07 08	FT		FT	FT	FT	FT	FT	FT	KS1	06		
E-16R1M			1200	1800								
04												
04												
05												
05												



NOTES:
 (1) Enter total depth of section using part code 27

LIVE LOAD HS20-44 MEMBER DATA : 400 FORM

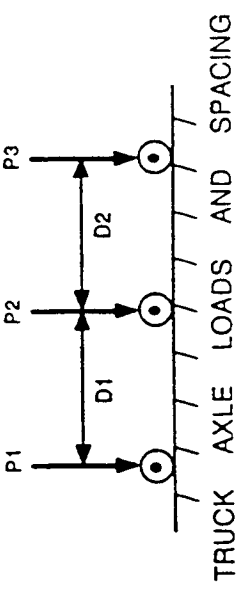
ACCOUNT												SORT NO.																																																																
E-16-11N ₁												41010																																																																
61 62 63 64 65 66 67 68												76 78 80																																																																
MEMBER NO.		NUMBER OF LIVE LOAD LANES		SUB-STRUCTURE		PLOT DATA						COMMENTS																																																																
		SUPERSTRUCTURE		STRUCTURE		RESISTING MOMENT OF UNIT STEEL																																																																						
		LT END		RT END		POSITIVE			NEGATIVE																																																																			
						MOMENT & SHEAR			INFLUENCE LINES																																																																			
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77

- NOTES:
- (1) FRAME DESCRIPTION data with the horizontal members numbered consecutively starting with 01 must accompany this data.
 - (2) MEMBER DATA - When the NUMBER OF L.L. LANES is given, it must be given for the left end of Superstructure Member 01. (Substructure Member 01 defaults to 1.0 when left blank). Thereafter, it is assumed to be constant until another entry is made.
 - (3) INFLUENCE LINES - When a "1" is entered, a plot of the influence lines will be produced along with the printed results.

LIVE LOAD TRUCK AND LANE DATA : 401 FORM

ACCOUNT		TRUCK (1 LANE)						LANE (1 LANE)			NUMBER OF LIVE LOAD LANES	COMMENTS	SORT NO. 4 0 1 7 8 7 8 8 0		
P ₁	D ₁	P ₂	D ₂	P ₃	D ₃	P ₄	UNIFORM LOAD	MOMENT RIDER	SHEAR RIDER	(7)					
KIPS	FT	KIPS	FT	KIPS	FT	KIPS	K/FT	KIPS	KIPS						
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46															
	240	40	240												
	80	140	320	300	320		0.640	180	260						

(CAN BE ADDED)



- NOTES:
- (1) LIVE LOAD DATA - For AASHTO HS20-44 Loading, leave TRUCK and LANE data blank for L.L. No. 1. When this data is given, it replaces the HS20-44 Loading.
 - (2) An entry for the NUMBER OF LIVE LOAD LANES overrides that given on MEMBER DATA (400 form).
 - (3) Data entries for L.L. No.'s 2 and 3 produce separate results in addition to L.L. No. 1

PRESTRESS DATA (1) : 600 FORM

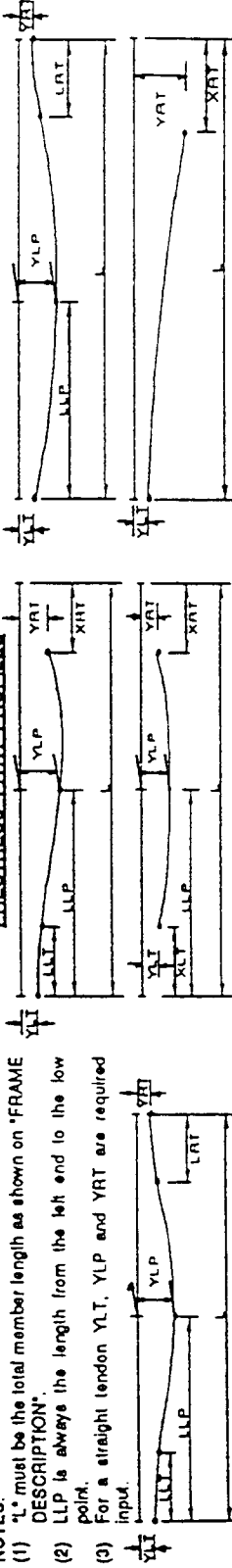
TRIAL NO.	FRAME NO.	PATH NO.	MEMBER NO.	CABLE PATH				SPECIFICATIONS							P-JACK	F _c	SHORTENING	LOSSES	RELATIVE HUMIDITY	NO LOW-LAY	POT PATHS	POT STRESSES										
				LLT	LLP	LRT	YLT	YLP	YRT	XLT	XRT	μ	K	I									% JACK	JACK END	LT	RT	ANCHOR SET	ALL TENS				
9 10 11 12 13 14 15 16 17 18 19 20 21	22 23 24 25 26 27 28 29 30 31 32 33	34 35 36 37 38 39 40 41 42 43	44 45 46 47 48 49 50 51	52 53 54 55 56 57 58 59 60 61 62 63 64	65 66 67 68 69 70 71 72	73 74 75 76 77	78 79 80	81 82 83 84	85 86 87 88 89 90 91 92 93 94	95 96 97 98 99 100 101 102 103 104	105 106 107 108 109 110 111 112	113 114 115 116 117 118 119 120																				
01	101	1	1	1.00	1.00	1.00	1.00	1.00	25	20	11	B 15	15	15	600	45	38	11														
01	101	2	2	1.00	3.17	1.00	1.00	1.00	25	20	11	B 15	15	15	600	45	38	11														
01	101	3	3	1.00	1.00	1.00	1.00	1.00	25	20	11	B 15	15	15	600	45	38	11														

SORT NO.

6 0 1 0
78 79 80

ACCOUNT
 91 02 03 04 05 06 07 08
 09 10 11 12 13 14 15 16 17 18 19 20 21

PRESTRESS PATH PROFILES



```
*****
*                               *
*           IAI-BDS             *
*       Bridge Design System    *
*                               *
*       By: Imbsen and Associates, Inc. *
*       VERSION 4.0.1   25-AUG-93   *
*                               *
*****
```

***** Licensed to: Colorado DOT *****
LISTING OF THE SORTED INPUT FILE

1
+

CARD NUMBER	1	2	3	4	5	6	7	8
1	E-16-IN, Structure	E-16-IN ;	CSGCP ;	SH-76 ;	Proj#I-761(84) ;	M.MOHSANI	2/95	000
2	E-16-IN,010102R	H 460	3865	150				100
3	E-16-IN,020203	H1170	3865	150				100
4	E-16-IN,030304	RH 460	3865	150		01R		100
5	E-16-IN,040502	P 200		150				100
6	E-16-IN,050603			150		04		100
7	E-16-IN,01 00		410 380 850 000	2150150000015000	49 912 49 912		01	200
8	E-16-IN,01 18401							200
9	E-16-IN,01 450		410 600 850 000	2150150000015000	49 912 49 912		02	200
10	E-16-IN,01 46002							200
11	E-16-IN,02 0002							200
12	E-16-IN,02 1002							200
13	E-16-IN,02 16101							200
14	E-16-IN,02100901							200
15	E-16-IN,02116002							200
16	E-16-IN,02117002							200
17	E-16-IN,03 0002							200
18	E-16-IN,03 1002							200
19	E-16-IN,03 27601							200
20	E-16-IN,03 46001							200
21	E-16-IN,04 000	1 200 800				06		201
22	E-16-IN,04 20006							201
23	E-16-IN,05 00006							201
24	E-16-IN,05 20006							201
25	E-16-IN,0002	5400P 390			DIAPHRAGM			300
26	E-16-IN,0002	5400P 780			DIAPHRAGM			300
27	E-16-IN,0101	2707U 00 460			ASPHALT AND RAILS			300
28	E-16-IN,0102	2707U 001170			ASPHALT AND RAILS			300
29	E-16-IN,0103	2707U 00 460			ASPHALT AND RAILS			300
30	E-16-IN,01 3333 3333 27 27							400
31	E-16-IN,02 3333 3333 27 27							400
32	E-16-IN,03 3333 3333 27 27							400
33	E-16-IN,1				HS20-44 TRUCK			401
34	E-16-IN,2 240 40 240				MILITARY LOAD			401
35	E-16-IN,01 3333 3333 27 27		LIVE LOAD DISTRIBUTIONS FOR PERMIT TRUCK					500
36	E-16-IN,02 3333 3333 27 27							500
37	E-16-IN,03 3333 3333 27 27							500
38	E-16-IN,4 216 40 217							02501
39	E-16-IN,4 270140 250 40 250120 250 40 250350 217 40				08	COLO PERMIT	01501	
40	E-16-IN,0110101005025 110 110 100			25 20	B 5 51	686545538601		600
41	E-16-IN,0110102205020 100 317 100			25 20	B 5 51	686545538601		600
42	E-16-IN,0110103255000 100 110 110			25 20	B 5 51	686545538601		600

+

	1	2	3	4	5	6	7	8
1IAI-BDS	Version 4.0.13	Licensed to: Colorado DOT						Run time: 07-JUL-95

16:13:47 Page 1
Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ; M.MOHSANI 2/95
0FRAME DESCRIPTION

MEM NO	END COND			SUPPORT			DEAD LOAD		K		CARRY OVER FACTORS		RECALL MEM	
	LT	RT	DIR	SPAN	I	HINGE	E	UNI	SEC	LT	RT	LT		RT
1	1	2	R	H	46.0	0.00	0.0	3865.	0.000	.150	0.00	0.00	0.00	0.00
2	2	3		H	117.0	0.00	0.0	3865.	0.000	.150	0.00	0.00	0.00	0.00
3	3	4	R	H	46.0	0.00	0.0	3865.	0.000	.150	0.00	0.00	0.00	01R
4	5	2	P		20.0	0.00	0.0	3250.	0.000	.150	0.00	0.00	0.00	0.00
5	6	3			0.0	0.00	0.0	3250.	0.000	.150	0.00	0.00	0.00	04

1IAI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 07-JUL-95

16:13:48 Page 2
Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ; M.MOHSANI 2/95
0SECTION PROPERTIES - INPUT
OMEM RE
NO LOC. CALL Z Y W D TOP BOT NO W T W FACT T W FACT L EX IN L EX IN E
STORE

	NO	LOC.	DEPTH	Z-BAR	Y-BAR	AREA	IZZ	IYY	E	E-STORE	STORE							
	1	0.0	0.0	0.0	41.0	3.80	8.50	0.00	2 15.0	15.0	0.00	0 15.0	0.00	4.9	9.12	4.9	9.12	3865.
01	1	18.4	01	** RECALL ONLY														
	1	45.0	0.0	0.0	41.0	6.00	8.50	0.00	2 15.0	15.0	0.00	0 15.0	0.00	4.9	9.12	4.9	9.12	3865.
02	1	46.0	02	** RECALL ONLY														

OSECTION PROPERTIES - OUTPUT

MEMBER 1 PROPERTIES

NO	LOC.	DEPTH	Z-BAR	Y-BAR	AREA	IZZ	IYY	E
0 1	0.0	3.80	20.50	2.79	46.47	50.04	6523.55	3865.00
0 1	18.4	3.80	20.50	2.79	46.47	50.04	6523.55	3865.00
0 1	45.0	6.00	20.50	4.25	57.47	189.37	7895.40	3865.00
0 1	46.0	6.00	20.50	4.25	57.47	189.37	7895.40	3865.00

MEMBER 1 PROPERTIES

0 LENGTH: 46.0 MIN E*I: 0.193E+06 STIFF: 4.686 LT 10.071 RT C.O.: 0.810 LT 0.377 RT

OSECTION PROPERTIES - INPUT

MEMBER 1 PROPERTIES

NO	LOC.	CALL	Z	Y	W	D	TOP	BOT	NO	W	T	W	FACT	T	W	FACT	L	EX	IN	L	EX	IN	E
STORE																							

	NO	LOC.	DEPTH	Z-BAR	Y-BAR	AREA	IZZ	IYY	E	E-STORE	STORE
--	----	------	-------	-------	-------	------	-----	-----	---	---------	-------

2	0.0	02	** RECALL ONLY									
2	1.0	02	** RECALL ONLY									
2	16.1	01	** RECALL ONLY									
2	100.9	01	** RECALL ONLY									
2	116.0	02	** RECALL ONLY									
2	117.0	02	** RECALL ONLY									

1IAI-BDS Version 4.0.13 Licensed to: Colorado DOT

Run time: 07-JUL-95

16:13:48 Page 3

Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ; M.MOHSENI 2/95

OSECTION PROPERTIES - OUTPUT

MEMBER 2 PROPERTIES

NO	LOC.	DEPTH	Z-BAR	Y-BAR	AREA	IZZ	IYY	E
0 2	0.0	6.00	20.50	4.25	57.47	189.37	7895.40	3865.00
0 2	1.0	6.00	20.50	4.25	57.47	189.37	7895.40	3865.00
0 2	16.1	3.80	20.50	2.79	46.47	50.04	6523.55	3865.00
0 2	100.9	3.80	20.50	2.79	46.47	50.04	6523.55	3865.00
0 2	116.0	6.00	20.50	4.25	57.47	189.37	7895.40	3865.00
0 2	117.0	6.00	20.50	4.25	57.47	189.37	7895.40	3865.00

MEMBER 2 PROPERTIES

0 LENGTH: 117.0 MIN E*I: 0.193E+06 STIFF: 5.814 LT 5.814 RT C.O.: 0.596 LT 0.596 RT

OSECTION PROPERTIES - INPUT

MEMBER 2 PROPERTIES

NO	LOC.	CALL	Z	Y	W	D	TOP	BOT	NO	W	T	W	FACT	T	W	FACT	L	EX	IN	L	EX	IN	E
STORE																							

	NO	LOC.	DEPTH	Z-BAR	Y-BAR	AREA	IZZ	IYY	E	E-STORE	STORE
--	----	------	-------	-------	-------	------	-----	-----	---	---------	-------

3	0.0	02	** RECALL ONLY									
3	1.0	02	** RECALL ONLY									
3	27.6	01	** RECALL ONLY									
3	46.0	01	** RECALL ONLY									

OSECTION PROPERTIES - OUTPUT

MEMBER 3 PROPERTIES

NO	LOC.	DEPTH	Z-BAR	Y-BAR	AREA	IZZ	IYY	E
0 3	0.0	6.00	20.50	4.25	57.47	189.37	7895.40	3865.00
0 3	1.0	6.00	20.50	4.25	57.47	189.37	7895.40	3865.00
0 3	27.6	3.80	20.50	2.79	46.47	50.04	6523.55	3865.00
0 3	46.0	3.80	20.50	2.79	46.47	50.04	6523.55	3865.00

MEMBER 3 PROPERTIES

0 LENGTH: 46.0 MIN E*I: 0.193E+06 STIFF: 10.071 LT 4.686 RT C.O.: 0.377 LT 0.810 RT

OSECTION PROPERTIES - INPUT

MEMBER 3 PROPERTIES

NO	LOC.	CALL	Z	Y	W	D	TOP	BOT	NO	W	T	W	FACT	T	W	FACT	L	EX	IN	L	EX	IN	E
STORE																							

	NO	LOC.	DEPTH	Z-BAR	Y-BAR	AREA	IZZ	IYY	E	E-STORE	STORE
--	----	------	-------	-------	-------	------	-----	-----	---	---------	-------

4	0.0	1	2.00	8.00	0.00	0.00	0.00	0.00	3250.00	0	06
---	-----	---	------	------	------	------	------	------	---------	---	----

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ; M.MOHSENI 2/95

OSECTION PROPERTIES - INPUT

MEMBER 4 PROPERTIES

NO	LOC.	CALL	Z	Y	W	D	TOP	BOT	NO	W	T	W	FACT	T	W	FACT	L	EX	IN	L	EX	IN	E
STORE																							

	NO	LOC.	DEPTH	Z-BAR	Y-BAR	AREA	IZZ	IYY	E	E-STORE	STORE
--	----	------	-------	-------	-------	------	-----	-----	---	---------	-------

4	20.0	06	** RECALL ONLY									
---	------	----	----------------	--	--	--	--	--	--	--	--	--

OSECTION PROPERTIES - OUTPUT

MEMBER 4 PROPERTIES

NO	LOC.	DEPTH	Z-BAR	Y-BAR	AREA	IZZ	IYY	E
0 4	0.0	0.00	4.00	1.00	16.00	5.33	85.33	3250.00
0 4	20.0	0.00	4.00	1.00	16.00	5.33	85.33	3250.00

MEMBER 4 PROPERTIES

0 LENGTH: 20.0 MIN E*I: 0.173E+05 STIFF: 4.000 LT 4.000 RT C.O.: 0.500 LT 0.500 RT
0SECTION PROPERTIES - INPUT
MEMBER RE
NO LOC. CALL Z Y W D TOP BOT NO W T W FACT T W FACT L EX IN L EX IN E
STORE

+/- CODE V/D H Z Y AREA IZZ E E-STORE STORE
5 0.0 06 ** RECALL ONLY
5 20.0 06 ** RECALL ONLY

0SECTION PROPERTIES - OUTPUT
MEMBER 5 PROPERTIES
NO LOC. DEPTH Z-BAR Y-BAR AREA IZZ IYY E
0 5 0.0 0.00 4.00 1.00 16.00 5.33 85.33 3250.00
0 5 20.0 0.00 4.00 1.00 16.00 5.33 85.33 3250.00

0 LENGTH: 20.0 MIN E*I: 0.173E+05 STIFF: 4.000 LT 4.000 RT C.O.: 0.500 LT 0.500 RT
1IAI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 07-JUL-95

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ;M.MOHSENI 2/95

0FRAME PROPERTIES
MEMBER JT END COND SUPPORT OR HINGE CARRY OVER FACTORS DISTRIBUTION FACTORS
NO LT RT LT RT DIR SPAN MIN E*I HINGE E LT RT LT RT
1 1 2 R H 46.0 0.1934E+06 0.0 3865. 0.810 0.000 0.000 0.754
2 2 3 H H 117.0 0.1934E+06 0.0 3865. 0.596 0.596 0.246 0.246
3 3 4 R H 46.0 0.1934E+06 0.0 3865. 0.000 0.810 0.754 0.000
4 5 2 P 20.0 0.1733E+05 0.0 3250. 0.000 0.500 0.000 0.000
5 6 3 P 20.0 0.1733E+05 0.0 3250. 0.000 0.500 0.000 0.000

0***** IF MEMBER IS HORIZONTAL SUPPORT OR HINGE FIELD EQUALS LOCATION OF HINGE FROM LEFT END OF MEMBER *****
***** IF MEMBER IS VERTICAL SUPPORT OR HINGE FIELD EQUALS SUPPORT WIDTH USED FOR MOMENT REDUCTION *****
1IAI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 07-JUL-95

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ;M.MOHSENI 2/95

0LOAD DATA TRIAL 0
LOAD CODE A B FIXED END MOMENTS LEFT RIGHT DEFLT COMMENTS
LINE MEM W OR P CODE A B LEFT RIGHT DEFLT COMMENTS
2 5.400 P 39.0 0.0 0. 0. DIAPHRAGM
2 5.400 P 78.0 0.0 0. 0. DIAPHRAGM

0FIXED END MOMENTS TRIAL 0
MEMBER NO LT RT MEM NO LT RT MEM NO LT RT
1 0. -2650. 2 -9142. -9142. 3 -2650. 0.
4 0. 0. 5 0. 0.

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ;M.MOHSENI 2/95

0SIDESWAY DIAGNOSTICS
0

RESULTS OF 1 INCH SWAY TO THE RIGHT
VERTICAL SHEAR (KIPS) MOMENTS (FT-KIPS)
MEMBER LT RT
4 78.0 -1560. 0.
5 78.0 -1560. 0.
BASED ON E = 3250. KSI.
1IAI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 07-JUL-95

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ;M.MOHSENI 2/95

0 *** FRAME DOES NOT SWAY WITH THIS LOADING ***
HORIZONTAL MEMBER MOMENTS TRIAL 0
MEMBER NO LEFT .1 PT .2 PT .3 PT .4 PT .5 PT .6 PT .7 PT .8 PT .9 PT RIGHT
0 1 0. -153. -454. -902. -1497. -2241. -3139. -4196. -5418. -6813. -8385.
0 2 -8385. -3951. -546. 1902. 3354. 3831. 3354. 1902. -546. -3951. -8385.
0 3 -8385. -6813. -5418. -4196. -3139. -2241. -1497. -902. -454. -153. 0.
HORIZONTAL MEMBER STRESSES TRIAL 0 BOTTOM FIBER
0 1 0. 59. 176. 350. 581. 639. 732. 845. 977. 1124. 1306.
0 2 1306. 974. 212. -738. -1301. -1486. -1301. -738. 212. 974. 1306.
0 3 1306. 1124. 977. 845. 732. 639. 581. 350. 176. 59. 0.
HORIZONTAL MEMBER STRESSES TRIAL 0 TOP FIBER
0 1 0. -21. -63. -126. -209. -238. -280. -332. -391. -458. -538.
0 2 -538. -370. -76. 265. 468. 535. 468. 265. -76. -370. -538.
0 3 -538. -458. -391. -332. -280. -238. -209. -126. -63. -21. 0.
OVERTICAL MEMBER MOMENTS TRIAL 0
0 4 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.
0 5 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.

OHORIZONTAL MEMBER SHEARS TRIAL 0												
0	1	-17.2	-49.3	-81.4	-113.4	-145.5	-178.2	-212.2	-247.6	-284.2	-322.2	-361.4
0	2	427.3	332.8	250.0	168.5	81.5	0.0	-81.5	-168.5	-250.0	-332.8	-427.3
0	3	361.4	322.2	284.2	247.6	212.2	178.2	145.5	113.4	81.4	49.3	17.2
OVERTICAL MEMBER SHEARS TRIAL 0												
0	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

OVERTICAL MEMBER REACTIONS TRIAL 0			
MEM NO	LT REACTION	RT REACTION	MEMBER WEIGHT
4	836.7	788.7	48.0
5	836.7	788.7	48.0

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ; M.MOHSENI 2/95

OTRIAL 0											
OTANGENTIAL ROTATIONS - RADIANS - CLOCKWISE POSITIVE											
SPAN	LT. END	RT. END	SPAN	LT. END	RT. END	SPAN	LT. END	RT. END	SPAN	LT. END	RT. END
0	1	-0.000743	0.001355	2	0.001355	-0.001355	3	-0.001355	0.000743		
0	4	0.000000	0.000000	5	0.000000	0.000000					
OHORIZONTAL MEMBER DEFLECTIONS IN FEET AT 1/ 4 POINTS FROM LEFT END - DOWNWARD POSITIVE											
0	MEMBER 1	E= 3865.	0.000	-0.008	-0.013	-0.011	0.000				
0	MEMBER 2	E= 3865.	0.000	0.070	0.121	0.070	0.000				
0	MEMBER 3	E= 3865.	0.000	-0.011	-0.013	-0.008	0.000				

OVERTICAL MEMBER DEFLECTIONS IN FEET AT 1/ 4 POINTS FROM LEFT END.											
0	MEMBER 4	E= 3250.	0.000	0.000	0.000	0.000	0.000				
0	MEMBER 5	E= 3250.	0.000	0.000	0.000	0.000	0.000				

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ; M.MOHSENI 2/95

OLOAD DATA TRIAL 1											
LINE MEM	W	O	R	P	LOAD CODE	A	B	FIXED END MOMENTS LEFT	RIGHT	DEFLT	COMMENTS
	1				2.707 U	0.0	46.0	0.	0.		ASPHALT AND RAILS
	2				2.707 U	0.0	117.0	0.	0.		ASPHALT AND RAILS
	3				2.707 U	0.0	46.0	0.	0.		ASPHALT AND RAILS

OFIXED END MOMENTS TRIAL 1											
MEM NO	FIXED END MOMENTS LT	RT	MEM NO	FIXED END MOMENTS LT	RT	MEM NO	FIXED END MOMENTS LT	RT			
1	0.	-969.	2	-3459.	-3459.	3	-969.	0.			
4	0.	0.	5	0.	0.						

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ; M.MOHSENI 2/95

0 *** FRAME DOES NOT SWAY WITH THIS LOADING ***

OHORIZONTAL MEMBER MOMENTS TRIAL 1												
MEM NO	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT	
0	1	0.	-59.	-175.	-349.	-580.	-868.	-1214.	-1617.	-2077.	-2594.	-3169.
0	2	-3169.	-1501.	-204.	722.	1278.	1463.	1278.	722.	-204.	-1501.	-3169.
0	3	-3169.	-2594.	-2077.	-1617.	-1214.	-868.	-580.	-349.	-175.	-59.	0.

OHORIZONTAL MEMBER STRESSES TRIAL 1 BOTTOM FIBER												
0	1	0.	23.	68.	135.	225.	248.	283.	326.	374.	428.	494.
0	2	494.	370.	79.	-280.	-496.	-568.	-496.	-280.	79.	370.	494.
0	3	494.	428.	374.	326.	283.	248.	225.	135.	68.	23.	0.

OHORIZONTAL MEMBER STRESSES TRIAL 1 TOP FIBER												
0	1	0.	-8.	-24.	-49.	-81.	-92.	-108.	-128.	-150.	-174.	-203.
0	2	-203.	-141.	-28.	101.	178.	204.	178.	101.	-28.	-141.	-203.
0	3	-203.	-174.	-150.	-128.	-108.	-92.	-81.	-49.	-24.	-8.	0.

OVERTICAL MEMBER MOMENTS TRIAL 1												
0	4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0	5	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

OHORIZONTAL MEMBER SHEARS TRIAL 1												
0	1	-6.6	-19.1	-31.5	-44.0	-56.4	-68.9	-81.3	-93.8	-106.2	-118.7	-131.1
0	2	158.4	126.7	95.0	63.3	31.7	0.0	-31.7	-63.3	-95.0	-126.7	-158.4
0	3	131.1	118.7	106.2	93.8	81.3	68.9	56.4	44.0	31.5	19.1	6.6

OVERTICAL MEMBER SHEARS TRIAL 1												
0	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

OVERTICAL MEMBER REACTIONS TRIAL 1			
MEM NO	LT REACTION	RT REACTION	MEMBER WEIGHT
4	289.5	289.5	
5	289.5	289.5	

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ; M.MOHSENI 2/95

OTRIAL 1											
OTANGENTIAL ROTATIONS - RADIANS - CLOCKWISE POSITIVE											
SPAN	LT. END	RT. END	SPAN	LT. END	RT. END	SPAN	LT. END	RT. END	SPAN	LT. END	RT. END
0	1	-0.000287	0.000520	2	0.000520	-0.000520	3	-0.000520	0.000287		
0	4	0.000000	0.000000	5	0.000000	0.000000					

OHORIZONTAL MEMBER DEFLECTIONS IN FEET AT 1/ 4 POINTS FROM LEFT END - DOWNWARD POSITIVE

```

0 MEMBER 1 E= 3865. 0.000 -0.003 -0.005 -0.004 0.000
0 MEMBER 2 E= 3865. 0.000 0.027 0.046 0.027 0.000
0 MEMBER 3 E= 3865. 0.000 -0.004 -0.005 -0.003 0.000
OVERTICAL MEMBER DEFLECTIONS IN FEET AT 1/ 4 POINTS FROM LEFT END.
0 MEMBER 4 E= 3250. 0.000 0.000 0.000 0.000 0.000
0 MEMBER 5 E= 3250. 0.000 0.000 0.000 0.000 0.000
LIAI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 07-JUL-95
    
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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ;M.MOHSENI 2/95

OLIVE LOAD DIAGNOSTICS

```

0
0SUPERSTRUCTURE LIVE LOAD
0
MEM      SUPERSTRUCTURE SUBSTRUCTURE      RESISTING MOMENT OF      PLOT PLOT INFLU-
NO.      LT.END      RT.END      LT.END      RT.END      POSITIVE      NEGATIVE      M  S SCALE ENCE
-----
1        3.333      3.333      2.7        2.7        0.          0.          0   0   NO   NO
2        3.333      3.333      2.7        2.7        0.          0.
3        3.333      3.333      2.7        2.7        0.          0.
O LIVE   -----TRUCK----- LANE----- NO. LIVE
LOAD     P1      D1      P2      D2      P3      UNIFORM  MOM.  SHEAR  LL  LOAD
NO.      RIDER  RIDER  IMPACT  LNS. SIDESWAY
1.       8.0     14.0   32.0   14.0   32.0   0.640   18.0   26.0   YES  0.00 NO
COMMENTS: HS20-44 TRUCK
+
2.       24.0    4.0    24.0    0.0    0.0    0.000   0.0    0.0    YES  0.00 NO
COMMENTS: MILITARY LOAD
    
```

IMPACT FACTORS CALCULATED BY PROGRAM

```

0 MEM      IMPACT
  NO      %
1         29.
2         21.
3         29.
LIAI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 07-JUL-95
    
```

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ;M.MOHSENI 2/95

```

OLL NO. 1.      NEGATIVE LIVE LOAD MOMENT ENVELOPE AND ASSOCIATED SHEARS
MEM LEFT      .1 PT      .2 PT      .3 PT      .4 PT      .5PT      .6 PT      .7 PT      .8 PT      .9 PT      RIGHT
NO
0 1 0. -472. -943. -1415. -1887. -2358. -2830. -3301. -3773. -4245. -4716.
SHEAR 0.0 -102.5 -102.5 -102.5 -102.5 -102.5 -102.5 -102.5 -102.5 -102.5 -102.5
0 2 -4716. -2514. -908. -389. -284. -224. -284. -389. -908. -2514. -4716.
SHEAR 201.1 161.4 16.4 9.0 9.0 0.0 -9.0 -9.0 -16.4 -201.1
0 3 -4716. -4245. -3773. -3301. -2830. -2358. -1887. -1415. -943. -472. 0.
SHEAR 102.5 102.5 102.5 102.5 102.5 102.5 102.5 102.5 102.5 102.5 0.0
OHORIZONTAL MEMBER STRESSES LL MAX NEG BOTTOM FIBER
0 1 0. 183. 366. 549. 732. 673. 660. 665. 680. 700. 735.
0 2 735. 620. 352. 151. 110. 87. 110. 151. 352. 620. 735.
0 3 735. 700. 680. 665. 660. 673. 732. 549. 366. 183. 0.
OHORIZONTAL MEMBER STRESSES LL MAX NEG TOP FIBER
0 1 0. -66. -132. -197. -263. -251. -253. -261. -272. -285. -303.
0 2 -303. -236. -127. -54. -40. -31. -40. -54. -127. -236. -303.
0 3 -303. -285. -272. -261. -253. -251. -263. -197. -132. -66. 0.
LIAI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 07-JUL-95
    
```

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ;M.MOHSENI 2/95

```

OLL NO. 1.      DEAD LOAD PLUS NEGATIVE LIVE LOAD MOMENT ENVELOPE
MEM LEFT      .1 PT      .2 PT      .3 PT      .4 PT      .5PT      .6 PT      .7 PT      .8 PT      .9 PT      RIGHT
NO
0 1 0. -625. -1397. -2316. -3384. -4599. -5968. -7497. -9191. -11057. -13101.
0 2 -13101. -6465. -1454. 1513. 3070. 3607. 3070. 1513. -1454. -6465. -13101.
0 3 -13101. -11057. -9191. -7497. -5968. -4599. -3384. -2316. -1397. -625. 0.
OHORIZONTAL MEMBER STRESSES FOR DL+LL MAX NEG BOTTOM FIBER
0 1 0. 242. 542. 898. 1312. 1312. 1391. 1511. 1657. 1825. 2041.
0 2 2041. 1594. 564. -587. -1191. -1399. -1191. -587. 564. 1594. 2041.
0 3 2041. 1825. 1657. 1511. 1391. 1312. 1312. 898. 542. 242. 0.
OHORIZONTAL MEMBER STRESSES FOR DL+LL MAX NEG TOP FIBER
0 1 0. -87. -195. -323. -472. -489. -533. -593. -663. -743. -841.
0 2 -841. -606. -203. 211. 428. 503. 428. 211. -203. -606. -841.
0 3 -841. -743. -663. -593. -533. -489. -472. -323. -195. -87. 0.
LIAI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 07-JUL-95
    
```

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ;M.MOHSENI 2/95

Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ; M.MOHSANI 2/95

DEAD LOAD PLUS POSITIVE LIVE LOAD MOMENT ENVELOPE AND ASSOCIATED SHEARS

OLL NO. 1.	MEMBER	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
0 1		0.	939.	1572.	1917.	2081.	2032.	1942.	1635.	1166.	479.	347.
	SHEAR	0.0	204.1	170.8	138.9	104.9	-103.4	-135.4	-169.5	-199.8	-228.7	7.5
0 2		347.	344.	1100.	2172.	2985.	3236.	2985.	2172.	1100.	344.	347.
	SHEAR	-9.0	78.1	133.8	176.2	137.2	96.0	-137.2	-176.2	-133.8	-78.1	9.0
0 3		347.	479.	1166.	1635.	1942.	2032.	2081.	1917.	1572.	939.	0.
	SHEAR	-7.5	228.7	199.8	169.5	135.4	103.4	-104.9	-138.9	-170.8	-204.1	0.0
HORIZONTAL MEMBER STRESSES LL MAX POS BOTTOM FIBER												
0 1		0.	-364.	-610.	-744.	-807.	-580.	-453.	-329.	-210.	-79.	-54.
0 2		-54.	-85.	-427.	-842.	-1158.	-1255.	-1158.	-842.	-427.	-85.	-54.
0 3		-54.	-79.	-210.	-329.	-453.	-580.	-807.	-744.	-610.	-364.	0.
HORIZONTAL MEMBER STRESSES LL MAX POS TOP FIBER												
0 1		0.	131.	219.	268.	290.	216.	173.	129.	84.	32.	22.
0 2		22.	32.	154.	303.	417.	452.	417.	303.	154.	32.	22.
0 3		22.	32.	84.	129.	173.	216.	290.	268.	219.	131.	0.

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ; M.MOHSANI 2/95

DEAD LOAD PLUS POSITIVE LIVE LOAD MOMENT ENVELOPE

OLL NO. 1.	MEMBER	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
0 1		0.	786.	1118.	1016.	584.	-209.	-1196.	-2561.	-4252.	-6334.	-8038.
0 2		-8038.	-3607.	554.	4074.	6339.	7068.	6339.	4074.	554.	-3607.	-8038.
0 3		-8038.	-6334.	-4252.	-2561.	-1196.	-209.	584.	1016.	1118.	786.	0.
HORIZONTAL MEMBER STRESSES FOR DL+LL MAX POS BOTTOM FIBER												
0 1		0.	-305.	-434.	-394.	-226.	60.	279.	516.	767.	1045.	1252.
0 2		1252.	889.	-215.	-1580.	-2459.	-2741.	-2459.	-1580.	-215.	889.	1252.
0 3		1252.	1045.	767.	516.	279.	60.	-226.	-394.	-434.	-305.	0.
HORIZONTAL MEMBER STRESSES FOR DL+LL MAX POS TOP FIBER												
0 1		0.	110.	156.	142.	81.	-22.	-107.	-202.	-307.	-426.	-516.
0 2		-516.	-338.	77.	568.	885.	986.	885.	568.	77.	-338.	-516.
0 3		-516.	-426.	-307.	-202.	-107.	-22.	81.	142.	156.	110.	0.

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ; M.MOHSANI 2/95

LIVE LOAD SHEAR ENVELOPES AND ASSOCIATED MOMENTS

OLL NO. 1.	MEMBER	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
OPOS. V	238.5	204.1	170.8	138.9	108.5	79.9	52.8	35.1	22.6	11.8	7.5	
MOM.	0.	939.	1572.	1917.	1997.	1838.	1457.	873.	640.	380.	347.	
NEG. V	-102.5	-102.5	-104.2	-108.9	-126.2	-144.2	-162.8	-182.1	-202.0	-228.7	-256.1	
MOM.	0.	-472.	907.	556.	501.	299.	-56.	-570.	-1250.	479.	-408.	
RANGE	341.0	306.6	275.0	247.8	234.7	224.1	215.6	217.1	224.6	240.4	263.6	
LIVE LOAD SHEAR ENVELOPES AND ASSOCIATED MOMENTS												
OPOS. V	277.6	258.0	229.6	193.6	153.3	112.3	74.1	42.1	18.7	9.0	9.0	
MOM.	-1749.	-514.	859.	2096.	2891.	3095.	2724.	1953.	1055.	241.	347.	
NEG. V	-9.0	-9.0	-18.7	-42.1	-74.1	-112.3	-153.3	-193.6	-229.6	-258.0	-277.6	
MOM.	347.	241.	1055.	1953.	2724.	3095.	2891.	2096.	859.	-514.	-1749.	
RANGE	286.6	266.9	248.3	235.7	227.4	224.6	227.4	235.7	248.3	266.9	286.6	
LIVE LOAD SHEAR ENVELOPES AND ASSOCIATED MOMENTS												
OPOS. V	256.1	228.7	202.0	182.1	162.8	144.2	126.2	108.9	104.2	102.5	102.5	
MOM.	-408.	479.	-1250.	-570.	-56.	299.	501.	556.	907.	-472.	0.	
NEG. V	-7.5	-11.8	-22.6	-35.1	-52.8	-79.9	-108.5	-138.9	-170.8	-204.1	-238.5	
MOM.	347.	488.	833.	1130.	1457.	1838.	1997.	1917.	1572.	939.	0.	
RANGE	263.6	240.4	224.6	217.1	215.6	224.1	234.7	247.8	275.0	306.6	341.0	

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ; M.MOHSANI 2/95

DEAD LOAD PLUS LIVE LOAD SHEAR ENVELOPE

OLL NO. 1.	MEMBER	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
OPOS. V	221.3	154.8	89.5	25.5	-36.9	-98.3	-159.4	-212.5	-261.6	-310.4	-353.9	
NEG. V	-119.8	-151.8	-185.5	-222.3	-271.7	-322.4	-375.0	-429.6	-486.2	-550.9	-617.5	
DEAD LOAD PLUS LIVE LOAD SHEAR ENVELOPE												
OPOS. V	704.9	590.7	479.6	362.1	234.8	112.3	-7.4	-126.4	-231.4	-323.8	-418.3	
NEG. V	418.3	323.8	231.4	126.4	7.4	-112.3	-234.8	-362.1	-479.6	-590.7	-704.9	
DEAD LOAD PLUS LIVE LOAD SHEAR ENVELOPE												
OPOS. V	617.5	550.9	486.2	429.6	375.0	322.4	271.7	222.3	185.5	151.8	119.8	
NEG. V	353.9	310.4	261.6	212.5	159.4	98.3	36.9	-25.5	-89.5	-154.8	-221.3	

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ; M.MOHSANI 2/95

LIVE LOAD SUPPORT RESULTS

OLL NO. 1.	MEMBER	MAX. AXIAL LOAD			MAX. LONGITUDINAL MOMENT		
		AXIAL LOAD	TOP	BOT.	AXIAL LOAD	TOP	BOT.
0							
0	SUPPORT JT. 1						
	POSITIVE	193.2	0.	0.	0.0	0.	0.
	NEGATIVE	-83.1	0.	0.	0.0	0.	0.
0	MEMBER 4						
	POSITIVE	331.8	0.	0.	0.0	0.	0.

MEMBER 5 NEGATIVE -13.4 0. 0. 0.0 0. 0.
 POSITIVE 331.8 0. 0. 0.0 0. 0.
 SUPPORT JT. 4 NEGATIVE -13.4 0. 0. 0.0 0. 0.
 POSITIVE 193.2 0. 0. 0.0 0. 0.
 NEGATIVE -83.1 0. 0. 0.0 0. 0.
 THE RATIO OF SUBSTRUCTURE / SUPERSTRUCTURE LOADING IS 0.810
 IIAI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 07-JUL-95

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ; M.MOHSENI 2/95
 OLL NO. 2. NEGATIVE LIVE LOAD MOMENT ENVELOPE AND ASSOCIATED SHEARS
 MEM LEFT .1 PT .2 PT .3 PT .4 PT .5PT .6 PT .7 PT .8 PT .9 PT RIGHT
 NO
 0 1 0. -325. -650. -976. -1301. -1626. -1951. -2276. -2601. -2927. -3252.
 SHEAR 0.0 -70.7 -70.7 -70.7 -70.7 -70.7 -70.7 -70.7 -70.7 -70.7 -70.7
 0 2 -3252. -1767. -611. -310. -226. -143. -226. -310. -611. -1767. -3252.
 SHEAR 145.8 119.7 73.3 7.2 7.2 7.2 -7.2 -7.2 -73.3 -119.7 -145.8
 0 3 -3252. -2927. -2601. -2276. -1951. -1626. -1301. -976. -650. -325. 0.
 SHEAR 70.7 70.7 70.7 70.7 70.7 70.7 70.7 70.7 70.7 70.7 0.0
 HORIZONTAL MEMBER STRESSES LL MAX NEG BOTTOM FIBER
 0 1 0. 126. 252. 378. 504. 464. 455. 459. 469. 483. 507.
 0 2 507. 436. 237. 120. 88. 55. 88. 120. 237. 436. 507.
 0 3 507. 483. 469. 459. 455. 464. 504. 378. 252. 126. 0.
 HORIZONTAL MEMBER STRESSES LL MAX NEG TOP FIBER
 0 1 0. -45. -91. -136. -182. -173. -174. -180. -188. -197. -209.
 0 2 -209. -166. -85. -43. -32. -20. -32. -43. -85. -166. -209.
 0 3 -209. -197. -188. -180. -174. -173. -182. -136. -91. -45. 0.
 IIAI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 07-JUL-95

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ; M.MOHSENI 2/95
 OLL NO. 2. DEAD LOAD PLUS NEGATIVE LIVE LOAD MOMENT ENVELOPE
 MEM LEFT .1 PT .2 PT .3 PT .4 PT .5PT .6 PT .7 PT .8 PT .9 PT RIGHT
 NO
 0 1 0. -478. -1104. -1877. -2798. -3867. -5090. -6472. -8020. -9739. -11636.
 0 2 -11636. -5718. -1157. 1592. 3128. 3689. 3128. 1592. -1157. -5718. -11636.
 0 3 -11636. -9739. -8020. -6472. -5090. -3867. -2798. -1877. -1104. -478. 0.
 HORIZONTAL MEMBER STRESSES FOR DL+LL MAX NEG BOTTOM FIBER
 0 1 0. 185. 428. 728. 1085. 1103. 1187. 1304. 1446. 1607. 1813.
 0 2 1813. 1410. 449. -617. -1213. -1431. -1213. -617. 449. 1410. 1813.
 0 3 1813. 1607. 1446. 1304. 1187. 1103. 1085. 728. 428. 185. 0.
 HORIZONTAL MEMBER STRESSES FOR DL+LL MAX NEG TOP FIBER
 0 1 0. -67. -154. -262. -390. -411. -455. -512. -579. -654. -747.
 0 2 -747. -536. -161. 222. 437. 515. 437. 222. -161. -536. -747.
 0 3 -747. -654. -579. -512. -455. -411. -390. -262. -154. -67. 0.
 IIAI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 07-JUL-95

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ; M.MOHSENI 2/95
 OLL NO. 2. POSITIVE LIVE LOAD MOMENT ENVELOPE AND ASSOCIATED SHEARS
 MEM LEFT .1 PT .2 PT .3 PT .4 PT .5PT .6 PT .7 PT .8 PT .9 PT RIGHT
 NO
 0 1 0. 790. 1361. 1723. 1894. 1890. 1782. 1519. 1112. 573. 276.
 SHEAR 0.0 68.4 -58.8 -81.9 -103.8 -124.6 -127.2 -146.7 -165.3 -182.9 6.0
 0 2 276. 449. 1100. 1865. 2435. 2629. 2435. 1865. 1100. 449. 276.
 SHEAR -7.2 89.8 77.1 145.8 119.7 -91.7 -119.7 -145.8 -173.6 -186.3 7.2
 0 3 276. 573. 1112. 1519. 1782. 1890. 1894. 1723. 1361. 790. 0.
 SHEAR -6.0 79.6 61.9 -60.0 -79.6 -82.2 -102.9 -124.9 -147.9 -171.8 0.0
 HORIZONTAL MEMBER STRESSES LL MAX POS BOTTOM FIBER
 0 1 0. -306. -528. -668. -735. -539. -415. -306. -200. -95. -43.
 0 2 -43. -111. -426. -723. -944. -1020. -944. -723. -426. -111. -43.
 0 3 -43. -95. -200. -306. -415. -539. -735. -668. -528. -306. 0.
 HORIZONTAL MEMBER STRESSES LL MAX POS TOP FIBER
 0 1 0. 110. 190. 240. 264. 201. 159. 120. 80. 39. 18.
 0 2 18. 42. 153. 260. 340. 367. 340. 260. 153. 42. 18.
 0 3 18. 39. 80. 120. 159. 201. 264. 240. 190. 110. 0.
 IIAI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 07-JUL-95

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ; M.MOHSENI 2/95
 OLL NO. 2. DEAD LOAD PLUS POSITIVE LIVE LOAD MOMENT ENVELOPE
 MEM LEFT .1 PT .2 PT .3 PT .4 PT .5PT .6 PT .7 PT .8 PT .9 PT RIGHT
 NO
 0 1 0. 637. 907. 822. 397. -351. -1356. -2677. -4306. -6240. -8108.
 0 2 -8108. -3502. 553. 3767. 5789. 6461. 5789. 3767. 553. -3502. -8108.
 0 3 -8108. -6240. -4306. -2677. -1356. -351. 397. 822. 907. 637. 0.
 HORIZONTAL MEMBER STRESSES FOR DL+LL MAX POS BOTTOM FIBER
 0 1 0. -247. -352. -319. -154. 100. 316. 539. 776. 1030. 1263.
 0 2 1263. 864. -215. -1461. -2245. -2506. -2245. -1461. -215. 864. 1263.
 0 3 1263. 1030. 776. 539. 316. 100. -154. -319. -352. -247. 0.
 HORIZONTAL MEMBER STRESSES FOR DL+LL MAX POS TOP FIBER
 0 1 0. 89. 127. 115. 55. -37. -121. -212. -311. -419. -521.
 0 2 -521. -328. 77. 526. 808. 902. 808. 526. 77. -328. -521.
 0 3 -521. -419. -311. -212. -121. -37. 55. 115. 127. 89. 0.
 IIAI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 07-JUL-95

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ; M.MOHSENI 2/95

LIVE LOAD SHEAR ENVELOPES AND ASSOCIATED MOMENTS

OLL NO.	2.										
OMEMBER	1 LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
OPOS. V	196.1	171.8	147.9	124.9	102.9	82.2	62.5	43.8	26.1	9.2	6.0
MOM.	0.	790.	1361.	1723.	1894.	1890.	1725.	1411.	960.	382.	276.
NEG. V	-70.7	-70.7	-70.7	-70.7	-84.8	-106.6	-127.2	-146.7	-165.3	-182.9	-199.7
MOM.	0.	-325.	-650.	-976.	1830.	1890.	1782.	1519.	1112.	573.	-87.
RANGE	266.8	242.5	218.6	195.6	187.8	188.8	189.7	190.6	191.4	192.2	205.7

LIVE LOAD SHEAR ENVELOPES AND ASSOCIATED MOMENTS

OLL NO.	2.										
OMEMBER	2 LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
OPOS. V	191.8	182.7	167.5	145.8	119.7	91.7	64.1	39.2	19.5	7.2	7.2
MOM.	-290.	308.	1071.	1865.	2435.	2629.	2407.	1837.	1100.	193.	276.
NEG. V	-7.2	-7.2	-19.5	-39.2	-64.1	-91.7	-119.7	-145.8	-167.5	-182.7	-191.8
MOM.	276.	193.	1100.	1837.	2407.	2629.	2435.	1865.	1071.	308.	-290.
RANGE	199.0	189.9	187.0	185.0	183.8	183.4	183.8	185.0	187.0	189.9	199.0

LIVE LOAD SHEAR ENVELOPES AND ASSOCIATED MOMENTS

OLL NO.	2.										
OMEMBER	3 LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
OPOS. V	199.7	182.9	165.3	146.7	127.2	106.6	84.8	70.7	70.7	70.7	70.7
MOM.	-87.	573.	1112.	1519.	1782.	1890.	1830.	-976.	-650.	-325.	0.
NEG. V	-6.0	-9.2	-26.1	-43.8	-62.5	-82.2	-102.9	-124.9	-147.9	-171.8	-196.1
MOM.	276.	382.	960.	1411.	1725.	1890.	1894.	1723.	1361.	790.	0.
RANGE	205.7	192.2	191.4	190.6	189.7	188.8	187.8	195.6	218.6	242.5	266.8

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ; M.MOHSENI 2/95

DEAD LOAD PLUS LIVE LOAD SHEAR ENVELOPE

OLL NO.	2.										
OMEMBER	1 LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
OPOS. V	178.9	122.5	66.6	11.5	-42.6	-96.0	-149.7	-203.7	-258.2	-313.0	-355.4
NEG. V	-87.9	-120.0	-152.0	-184.1	-230.3	-284.8	-339.4	-394.3	-449.5	-505.1	-561.1

DEAD LOAD PLUS LIVE LOAD SHEAR ENVELOPE

OLL NO.	2.										
OMEMBER	2 LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
OPOS. V	619.1	515.5	417.6	314.3	201.3	91.7	-17.5	-129.3	-230.6	-325.6	-420.1
NEG. V	420.1	325.6	230.6	129.3	17.5	-91.7	-201.3	-314.3	-417.6	-515.5	-619.1

DEAD LOAD PLUS LIVE LOAD SHEAR ENVELOPE

OLL NO.	2.										
OMEMBER	3 LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
OPOS. V	561.1	505.1	449.5	394.3	339.4	284.8	230.3	184.1	152.0	120.0	87.9
NEG. V	355.4	313.0	258.2	203.7	149.7	96.0	42.6	-11.5	-66.6	-122.5	-178.9

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ; M.MOHSENI 2/95

LIVE LOAD SUPPORT RESULTS

		MAX. AXIAL LOAD			MAX. LONGITUDINAL MOMENT		
		AXIAL LOAD	TOP	BOT.	AXIAL LOAD	TOP	BOT.
OSUPPORT JT. 1	POSITIVE	158.9	0.	0.	0.0	0.	0.
	NEGATIVE	-57.3	0.	0.	0.0	0.	0.
OMEMBER 4	POSITIVE	186.0	0.	0.	0.0	0.	0.
	NEGATIVE	-10.7	0.	0.	0.0	0.	0.
OMEMBER 5	POSITIVE	186.0	0.	0.	0.0	0.	0.
	NEGATIVE	-10.7	0.	0.	0.0	0.	0.
OSUPPORT JT. 4	POSITIVE	158.9	0.	0.	0.0	0.	0.
	NEGATIVE	-57.3	0.	0.	0.0	0.	0.

0 THE RATIO OF SUBSTRUCTURE / SUPERSTRUCTURE LOADING IS 0.810

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ; M.MOHSENI 2/95

LIVE LOAD DIAGNOSTICS

0

LIVE LOAD GENERATOR

MEM NO.	NUMBER OF LIVE LOAD LANES				RESISTING MOMENT OF UNIT STEEL		PLOT M ENV.	PLOT S SCALE	INFLU- ENCE LINES	GEN
	LT.END	RT.END	LT.END	RT.END	POSITIVE	NEGATIVE				
1	3.333	3.333	2.7	2.7	0.	0.	0	0	NO	NO
2	3.333	3.333	2.7	2.7	0.	0.				
3	3.333	3.333	2.7	2.7	0.	0.				

0 LIVE LOAD

NO	TRUCK OR TRAIN LOADING												OVER LOAD	RRL	IMPACT	COMB	CARD CONTROL
	P1	D1	P2	D2	P3	D3	P4	D4	P5	D5	P6	D6					
4.	27.0	14.0	25.0	4.0	25.0	12.0	25.0	4.0	25.0	35.0	21.7	4.0	8.	YES		01	
0	P7	D7	P8	D8	P9	D9	P10	D10	P11	D11	P12	D12					
0	21.6	4.0	21.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				02	
0	P13	D13	P14	D14	P15	D15	P16	D16	P17	D17	P18	D18					
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
0	P19	D19	P20	D20	P21	D21	P22	D22	P23	D23	P24	D24					
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
0	P25	D25	P26	D26	P27	D27	P28	D28	P29	D29	P30	D30					
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					

IMPACT FACTORS CALCULATED BY PROGRAM

0 MEM IMPACT
NO %
1 29.
2 21.
3 29.
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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ; M.MOHSANI 2/95
NEGATIVE LIVE LOAD MOMENT ENVELOPE AND ASSOCIATED SHEARS
*** SPECIAL TRUCK WITH 8 AXLES WAS REQUESTED THIS LIVE LOAD ***

MEM NO	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
0 1	0.	-922.	-1844.	-2766.	-3688.	-4610.	-5532.	-6454.	-7376.	-8298.	-9220.
SHEAR	0.0	-200.4	-200.4	-200.4	-200.4	-200.4	-200.4	-200.4	-200.4	-200.4	-200.4
0 2	-9220.	-4598.	-1320.	-578.	-422.	-266.	-422.	-578.	-1320.	-4598.	-9220.
SHEAR	426.7	340.1	209.4	13.3	13.3	13.3	-13.3	-13.3	-209.4	-340.1	-426.7
0 3	-9220.	-8298.	-7376.	-6454.	-5532.	-4610.	-3688.	-2766.	-1844.	-922.	0.
SHEAR	200.4	200.4	200.4	200.4	200.4	200.4	200.4	200.4	200.4	200.4	0.0
OHORIZONTAL MEMBER STRESSES LL MAX NEG BOTTOM FIBER											
0 1	0.	358.	715.	1073.	1430.	1315.	1290.	1300.	1330.	1369.	1437.
0 2	1437.	1134.	512.	224.	164.	103.	164.	224.	512.	1134.	1437.
0 3	1437.	1369.	1330.	1300.	1290.	1315.	1430.	1073.	715.	358.	0.
OHORIZONTAL MEMBER STRESSES LL MAX NEG TOP FIBER											
0 1	0.	-129.	-257.	-386.	-515.	-490.	-494.	-510.	-532.	-558.	-592.
0 2	-592.	-431.	-184.	-81.	-59.	-37.	-59.	-81.	-184.	-431.	-592.
0 3	-592.	-558.	-532.	-510.	-494.	-490.	-515.	-386.	-257.	-129.	0.

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ; M.MOHSANI 2/95
DEAD LOAD PLUS NEGATIVE LIVE LOAD MOMENT ENVELOPE
*** SPECIAL TRUCK WITH 8 AXLES WAS REQUESTED THIS LIVE LOAD ***

MEM NO	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
0 1	0.	-1075.	-2298.	-3668.	-5185.	-6851.	-8671.	-10650.	-12795.	-15111.	-17605.
0 2	-17605.	-8549.	-1866.	1324.	2932.	3566.	2932.	1324.	-1866.	-8549.	-17605.
0 3	-17605.	-15111.	-12795.	-10650.	-8671.	-6851.	-5185.	-3668.	-2298.	-1075.	0.
OHORIZONTAL MEMBER STRESSES FOR DL+LL MAX NEG BOTTOM FIBER											
0 1	0.	417.	891.	1422.	2011.	1955.	2021.	2146.	2306.	2494.	2743.
0 2	2743.	2108.	724.	-513.	-1137.	-1383.	-1137.	-513.	724.	2108.	2743.
0 3	2743.	2494.	2306.	2146.	2021.	1955.	2011.	1422.	891.	417.	0.
OHORIZONTAL MEMBER STRESSES FOR DL+LL MAX NEG TOP FIBER											
0 1	0.	-150.	-321.	-512.	-724.	-728.	-774.	-842.	-923.	-1015.	-1130.
0 2	-1130.	-801.	-260.	185.	409.	498.	409.	185.	-260.	-801.	-1130.
0 3	-1130.	-1015.	-923.	-842.	-774.	-728.	-724.	-842.	-923.	-1015.	0.

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ; M.MOHSANI 2/95
POSITIVE LIVE LOAD MOMENT ENVELOPE AND ASSOCIATED SHEARS
*** SPECIAL TRUCK WITH 8 AXLES WAS REQUESTED THIS LIVE LOAD ***

MEM NO	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
0 1	0.	1337.	2176.	2719.	2836.	3000.	2712.	2148.	1350.	647.	515.
SHEAR	0.0	290.7	175.7	120.6	102.6	-61.5	-176.4	-230.3	-212.9	-237.3	11.2
0 2	515.	359.	1075.	3279.	4856.	5266.	4856.	3279.	1075.	359.	515.
SHEAR	-13.3	-13.3	164.6	213.9	127.3	-57.1	-127.3	-213.9	-164.6	13.3	13.3
0 3	515.	647.	1350.	2148.	2712.	3000.	2836.	2719.	2176.	1337.	0.
SHEAR	-11.2	237.3	212.9	230.3	176.4	61.5	-102.6	-120.6	-175.7	-290.7	0.0
OHORIZONTAL MEMBER STRESSES LL MAX POS BOTTOM FIBER											
0 1	0.	-519.	-844.	-1055.	-1100.	-856.	-632.	-433.	-243.	-107.	-80.
0 2	-80.	-89.	-417.	-1272.	-1883.	-2043.	-1883.	-1272.	-417.	-89.	-80.
0 3	-80.	-107.	-243.	-433.	-632.	-856.	-1100.	-1055.	-844.	-519.	0.
OHORIZONTAL MEMBER STRESSES LL MAX POS TOP FIBER											
0 1	0.	187.	304.	379.	396.	319.	242.	170.	97.	43.	33.
0 2	33.	34.	150.	458.	678.	735.	678.	458.	150.	34.	33.
0 3	33.	43.	97.	170.	242.	319.	396.	379.	304.	187.	0.

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ; M.MOHSANI 2/95
DEAD LOAD PLUS POSITIVE LIVE LOAD MOMENT ENVELOPE
*** SPECIAL TRUCK WITH 8 AXLES WAS REQUESTED THIS LIVE LOAD ***

MEM NO	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
0 1	0.	1184.	1723.	1817.	1339.	759.	-427.	-2048.	-4069.	-6165.	-7869.
0 2	-7869.	-3592.	528.	5181.	8210.	9098.	8210.	5181.	528.	-3592.	-7869.
0 3	-7869.	-6165.	-4069.	-2048.	-427.	759.	1339.	1817.	1723.	1184.	0.
OHORIZONTAL MEMBER STRESSES FOR DL+LL MAX POS BOTTOM FIBER											
0 1	0.	-459.	-668.	-705.	-519.	-216.	100.	413.	733.	1017.	1226.
0 2	1226.	886.	-205.	-2009.	-3184.	-3529.	-3184.	-2009.	-205.	886.	1226.
0 3	1226.	1017.	733.	413.	100.	-216.	-519.	-705.	-668.	-459.	0.
OHORIZONTAL MEMBER STRESSES FOR DL+LL MAX POS TOP FIBER											
0 1	0.	165.	240.	254.	187.	81.	-38.	-162.	-294.	-414.	-505.
0 2	-505.	-337.	74.	723.	1146.	1270.	1146.	723.	74.	-337.	-505.

0 3 -505. -414. -294. -162. -38. 81. 187. 254. 240. 165. 0.
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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ;M.MOHSANI 2/95

LIVE LOAD SHEAR ENVELOPES AND ASSOCIATED MOMENTS

*** SPECIAL TRUCK WITH 8 AXLES WAS REQUESTED THIS LIVE LOAD ***

MEMBER	1 LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
OPOS. V	348.3	290.7	235.3	182.5	132.8	99.7	73.7	48.9	20.4	11.2	11.2
MOM.	0.	1337.	2165.	2519.	2443.	2294.	2034.	1576.	946.	464.	515.
NEG. V	-200.4	-200.4	-200.4	-200.4	-235.5	-282.8	-324.0	-358.9	-387.9	-429.0	-482.5
MOM.	0.	-922.	-1844.	-2766.	-301.	-1185.	-2336.	-3660.	-5090.	-3376.	-5294.
RANGE	548.8	491.2	435.7	383.0	368.2	382.6	397.7	407.8	408.3	440.2	493.7

LIVE LOAD SHEAR ENVELOPES AND ASSOCIATED MOMENTS

*** SPECIAL TRUCK WITH 8 AXLES WAS REQUESTED THIS LIVE LOAD ***

MEMBER	2 LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
OPOS. V	543.3	462.5	381.1	308.8	227.8	142.6	77.4	38.3	13.3	13.3	13.3
MOM.	-8208.	-3775.	253.	2783.	4426.	4939.	2813.	1772.	203.	359.	515.
NEG. V	-13.3	-13.3	-13.3	-38.3	-77.4	-142.6	-227.8	-308.8	-381.1	-462.5	-543.3
MOM.	515.	359.	203.	1772.	2813.	4939.	4426.	2783.	253.	-3775.	-8208.
RANGE	556.6	475.9	394.5	347.0	305.2	285.2	305.2	347.0	394.5	475.9	556.6

LIVE LOAD SHEAR ENVELOPES AND ASSOCIATED MOMENTS

*** SPECIAL TRUCK WITH 8 AXLES WAS REQUESTED THIS LIVE LOAD ***

MEMBER	3 LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
OPOS. V	482.5	429.0	387.9	358.9	324.0	282.8	235.5	200.4	200.4	200.4	200.4
MOM.	-5294.	-3376.	-5090.	-3660.	-2336.	-1185.	-301.	-2766.	-1844.	-922.	0.
NEG. V	-11.2	-11.2	-20.4	-48.9	-73.7	-99.7	-132.8	-182.5	-235.3	-290.7	-348.3
MOM.	515.	464.	946.	1576.	2034.	2294.	2443.	2519.	2165.	1337.	0.
RANGE	493.7	440.2	408.3	407.8	397.7	382.6	368.2	383.0	435.7	491.2	548.8

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ;M.MOHSANI 2/95

DEAD LOAD PLUS LIVE LOAD SHEAR ENVELOPE

*** SPECIAL TRUCK WITH 8 AXLES WAS REQUESTED THIS LIVE LOAD ***

MEMBER	1 LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
OPOS. V	331.1	241.4	153.9	69.1	-12.7	-78.5	-138.5	-198.6	-263.8	-311.0	-350.2
NEG. V	-217.7	-249.7	-281.8	-313.9	-380.9	-461.0	-536.3	-606.4	-672.1	-751.2	-844.0

DEAD LOAD PLUS LIVE LOAD SHEAR ENVELOPE

*** SPECIAL TRUCK WITH 8 AXLES WAS REQUESTED THIS LIVE LOAD ***

MEMBER	2 LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
OPOS. V	970.5	795.3	631.2	477.3	309.3	142.6	-4.1	-130.2	-236.7	-319.4	-413.9
NEG. V	413.9	319.4	236.7	130.2	4.1	-142.6	-309.3	-477.3	-631.2	-795.3	-970.5

DEAD LOAD PLUS LIVE LOAD SHEAR ENVELOPE

*** SPECIAL TRUCK WITH 8 AXLES WAS REQUESTED THIS LIVE LOAD ***

MEMBER	3 LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
OPOS. V	844.0	751.2	672.1	606.4	536.3	461.0	380.9	313.9	281.8	249.7	217.7
NEG. V	350.2	311.0	263.8	198.6	138.5	78.5	12.7	-69.1	-153.9	-241.4	-331.1

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ;M.MOHSANI 2/95

*** SPECIAL TRUCK WITH 8 AXLES WAS REQUESTED THIS LIVE LOAD ***

LIVE LOAD SUPPORT RESULTS

		MAX. AXIAL LOAD			MAX. LONGITUDINAL MOMENT		
		AXIAL LOAD	TOP	BOT.	AXIAL LOAD	TOP	BOT.
OSUPPORT JT. 1	POSITIVE	282.2	0.	0.	0.0	0.	0.
	NEGATIVE	-162.4	0.	0.	0.0	0.	0.
MEMBER 4	POSITIVE	611.8	0.	0.	0.0	0.	0.
	NEGATIVE	-19.9	0.	0.	0.0	0.	0.
MEMBER 5	POSITIVE	611.8	0.	0.	0.0	0.	0.
	NEGATIVE	-19.9	0.	0.	0.0	0.	0.
OSUPPORT JT. 4	POSITIVE	282.2	0.	0.	0.0	0.	0.
	NEGATIVE	-162.4	0.	0.	0.0	0.	0.

0 THE RATIO OF SUBSTRUCTURE / SUPERSTRUCTURE LOADING IS 0.810

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ;M.MOHSANI 2/95

0 PRESTRESS COMBINATION DATA

0 NO PRESTRESS COMBINATION DATA GIVEN SO DEFAULTS WERE USED.

0 LIVE LOAD NUMBER '1' RESULTS USED FOR P/S DESIGN AND OTHER LIVE LOADS, IF PRESENTED, ALSO WILL BE CHECKED TO DETERMINE THE ULTIMATE MOMENT CAPACITY.

0 THE FOLLOWING VALUES ARE BEING USED IN THE CALCULATION OF MOMENT & SHEAR REQUIREMENTS.

0 D.L. LOAD FACTOR: 1.30

L.L. LOAD FACTOR: 2.17 OR 1.30

PHI FACTOR FOR SHEAR : 0.90

PHI FACTOR FOR MOMENT: 0.95

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0 LL NO. 1 ULTIMATE MOMENT APPLIED = 1.30 X (DL+ADL) + 2.17 X (LL+I) + 1.00 X (P/S SEC. MOMENT)
0 LL NO. 2 ULTIMATE MOMENT APPLIED = 1.30 X (DL+ADL) + 2.17 X (LL+I) + 1.00 X (P/S SEC. MOMENT)
0 LL NO. 4 ULTIMATE MOMENT APPLIED = 1.30 X (DL+ADL) + 1.30 X (LL+I) + 1.00 X (P/S SEC. MOMENT)
0 LL NO. 1 ULTIMATE SHEAR APPLIED = 1.30 X (DL+ADL) + 2.17 X (LL+I) + 1.00 X (P/S SEC. SHEAR)
0 LL NO. 2 ULTIMATE SHEAR APPLIED = 1.30 X (DL+ADL) + 2.17 X (LL+I) + 1.00 X (P/S SEC. SHEAR)
0 LL NO. 4 ULTIMATE SHEAR APPLIED = 1.30 X (DL+ADL) + 1.30 X (LL+I) + 1.00 X (P/S SEC. SHEAR)
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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ;M.MOHSENI 2/95

0INPUT PRESTRESSED DATA

0TRIAL 1 FRAME 1 PATH 01

0 MEM

NO.	LLT/X	LLP/Y	LRT/Z	YLT/TYPE	YLP/SLOPE	YRT	U	K
0 1	0.00	0.50	0.25	1.10	1.10	1.00	0.25	0.0002
0 2	0.20	0.50	0.20	1.00	3.17	1.00	0.25	0.0002
0 3	0.25	0.50	0.00	1.00	1.10	1.10	0.25	0.0002

0XLT(FT) = 0.0 XRT(FT) = 0.0 STEEL STRESS(KSI) = 270. JACKING % = 0.75 JACKING ENDS = B
 0ANCHOR SET(IN); LEFT = 0.625 RIGHT = 0.625 CONC. STRENGTH(Psi) = 4500. ALLOW. TENSION(Psi) = -402.
 0P-JACK(KIPS) = 6865. SHORTENING PERCENT= 50 TOTAL LOSSES(KSI) = 38 RELATIVE HUMIDITY % = 60.
 0LOW-LAX = NO PLOT PATHS = NO PLOT STRESSES = NO

0CABLE PATH OFFSETS

MEMBER	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
0 1	1.10	1.10	1.10	1.10	1.10	1.10	1.09	1.07	1.03	1.01	1.00
0 2	1.00	1.22	1.87	2.59	3.03	3.17	3.03	2.59	1.87	1.22	1.00
0 3	1.00	1.01	1.03	1.07	1.09	1.10	1.10	1.10	1.10	1.10	1.10

0CABLE PATH ECCENTRICITIES

0 1	0.094	0.094	0.094	0.094	0.094	-0.034	-0.171	-0.324	-0.489	-0.642	-0.751
0 2	-0.751	-0.006	0.862	1.586	2.020	2.164	2.020	1.586	0.862	-0.006	-0.751
0 3	-0.751	-0.642	-0.489	-0.324	-0.171	-0.034	0.094	0.094	0.094	0.094	0.094

0FORCE COEFFICIENTS

0 1	0.697	0.698	0.699	0.700	0.701	0.702	0.704	0.705	0.707	0.709	0.710
0 2	0.710	0.721	0.732	0.739	0.747	0.754	0.747	0.739	0.732	0.721	0.710
0 3	0.710	0.709	0.707	0.705	0.704	0.702	0.701	0.700	0.699	0.698	0.697

0THE POINT OF NO MOVEMENT FOR PRESTRESSING IS IN SPAN 2, 58.50 FEET FROM THE LEFT END OF THE SPAN

0THE LEFT ANCHOR SET LENGTH IS 103.99 THE RIGHT ANCHOR SET LENGTH IS 103.99

0THE FORCE COEF. AT THE LEFT END IS 0.697 THE FORCE COEF. AT THE RIGHT END IS 0.697

0INITIAL FORCE COEFF. AT POINT OF NO MOVEMENT = 0.942

0 ***** CONSIDER ONE END JACKING AS TWO END JACKING IS NOT VERY ECONOMICAL IN THIS PROBLEM. *****

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ;M.MOHSENI 2/95

0SECONDARY MOMENT DUE TO PJACK = 1

0TRIAL 1 FRAME 1 PATH 01

FEM'S DUE TO SECONDARY EFFECTS BEFORE BALANCING

MEMBER	LEFT END	RIGHT END	MEMBER	LEFT END	RIGHT END	MEMBER	LEFT END	RIGHT END
0 1	0.000	-0.231	2	0.951	0.951	3	-0.231	0.000
0 1	0.000	0.813	2	0.813	0.813	3	0.813	0.000

DEM'S DUE TO SECONDARY EFFECTS --- UNIT = K-FT

DEM'S DUE TO SECONDARY EFFECTS IN COLUMN --- UNIT = K-FT

0P/S MOMENT COEF.

*** FRAME DOES NOT SWAY WITH THIS LOADING. ***

ADJUSTED FOR LOSSES & SECONDARY MOMENTS BUT NO SHORTENING

MEM

NO	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
0 1	-0.0659	0.0153	0.0965	0.1778	0.2590	0.4307	0.6084	0.7979	0.9963	1.1868	1.3466
0 2	1.3466	0.8172	0.1818	-0.3589	-0.6960	-0.8201	-0.6960	-0.3589	0.1818	0.8172	1.3466
0 3	1.3466	1.1868	0.9963	0.7979	0.6084	0.4307	0.2590	0.1778	0.0965	0.0153	-0.0659

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ;M.MOHSENI 2/95

0FEMS DELTAS IN COLUMNS DUE TO SHORTENING - PJACK=1

0TRIAL = 1 FRAME =1 PATH =01

0 MEM

NO	LT. END	FEM	RT. END	DELTA TOP OF COL.
0 4	-0.01509158	0.00000000	0.00000000	0.00000161
0 5	0.01509158	0.00000000	0.00000000	-0.00000161

0***** POINT OF NO MOVEMENT FOR STRUCTURE SHORTENING IS, 58.5 FEET FROM THE LEFT END OF SPAN 2 *****

***** INFORMATION PROVIDED ABOVE ALSO CAN BE USED AS AN AID TO DETERMINE THE MOVEMENT RATING "MR". *****

0P/S MOMENT COEF.

ADJUSTED FOR LOSSES & SECONDARY MOMENTS & SHORTENING

MEM

NO	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
0 1	-0.0659	0.0153	0.0965	0.1778	0.2590	0.4307	0.6084	0.7979	0.9963	1.1868	1.3466
0 2	1.3466	0.8172	0.1818	-0.3589	-0.6960	-0.8201	-0.6960	-0.3589	0.1818	0.8172	1.3466
0 3	1.3466	1.1868	0.9963	0.7979	0.6084	0.4307	0.2590	0.1778	0.0965	0.0153	-0.0659

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ;M.MOHSENI 2/95
 OFEMS DELTAS IN COLUMNS DUE TO SHORTENING - PJACK=1
 OTRIAL = 1 FRAME =1 PATH =01
 0 MEM FEM FEM FEM DELTA TOP OF COL.
 NO LT. END RT. END (POSITIVE TO RIGHT) --- UNIT = FT
 0 4 -0.01509158 0.00000000 0.0000161
 0 5 0.01509158 0.00000000 -0.0000161
 ***** POINT OF NO MOVEMENT FOR STRUCTURE SHORTENING IS, 58.5 FEET FROM THE LEFT END OF SPAN 2 *****
 ***** INFORMATION PROVIDED ABOVE ALSO CAN BE USED AS AN AID TO DETERMINE THE MOVEMENT RATING "MR". *****
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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ;M.MOHSENI 2/95
 OTRIAL 1 FRAME 1 PATH 01
 OHORIZONTAL MEMBER STRESSES PRESTRESS ONLY BOTTOM FIBER AFTER ALL LOSSES (PSI)
 MEM
 NO LEFT .1 PT .2 PT .3 PT .4 PT .5 PT .6 PT .7 PT .8 PT .9 PT RIGHT
 0 1 891. 676. 460. 245. 30. -152. -306. -459. -610. -741. -851.
 0 2 -851. -692. 267. 1714. 2620. 2958. 2620. 1714. 267. -692. -851.
 0 3 -851. -741. -610. -459. -306. -152. 30. 245. 460. 676. 891.
 OHORIZONTAL MEMBER STRESSES PRESTRESS ONLY TOP FIBER AFTER ALL LOSSES (PSI)
 0 1 652. 731. 810. 889. 967. 1006. 1040. 1077. 1117. 1151. 1183.
 0 2 1183. 1217. 925. 414. 100. -12. 100. 414. 925. 1217. 1183.
 0 3 1183. 1151. 1117. 1077. 1040. 1006. 967. 889. 810. 731. 652.
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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ;M.MOHSENI 2/95
 OTRIAL 1 FRAME 1 PATH 01
 OHORIZONTAL MEMBER MOMENTS DUE TO P/S
 MEM
 NO LEFT .1 PT .2 PT .3 PT .4 PT .5 PT .6 PT .7 PT .8 PT .9 PT RIGHT
 0 1 -452. 105. 663. 1220. 1778. 2957. 4177. 5477. 6839. 8147. 9245.
 0 2 9245. 5610. 1248. -2464. -4778. -5630. -4778. -2464. 1248. 5610. 9245.
 0 3 9245. 8147. 6839. 5477. 4177. 2957. 1778. 1220. 663. 105. -452.
 OVERTICAL MEMBER MOMENTS DUE TO P/S
 MEM
 NO LEFT .1 PT .2 PT .3 PT .4 PT .5 PT .6 PT .7 PT .8 PT .9 PT RIGHT
 0 4 -104. -93. -83. -73. -62. -52. -41. -31. -21. -10. 0.
 0 5 104. 93. 83. 73. 62. 52. 41. 31. 21. 10. 0.
 OTANGENTIAL ROTATIONS - RADIANS - CLOCKWISE POSITIVE
 SPAN LT. END RT. END SPAN LT. END RT. END SPAN LT. END RT. END
 0 1 0.000926 -0.001692 2 -0.001692 0.001692 3 0.001692 -0.000926
 0 4 -0.000277 0.000138 5 0.000277 -0.000138
 OHORIZONTAL MEMBER DEFLECTIONS IN FEET AT 1/ 4 POINTS FROM LEFT END - DOWNWARD POSITIVE
 0 MEMBER 1 E= 3865. 0.000 0.011 0.017 0.014 0.000
 0 MEMBER 2 E= 3865. 0.000 -0.092 -0.165 -0.092 0.000
 0 MEMBER 3 E= 3865. 0.000 0.014 0.017 0.011 0.000
 OVERTICAL MEMBER DEFLECTIONS IN FEET AT 1/ 4 POINTS FROM LEFT END.
 0 MEMBER 4 E= 3250. 0.000 -0.001 -0.001 -0.001 0.000
 0 MEMBER 5 E= 3250. 0.000 0.001 0.001 0.001 0.000
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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ;M.MOHSENI 2/95
 OTRIAL 1 FRAME 1
 OHORIZONTAL MEMBER STRESSES FOR ALL P/S PATHS BEFORE LOSSES BOTTOM FIBER (PSI)
 MEM
 NO LEFT .1 PT .2 PT .3 PT .4 PT .5 PT .6 PT .7 PT .8 PT .9 PT RIGHT
 0 1 1131. 861. 591. 321. 51. -180. -376. -570. -760. -926. -1065.
 0 2 -1065. -860. 345. 2154. 3277. 3687. 3277. 2154. 345. -860. -1065.
 0 3 -1065. -926. -760. -570. -376. -180. 51. 321. 591. 861. 1131.
 OHORIZONTAL MEMBER STRESSES FOR ALL P/S PATHS BEFORE LOSSES TOP FIBER (PSI)
 0 1 828. 926. 1025. 1123. 1221. 1270. 1313. 1360. 1409. 1452. 1491.
 0 2 1491. 1530. 1159. 518. 125. -12. 125. 518. 1159. 1530. 1491.
 0 3 1491. 1452. 1409. 1360. 1313. 1270. 1221. 1123. 1025. 926. 828.
 LIAI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 07-JUL-95

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ;M.MOHSENI 2/95
 OTRIAL 1 FRAME 1
 OHORIZONTAL MEMBER STRESSES FOR ALL P/S PATHS AFTER ALL LOSSES BOTTOM FIBER (PSI)
 MEM
 NO LEFT .1 PT .2 PT .3 PT .4 PT .5 PT .6 PT .7 PT .8 PT .9 PT RIGHT
 0 1 891. 676. 460. 245. 30. -152. -306. -459. -610. -741. -851.
 0 2 -851. -692. 267. 1714. 2620. 2958. 2620. 1714. 267. -692. -851.
 0 3 -851. -741. -610. -459. -306. -152. 30. 245. 460. 676. 891.
 OHORIZONTAL MEMBER STRESSES FOR ALL P/S PATHS AFTER ALL LOSSES TOP FIBER (PSI)
 0 1 652. 731. 810. 889. 967. 1006. 1040. 1077. 1117. 1151. 1183.
 0 2 1183. 1217. 925. 414. 100. -12. 100. 414. 925. 1217. 1183.
 0 3 1183. 1151. 1117. 1077. 1040. 1006. 967. 889. 810. 731. 652.
 LIAI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 07-JUL-95

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ;M.MOHSENI 2/95
 OTRIAL 1 FRAME 1
 OHORIZONTAL MEMBER STRESSES DL + P/S BEFORE ALL LOSSES BOTTOM FIBER (PSI)

```
MEM
NO LEFT .1 PT .2 PT .3 PT .4 PT .5 PT .6 PT .7 PT .8 PT .9 PT RIGHT
0 1 1131. 920. 767. 671. 632. 459. 355. 275. 216. 198. 241.
0 2 241. 115. 557. 1416. 1976. 2201. 1976. 1416. 557. 115. 241.
0 3 241. 198. 216. 275. 355. 459. 632. 671. 767. 920. 1131.
OHORIZONTAL MEMBER STRESSES DL + P/S BEFORE ALL LOSSESTOP FIBER (PSI)
0 1 828. 905. 961. 997. 1012. 1032. 1033. 1028. 1018. 994. 953.
0 2 953. 1159. 1082. 783. 593. 523. 593. 783. 1082. 1159. 953.
0 3 953. 994. 1018. 1028. 1033. 1032. 1012. 997. 961. 905. 828.
LIAI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 07-JUL-95
```

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ;M.MOHSENI 2/95

```
OTRIAL 1 FRAME 1
OHORIZONTAL MEMBER STRESSES DL + P/S AFTER ALL LOSSES BOTTOM FIBER (PSI)
MEM
NO LEFT .1 PT .2 PT .3 PT .4 PT .5 PT .6 PT .7 PT .8 PT .9 PT RIGHT
0 1 891. 735. 636. 595. 610. 488. 425. 386. 367. 383. 455.
0 2 455. 283. 479. 976. 1319. 1472. 1319. 976. 479. 283. 455.
0 3 455. 383. 367. 386. 425. 488. 610. 595. 636. 735. 891.
OHORIZONTAL MEMBER STRESSES DL + P/S AFTER ALL LOSSES TOP FIBER (PSI)
0 1 652. 710. 747. 763. 758. 768. 760. 746. 726. 693. 645.
0 2 645. 847. 849. 680. 568. 523. 568. 680. 849. 847. 645.
0 3 645. 693. 726. 746. 760. 768. 758. 763. 747. 710. 652.
OHORIZONTAL MEMBER STRESSES DL + ADDED DL + P/S AFTER ALL LOSSES BOTTOM FIBER (PSI)
0 1 891. 758. 704. 730. 835. 735. 708. 712. 741. 811. 949.
0 2 949. 653. 558. 696. 823. 904. 823. 696. 558. 653. 949.
0 3 949. 811. 741. 712. 708. 735. 835. 730. 704. 758. 891.
OHORIZONTAL MEMBER STRESSES DL + ADDED DL + P/S AFTER ALL LOSSES TOP FIBER (PSI)
0 1 652. 702. 722. 714. 678. 676. 652. 618. 576. 519. 441.
0 2 441. 706. 820. 781. 746. 727. 746. 781. 820. 706. 441.
0 3 441. 519. 576. 618. 652. 676. 677. 714. 722. 702. 652.
LIAI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 07-JUL-95
```

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ;M.MOHSENI 2/95

```
OTRIAL 1 FRAME 1
OHORIZONTAL MEMBER STRESSES DL + ADDED DL + MAX POS LL + I + P/S BOTTOM FIBER (PSI)
MEM
NO LEFT .1 PT .2 PT .3 PT .4 PT .5 PT .6 PT .7 PT .8 PT .9 PT RIGHT
0 1 891. 394. 95. -14. 28. 156. 255. 383. 531. 732. 895.
0 2 895. 568. 131. -146. -334. -351. -334. -146. 131. 568. 895.
0 3 895. 732. 531. 383. 255. 156. 28. -14. 95. 394. 891.
OHORIZONTAL MEMBER STRESSES DL + ADDED DL + MAX POS LL + I + P/S TOP FIBER (PSI)
0 1 652. 833. 941. 982. 968. 892. 825. 747. 660. 551. 463.
0 2 463. 739. 974. 1084. 1163. 1179. 1163. 1084. 974. 739. 463.
0 3 463. 551. 660. 747. 825. 892. 968. 982. 941. 833. 652.
OHORIZONTAL MEMBER STRESSES DL + ADDED DL + MAX NEG LL + I + P/S BOTTOM FIBER (PSI)
0 1 891. 941. 1070. 1279. 1567. 1408. 1368. 1377. 1422. 1512. 1684.
0 2 1684. 1273. 910. 847. 933. 991. 933. 847. 910. 1273. 1684.
0 3 1684. 1512. 1422. 1377. 1368. 1408. 1567. 1279. 1070. 941. 891.
OHORIZONTAL MEMBER STRESSES DL + ADDED DL + MAX NEG LL+ I + P/S FOR TOP FIBER (PSI)
0 1 652. 636. 590. 517. 414. 425. 399. 357. 304. 234. 138.
0 2 138. 471. 694. 726. 707. 696. 707. 726. 694. 471. 138.
0 3 138. 234. 304. 357. 399. 425. 414. 517. 590. 636. 652.
```

0**** MIN PJACK = 6870. KIPS CONC STRENGTH AT 28 DAYS = 4210. PSI AT STRESSING = 4001. PSI ****

LIAI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 07-JUL-95

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ;M.MOHSENI 2/95

```
OTOTAL PE MOMENTS FOR ALL MEMBERS.
MEM
NO LEFT .1 PT .2 PT .3 PT .4 PT .5 PT .6 PT .7 PT .8 PT .9 PT RIGHT
0 1 -452. 105. 663. 1220. 1778. 2957. 4177. 5477. 6839. 8147. 9245.
0 2 9245. 5610. 1248. -2464. -4778. -5630. -4778. -2464. 1248. 5610. 9245.
0 3 9245. 8147. 6839. 5477. 4177. 2957. 1778. 1220. 663. 105. -452.
0 4 -104. -93. -83. -73. -62. -52. -41. -31. -21. -10. 0.
0 5 104. 93. 83. 73. 62. 52. 41. 31. 21. 10. 0.
OTOTAL P/S DEFLECTION FOR TRIAL
OTANGENTIAL ROTATIONS - RADIANS - CLOCKWISE POSITIVE
SPAN LT. END RT. END SPAN LT. END RT. END SPAN LT. END RT. END
0 1 0.000926 -0.001692 2 -0.001692 0.001692 3 0.001692 -0.000926
0 4 -0.000277 0.000138 5 0.000277 -0.000138
OHORIZONTAL MEMBER DEFLECTIONS IN FEET AT 1/ 4 POINTS FROM LEFT END - DOWNWARD POSITIVE
0 MEMBER 1 E= 3865. 0.000 0.011 0.017 0.014 0.000
0 MEMBER 2 E= 3865. 0.000 -0.092 -0.165 -0.092 0.000
0 MEMBER 3 E= 3865. 0.000 0.014 0.017 0.011 0.000
OVERTICAL MEMBER DEFLECTIONS IN FEET AT 1/ 4 POINTS FROM LEFT END.
0 MEMBER 4 E= 3250. 0.000 -0.001 -0.001 -0.001 0.000
0 MEMBER 5 E= 3250. 0.000 0.001 0.001 0.001 0.000
LIAI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 07-JUL-95
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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ;M.MOHSENI 2/95

```
OTOTAL TOP PF FOR TRIAL
MEM
NO LEFT .1 PT .2 PT .3 PT .4 PT .5 PT .6 PT .7 PT .8 PT .9 PT RIGHT
```

```

0 1      0.      0.      0.      0.      0.      4819.    4830.    4843.    4853.    4865.    4878.
0 2    4878.    4947.      0.      0.      0.      0.      0.      0.      0.      4947.    4878.
0 3    4878.    4865.    4853.    4843.    4830.    4819.      0.      0.      0.      0.      0.
OTOTAL BOTTOM PF FOR TRIAL
0 1    4787.    4794.    4800.    4806.    4813.      0.      0.      0.      0.      0.      0.
0 2      0.      0.    5025.    5073.    5129.    5180.    5129.    5073.    5025.      0.      0.
0 3      0.      0.      0.      0.      0.      0.    4813.    4806.    4800.    4794.    4787.
1IAI-BDS      Version 4.0.13      Licensed to: Colorado DOT      Run time: 07-JUL-95
    
```

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ;M.MOHSENI 2/95
0 LONG TERM LOSSES
TOTAL LOSS (KSI) = SH + ES + CRC + CRS
MEM
NO LEFT .1 PT .2 PT .3 PT .4 PT .5 PT .6 PT .7 PT .8 PT .9 PT RIGHT
0 1 32.8 32.8 32.8 32.9 33.0 32.6 32.5 32.3 32.2 32.0 31.7
0 2 31.7 33.7 35.8 40.8 45.8 48.4 45.8 40.8 35.8 33.7 31.7
0 3 31.7 32.0 32.2 32.3 32.5 32.6 33.0 32.9 32.8 32.8 32.8
0 SHEAR DESIGN - AASHTO 1980
MEMBER: 1
LEFT .1 PT .2 PT .3 PT .4 PT .5 PT .6 PT .7 PT .8 PT .9 PT RIGHT
0V-CABLE 0. 0. 0. 0. 0. 1. 17. 34. 34. 17. 2.
SECONDARY 121. 121. 121. 121. 121. 121. 121. 121. 121. 121. 121.
VU 608. 475. 345. 344. 447. 568. 682. 789. 891. 1010. 1146.
VC 984. 698. 950. 857. 734. 817. 862. 892. 915. 932. 937.
REQD WEB 60. 60. 60. 60. 60. 60. 60. 60. 60. 60. 60.
AS(IN)/FT 0.60 * 0.60 * 0.60 * 0.60 * 0.60 * 0.60 * 0.60 * 0.60 * 0.60 * 0.69 1.17
MEMBER: 2
0V-CABLE 23. 183. 352. 251. 127. 0. 127. 251. 352. 183. 11.
SECONDARY 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.
VU 1468. 1199. 947. 721. 480. 244. 480. 721. 947. 1199. 1468.
VC 1337. 1315. 976. 549. 354. 250. 354. 549. 976. 1315. 1337.
REQD WEB 60. 60. 60. 60. 60. 60. 60. 60. 60. 60. 60.
AS(IN)/FT 1.02 0.60 * 0.60 * 1.39 0.98 0.60 * 0.98 1.39 0.60 * 0.60 * 1.02
MEMBER: 3
0V-CABLE 2. 17. 34. 34. 17. 1. 0. 0. 0. 0. 0.
SECONDARY -121. -121. -121. -121. -121. -121. -121. -121. -121. -121. -121.
VU 1146. 1010. 891. 789. 682. 568. 447. 344. 345. 475. 608.
VC 937. 932. 915. 892. 862. 817. 734. 857. 950. 698. 984.
REQD WEB 60. 60. 60. 60. 60. 60. 60. 60. 60. 60. 60.
AS(IN)/FT 1.17 0.69 0.60 * 0.60 * 0.60 * 0.60 * 0.60 * 0.60 * 0.60 * 0.60 * 0.60 *
    
```

ONOTE: * AFTER REQD WEB INDICATES ADDITIONAL WEB WIDTH REQD. * AFTER AS(IN)/FT INDICATES MINIMUM REQD.
 1IAI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 07-JUL-95

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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ;M.MOHSENI 2/95
0 AASHTO ULTIMATE MOMENT
SECOND ULT MOM ULT MOM AVERAGE NEUTRAL MILD STEEL COMBINED ULT MOM ULT MOM
MOMENT APPLD P/S CAP FSU AXIS REQD REINFORCEMENT MILD CAP TOTAL CAP
(K-FT) (K-FT) (K-FT) (KSI) (IN) (SQ.IN) INDEX (K-FT) (K-FT)
0 ***** ULTIMATE MOMENT NOT CALCULATED BECAUSE USER DID NOT USE SUPERSTRUCTURE SECTIONS
OR USER DID NOT USE '250' DATA CARD
0 TENDON ELONGATION
PATH NO. P-JACK % JACK FY AS AVE STRESS TENDON LENGTH ELONGATION
(KIPS) (K-FT) (KSI) (SQ IN) (KSI) (FT) * (IN)
0 01 6870. 75. 270. 33.93 199.39 213.00 18.20
ONOTE: TENDON LENGTH INCLUDES 4 FEET FOR JACKS.
0 MODULUS USED FOR P/S STEEL IS 28000. KSI
1IAI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 07-JUL-95
    
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Structure E-16-IN ; CSGCP ; SH-76 ; Proj#I-761(84) ;M.MOHSENI 2/95
0 'APPROXIMATE QUANTITY'
***** CONCRETE SUPER 397 C.Y. *****
***** CONCRETE SUB 23 C.Y. *****
***** P/S TRIAL 24090 LBS. *****
0 THE SUPERSTRUCTURE CONCRETE QUANTITY IS BASED ON THE UNIT
WEIGHT OF CONCRETE SUPPLIED ON THE FRAME DESCRIPTION CARD.
IT ASSUMES THAT ALL THE DEAD LOAD IS GIVEN IN TRIAL 0.
THE CONCRETE SUBSTRUCTURE QUANTITY IS BASED ON TRIAL 0 ONLY.
THE P/S QUANTITIES FOR STRAND ONLY ARE FOR EACH TRIAL, THAT
WAS ENTERED AND IN THAT ORDER. STRAND USE IS BASED ON THE
LENGTH FROM ANCHOR TO ANCHOR.
LEND OF JOB - 022086
0 INCREMENTED CPU TIME (SECONDS)= 1.
INCREMENTED CLOCK TIME (SECONDS)= 8.
    
```

9B-5b CBGCP EXAMPLE

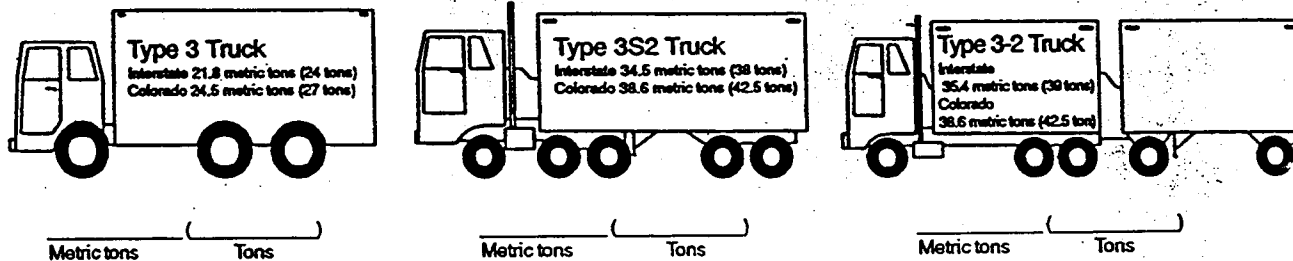
This is a 2 span Concrete Box Girder Continuous Post-Tensioned structure. It consists of two horizontal members and three vertical members. Members have left and right end joint associated with them and are connected together by specifying the appropriate joint numbers. BDS or the new version of California Frame program is used to model the structure.

COLORADO DEPARTMENT OF TRANSPORTATION LOAD FACTOR RATING SUMMARY	Structure # <i>G-04-AL</i>
	State highway # <i>70</i>
Rated using Asphalt thickness: <i>50</i> mm (<i>2.0</i> in.) <input checked="" type="checkbox"/> Colorado legal loads <input type="checkbox"/> Interstate legal loads	Batch I.D. <i>C81009</i>
	Structure type <i>CBGCP</i>
	Parallel structure # _____

Structural member	<i>GIRDER</i>	<i>SLAB</i>		
-------------------	---------------	-------------	--	--

Metric tons (Tons)

Inventory	<i>34.0 (37.4)</i>	<i>30.36 (33.42)</i>	<i>()</i>	<i>()</i>
Operating	<i>60.9 (67.1)</i>	<i>50.6 (55.71)</i>	<i>()</i>	<i>()</i>
Type 3 truck	<i>()</i>	<i>()</i>	<i>()</i>	<i>()</i>
Type 3S2 truck	<i>()</i>	<i>()</i>	<i>()</i>	<i>()</i>
Type 3-2 truck	<i>()</i>	<i>()</i>	<i>()</i>	<i>()</i>
Permit truck	<i>148.9 (164.0)</i>	<i>()</i>	<i>()</i>	<i>()</i>



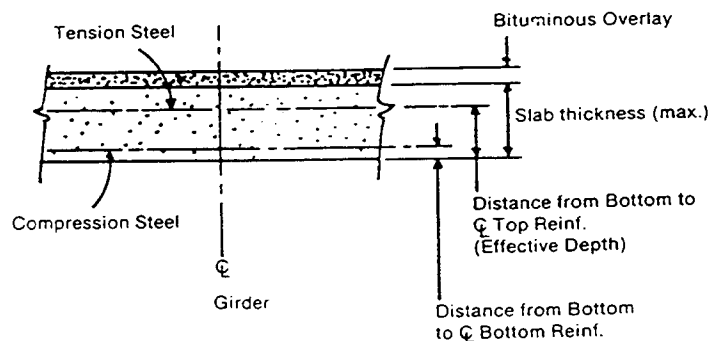
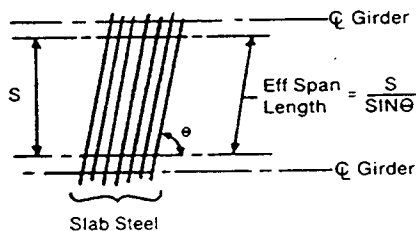
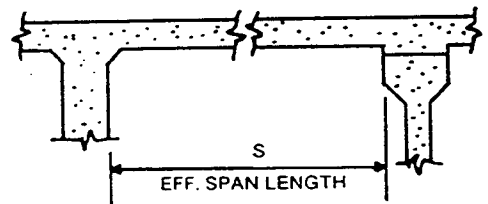
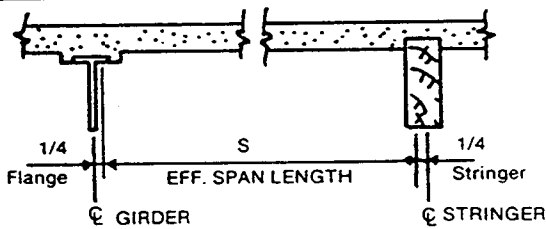
Comments			
<i>PROJ I70-1(75)57</i>			
<i>Designated color for overload map: WHITE</i>			
Rated by <i>Rater's Signature</i>		Checked by <i>checker's Signature</i>	
Date <i>Date</i>		Date <i>Date</i>	

Previous editions are obsolete and may not be used

DEPARTMENT OF HIGHWAYS
 DIVISION OF HIGHWAYS
 STATE OF COLORADO
 DOH Form 709
 July, 1985

CONCRETE SLAB RATING

DESCRIPTION	INPUT	UNITS	CARD IMAGE COLS.
LOAD TYPE: 1 = Colo. Trucks 2 = Interstate			1
STRUCTURE NUMBER:	G - 0 4 - A L -		2 - 8
RATER:	M.M.		9 - 11
HIGHWAY NUMBER:	7 0		12 - 14
BATCH I.D.:	C 8 1 0 0 9		15 - 20
COMMENTS:			21 - 41
EFFECTIVE SPAN LENGTH:	7 5 0 0	FEET	42 - 46
ACTUAL SLAB THICKNESS:	8 2 5 0	INCHES	47 - 51
EFFECTIVE DEPTH:	5 4 3 8	INCHES	52 - 56
TOP STEEL AREA:	0 7 4	In ² /Ft	57 - 59
ASPHALT OVERLAY:	3 5 0	INCHES	60 - 63
INV Fc (f'c load factor):	3 0 0 0	P.S.I.	64 - 67
INV Fs (Fy load factor):	4 0 0 0 0	P.S.I.	68 - 72
INV MODULAR RATIO: (load factor method: leave blank)		Es/Ec	73 - 74
DEPTH TO BOTT. REIN.:	1 3 1	INCHES	75 - 77
BOTT. STEEL AREA:	0 7 4	In ² /Ft	78 - 80



SLAB RATING Version 1.0
DATE: 95/03/06

STRUCTURE NO. G-04-AL RATER: MM STATE HWY NO. = 70
BATCH ID= C81009 DESCRIPTION: RATING LOAD FACTOR RATING-COMP STEEL NOT USED
LOAD FACTOR RATING-COMP STEEL NOT USED---LOAD FACTOR RATING-COMP STEEL NOT USED

INPUT DATA

EFF. SPAN(FT)= 7.500 EFF. DEPTH(INS)= 5.438
REINF. (SQ. IN)= .74 WEARING SURFACE(IN)= 3.50
SLAB TK(IN)= 8.250 CONC. STRENGTH(PSI) INV= 3000. OPER= 3000.
STEEL YIELD (PSI) INV= 40000. OPER= 40000.
N= 9.
DI= 1.31 AS1= .74

DEAD LOAD MOMENT .82 K-FT
LL+I MOMENT 4.94 K-FT
GROSS WEIGHT 36.0 TONS

	INVENTORY	OPERATING
ACTUAL CONCRETE STRESS (PSI)	1000.54	1566.78
ACTUAL REINF. STEEL STRESS (PSI)	18721.07	29316.04
ACTUAL COMP. STEEL STRESS (PSI)	4651.52	7283.99
MEMBER CAPACITY (K-FT)	11.00	11.00
MEMBER CAPACITY (LL+I) (K-FT)	9.94	9.94
RATING	(TONS) 33.42	55.71

Rater's signature & Date
Checker's signature & Date

COLORADO DEPARTMENT OF TRANSPORTATION
DESIGN COMPUTATIONS

INFORMATION FOR RATING From Advanced plans:

Live Load distribution factor = $\frac{\text{width}}{7.0} = \frac{34.5}{7} = 4.9286$ wheel lines

Dead Loads

Asphalt	$2\frac{1}{2} \times 32' \times 144 \#$	= 768 PLF (From Design plans)
curbs	$8\frac{1}{2} \times 1.25' \times 150 \# \times 2$	= 250
Rail	$61.12 \# \times 2$	= 122
		1140 PLF

Diaphragms (intermediate)

$(4'-8" - (8\frac{1}{4}" + 4")) \div 2 = 1.8229'$ $\frac{3}{12} = \frac{1}{4} = 21.875"$ $x = 5.5" = .4557'$

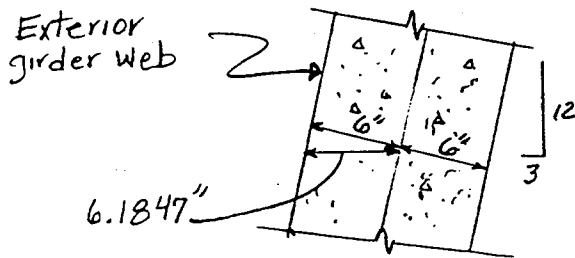
$[8'-6" - (6.1847" + 6" + 5.5)] \times 2 + (8'-6" - 1'-0") = 21.5526'$

$21.5526' \times 3.5' \times 8\frac{1}{2} = 50.29 \text{ ft}^3$

fillets = $(7.5' \times 4) + (3.5' \times 6) + (6.5' \times 2) = 64' \times (\frac{1}{2} \times \frac{3 \times 3}{144}) = 2.0 \text{ ft}^3/\text{side} \times 2 \text{ sides}$

Weight = $54.29 \times 150 = 8143.5 \text{ lbs. USE } 8.14 \text{ kips}$

Formwork - $7 \#/\text{ft}^2 \times 8.5' \times 3 = 178.5 \text{ PLF} = 0.179 \text{ KLF}$



COLORADO DEPARTMENT OF TRANSPORTATION		Sheet <u>1</u> of <u>9</u>
By: <u>MM</u> Date <u>3/95</u> REV.	Project No. <u>I70-1(75)57</u>	<u>CB1009</u>
Chk'd: Date	Structure No. <u>G-04-AL</u> REV. <u>LFD</u>	From <u>T&E NOTES 5-81</u>

COLORADO DEPARTMENT OF TRANSPORTATION
DESIGN COMPUTATIONS

FRAME DESCRIPTION:

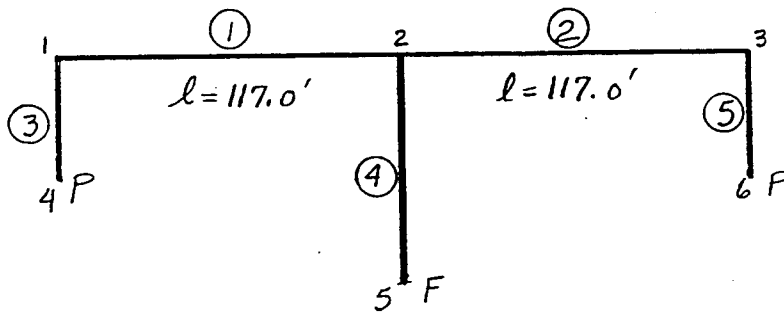
BDS (calframe) is RUN with abutments coded as vertical members.

Elev. Leftout Abut. 1 back face	4907.6743	} 9.4743'	} use 9.5'
Elev. Bottom of Abut.	4898.2		
Leftout Abut. 3 back face	4908.1448	} 9.5448'	
Elev. Bottom of Abut.	4898.6		

$Y_b = 2.77'$ (From design notes, section property calcs)

$4.6667' - 2.77 = 1.8967'$

$9.5 - (1.8967' + 0.5') = 7.10'$



$I = 34.0(2.5)^3 / 12 = 44.3 \text{ ft}^4$

Live Load input

Live Load lanes = $34.5' / (7 \times 2) = 2.4643$

COLORADO DEPARTMENT OF TRANSPORTATION		Sheet 2 of 9
By:MMDate REV. 3-95	Project No. I70-1(75)57	C81009
Chk'd: Date	Structure No. G-04-AL	REV. LFD From TCF NOTES 5-81

COLORADO DEPARTMENT OF TRANSPORTATION
DESIGN COMPUTATIONS

Frame Description (cont.)

Member 4 length:

Bottom of footing elev. 78.0
 footing depth 2.0
 80.0

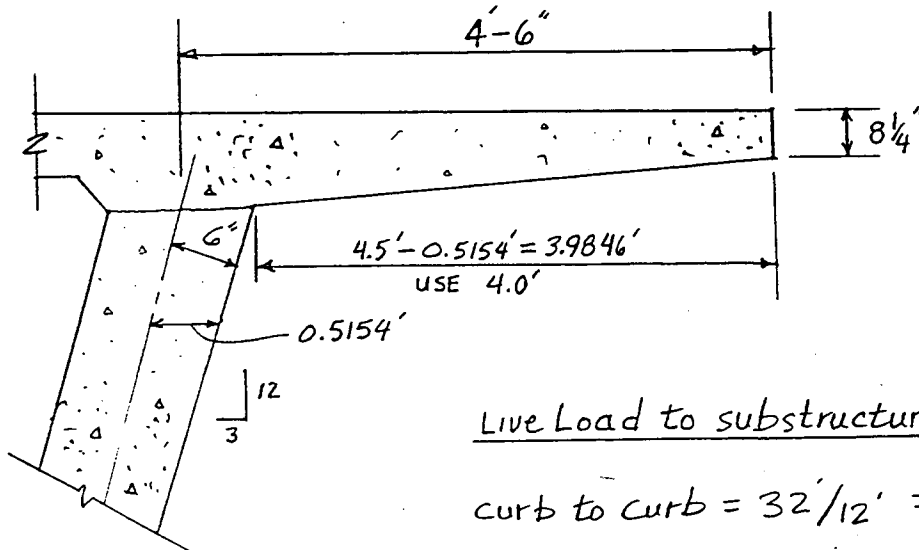
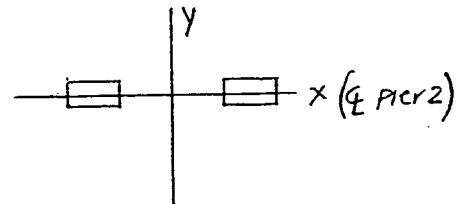
Top of column elev. $(0.76 + 0.41) / 2 + 103.0 = 103.585$
 Assumed 2.0' for y_b
 $+ 2.0$
 105.585
 $- 80.0$
 25.585'

$E = 150^{1.5} \cdot 33 \sqrt{4500} = 4066 \text{ KSI SUPERSTRUCTURE.}$

$E = 150^{1.5} \cdot 33 \sqrt{3000} = 3320 \text{ KSI PIER WALLS (SUBSTRUCTURE)}$

I_x (PIER WALL)

$4.05 \times 2^{3/12} \times 2 = 5.4 \text{ ft}^4$



Live Load to substructure:

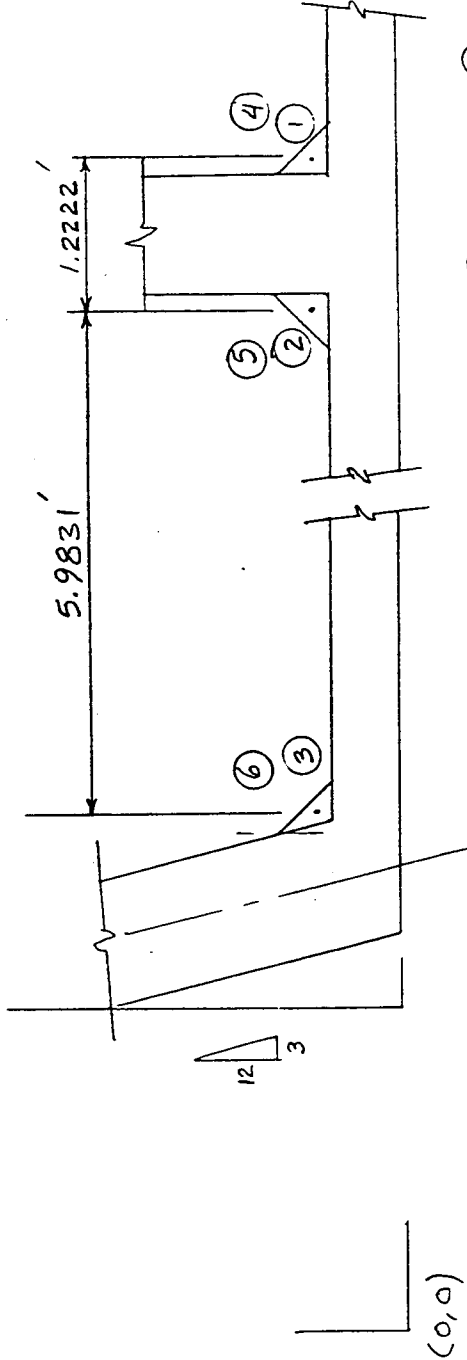
curb to curb = $32' / 12' = 2.6$ use 2 lanes.

2 lanes / 2 columns = 1 lane / column

By:MM Date 3/95 REV.		Project No. I70-1(75)57	C81009
Chkd: Date	Structure No. G-04-AL	REV. LFD	FROM TCF NOTES 5-81

COLORADO DEPARTMENT OF TRANSPORTATION
DESIGN COMPUTATIONS

code fillets @ bottom slab: (only coded when requiring more accuracy.)



$$X \quad 34.5/2 = \pm (4.25' - 0.5') = 17.25' \pm 3.75 = 21.0' \quad \textcircled{4} \quad \textcircled{1}$$

$$21.0 + 1.03' = 22.0' \quad \textcircled{5}$$

$$13.5 - 1.03' = 12.5' \quad \textcircled{2}$$

$$4.6667 - [(8\frac{1}{4} + 4'') + (5\frac{3}{4}'')] = 4.6667 - 1.5 = 3.1667'$$

$$3/12 = x/3.1667 \quad x = 0.7917'$$

$$x = \tan^{-1} \frac{3}{12} ; \quad 1/\cos \alpha = 1.0308' + 0.7917 = 1.8224'$$

$$8.5 - (1.8224' + 1.0/2) = 6.1776'$$

$$12.5' - 6.1776' = 6.3224' \quad \textcircled{3}$$

$$22.0' + 6.1776' = 28.1776' \quad \textcircled{6}$$

$$Y = 5\frac{3}{4}'' = 0.4792'$$

COLORADO DEPARTMENT OF TRANSPORTATION

Sheet 4 of 9

By: Date 3/95 REV.	Project No. I70-1 (75) 57	C81009
Chk'd: Date	Structure No. G-04-AL REV. LFD	From TCF NOTES 5-81

COLORADO DEPARTMENT OF TRANSPORTATION
DESIGN COMPUTATIONS

INVENTORY RATING

@ 1.0 or 3.0 point:

<u>Bottom Fiber (Psi)</u>			<u>Top Fiber (Psi)</u>	
577		DL+ADDED DL+P/S	456	
$6\sqrt{F'_c} = 6\sqrt{4500} = -402$		F_b CAP.	$1800 = 0.4(4500)$	
$-402 - 577 = -979$		f_b LL CAP	$1344 = 1800 - 456$	
-87	Σ (+)	f_b LL (+)	59	
11.25		f_b CAP.LL / f_b LL	22.8	
405.1		* 36 tons	820	

$0.4(4500) = 1,800$		F_b CAP	$-402 = 6\sqrt{4500}$	
$1800 - 577 = 1,223$		f_b LL CAP	$-858 = -402 - 456$	
381	Σ (-)	f_b LL (-)	-261	
3.21		f_b CAP / f_{LL}	3.29	
115.6		* 36 tons	118.3	

* Based on the relation of prestress force to stress in the concrete it will not be necessary to rate the 1.0 or 3.0 points for operating capacity.

COLORADO DEPARTMENT OF TRANSPORTATION		Sheet 5 of 9
By: MM Date 2-95	Project No. I 70-1(75)57	C81009
Chk'd: Date	Structure No. G-04-AL	REV. LFD.

COLORADO DEPARTMENT OF TRANSPORTATION
DESIGN COMPUTATIONS

1.5 or 2.5 POINT INVENTORY RATING:

Bottom Fiber (Psi)			Top Fiber (Psi)	
361		DL + ADDED DL + P/S		655
-402		F_b CAP.		1800
-763		f_b LL CAP		1145
-380		f_b LL (+)		260
2.0		f_b CAP LL / f_b LL		4.4
72.0		* 36 Tons		158.5
<hr/>				
1,800		F_b CAP		-402
1,439		f_b LL CAP		-1,057
66		f_b LL (-)		-45
21.8		f_b CAP LL / f_b LL		23.49
		* 36		

2.0 POINT INV. RATING

Bottom Fiber			Top Fiber	
1,189		DL + DLC + P/S		-102
$0.4 f'_c = 1800$		F_b CAP		-402 $6\sqrt{f'_c}$
$1800 - 1189 = 701$		f_b LL CAP		-300 = -402 - 102
421		f_b LL (-)		-289
1.66		f_b LL CAP / f_b LL		1.038
59.9		* 36 tons		37.4 ← CONTROLS

COLORADO DEPARTMENT OF TRANSPORTATION

Sheet 6 of 9

By: MM Date 2/95	Project No. I 70 - 1 (75) 57	C 81009
Chk'd: Date	Structure No. G-04-AL	

COLORADO DEPARTMENT OF TRANSPORTATION
DESIGN COMPUTATIONS

OPERATING, EATING & INVENTORY RATING

Rating @ 1.5 or 2.5 Point:

Values from Calframe (BDs) output:

Horizontal member moment (trial 0) = 5,230 k-ft

Horizontal member moment (trial 1) = 735 k-ft

Positive live load + impact moment = 3,092 k-ft

• Average stress in prestressing steel, F_{SU}^* = 262.26 Ksi
(at ultimate Load)

• Ultimate moment P/S capacity, M_n = 24,316 k-ft

• Secondary moment due to P/S, M_s = 3,725 k-ft

Rating

$$OPR = \frac{0.95 M_n - 1.3 (M_{DL} + M_{DLC}) - 1.0 M_s}{1.3 M_{LL+I}} * 36$$

$$INV = \frac{3}{5} OPR$$

$$OPR = \frac{0.95 (24,316) - 1.3 (5,230 + 735) - 3,725}{1.3 * 3,092} * 36$$

$$OPR = 104.1 \text{ Tons}$$

$$INV = \frac{3}{5} * 104.1 = 62.4 \text{ Tons}$$

COLORADO DEPARTMENT OF TRANSPORTATION		Sheet 7 of 9
By: MM Date 2/95	Project No. 170-1(75)57	C81009
Chk'd: Date	Structure No. G-04-AL	REV. LFD

COLORADO DEPARTMENT OF TRANSPORTATION
DESIGN COMPUTATIONS

OPERATING & INVENTORY RATING

Rating at 2.0 POINT

From Calframe (BDS) OUTPUT: Pg. 6, 9, 12, 39

Horizontal member moment (trial 0) = -10,458 K-ft

Horizontal member moment (trial 1) = -1469 K-ft

Negative Live Load + impact moment = -3432 K-ft

Average stress in prestressing steel, F_{su}^* = 256.57 KSI
(at ultimate load)

Ultimate moment P/S Capacity, M_n = 22,593 K-ft

Secondary moment due to P/S, M_s = 2,355 K-ft

Rating

$$OPR = \frac{0.95 M_n - 1.3 (M_{DL} + M_{DC}) + 1.0 M_s}{1.3 M_{LL+I}} * 36$$

$$OPR = \frac{0.95 (22,593) - 1.3 (10,458 + 1469) + 2355}{1.3 (3432)} * 36$$

OPR = 67.1 TONS. ← CONTROLS

INV = $\frac{3}{5}$ (OPR) = 40.2 TONS. ←

COLORADO DEPARTMENT OF TRANSPORTATION

Sheet 8 of 9

By: MM Date 3/95

Project No. I70-1(75)57

C81009

Chk'd: Date

Structure No. G-04-AL

REV, LFD.

**COLORADO DEPARTMENT OF TRANSPORTATION
DESIGN COMPUTATIONS**

Permit truck Rating: (LL No. 4 BDS RUN)

$$M_{LL+I} @ 1.0 = 5689 \text{ K-ft}$$

$$M_{LL+I} @ 2.0 = 3739 \text{ K-ft}$$

$$M_{LL+I} @ 2.5 = 5123 \text{ K-ft}$$

@ 1.5, 2.5 Location:

$$R_{OPR} = \frac{23,100 - 1.3(5230 + 735) - 3725}{1.3 * 5123} * 96 = 167.5 \text{ Tons}$$

@ 2.0 Location:

$$R_{OPR} = \frac{21,463.35 - 1.3(11,927) + 2355}{1.3 * 3739} * 96 = \underline{\underline{164.0 \text{ Tons}}}$$

@ 1.0 Location:

$$R_{OPR} = \frac{0.95 * 19309 - 1.3(7816) + 5095}{1.3 * 5689} * 96 = 172.3 \text{ Tons}$$

COLOR = WHITE

R_{OPR} permit = 164.0 Tons.
@ 2.0

By: MM	Date	Project no. I70-1(75)57	Project code (SA#):
Chk'd:	Date	Structure no. G-04-AL	Sheet 9 of 9

Input Forms

COMMENTS : 000 FORM

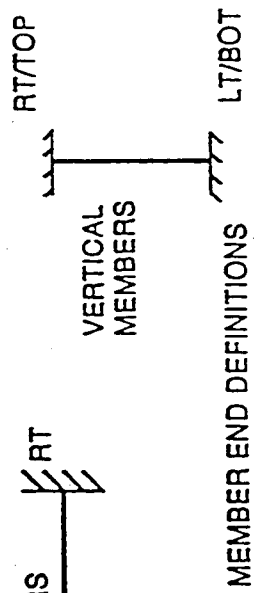
ACCOUNT		SORT NO.	
01	02	03	04
05	06	07	08
09	10	11	12
13	14	15	16
17	18	19	20
21	22	23	24
25	26	27	28
29	30	31	32
33	34	35	36
37	38	39	40
41	42	43	44
45	46	47	48
49	50	51	52
53	54	55	56
57	58	59	60
61	62	63	64
65	66	67	68
69	70	71	72
73	74	75	76
77	78	79	80
81	82	83	84
85	86	87	88
89	90	91	92
93	94	95	96
97	98	99	00
01	02	03	04
05	06	07	08
09	10	11	12
13	14	15	16
17	18	19	20
21	22	23	24
25	26	27	28
29	30	31	32
33	34	35	36
37	38	39	40
41	42	43	44
45	46	47	48
49	50	51	52
53	54	55	56
57	58	59	60
61	62	63	64
65	66	67	68
69	70	71	72
73	74	75	76
77	78	79	80
81	82	83	84
85	86	87	88
89	90	91	92
93	94	95	96
97	98	99	00

STRUCTURE 6-04-AL2 CBGCP SH-701 BRIDGE#1707-1 (75) S7; M.M.

NOTES:
 (1) First line of comments will appear at the top of each page of output
 (2) Additional lines may be used if required

FRAME DESCRIPTION : 100 FORM

ACCOUNT		MEMBER NO.		END JOINT NO.		END CONDITION		LENGTH		MN		HINGE LOC. OR SUPPORT WIDTH		E		DEAD LOAD				MEMBER PROPERTIES				RECALL				DL			
1010		1010		1010		1010		1010		1010		1010		1010		1010		1010		1010		1010		1010		1010		1010			
MEMBER NO.		END JOINT NO.		END CONDITION		LENGTH		MN		HINGE LOC. OR SUPPORT WIDTH		E		UNIFORM		UNIT WT		K STIFFNESS FACTOR				C CARRY OVER FACTOR				MEMBER		DEFLECTIONS		SIDESWAY	
MEMBER NO.		END JOINT NO.		END CONDITION		LENGTH		MN		HINGE LOC. OR SUPPORT WIDTH		E		UNIFORM		UNIT WT		K STIFFNESS FACTOR				C CARRY OVER FACTOR				MEMBER		DEFLECTIONS		SIDESWAY	
MEMBER NO.		END JOINT NO.		END CONDITION		LENGTH		MN		HINGE LOC. OR SUPPORT WIDTH		E		UNIFORM		UNIT WT		K STIFFNESS FACTOR				C CARRY OVER FACTOR				MEMBER		DEFLECTIONS		SIDESWAY	
01010102	1010	1010	H	11170	11170	4066	1150																								
02010103	1010	1010	H																												
03010101	1010	1010	V	171	4430	1320	150																								
04050102	1010	1010	V	256	1540	3320	150																								
05060103	1010	1010	V																												



NOTES:
 (1) Member numbers must be numbered consecutively.
 (2) Possible END CONDITIONS are:
 [BLANK] = fixed (by default)
 P = pinned
 R = roller
 C = cantilever
 (3) DIRECTION CODE
 G or H = girder or horizontal member

PARTS DATA : 201 FORM

ACCOUNT		PART DIMENSION		REF. PT. COORD.		ANY SHAPE			STORE SECTION		SORT NO.																																																				
MEMBER NO.	CROSS SEC. LOC. X FT	PART CODE	VERTICAL V OR DEPTH D FT	HORIZ. H FT	Z FT	Y FT	AREA FT	Izz FT	E IN	11	12	13																																																			
													14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
6104-1A12																																																															
01	10.0	5	3.333	3.333	13.50	4.792																																																									
01	10.0	6	3.333	3.333	12.50	4.792																																																									
01	10.0	5	3.333	3.333	16.32	4.792																																																									
01	10.0	6	3.333	3.333	21.00	4.792																																																									
01	10.0	5	3.333	3.333	22.00	4.792																																																									
01	10.0	6	3.333	3.333	28.18	4.792																																																									

NOTES:
 (1) Enter total depth of section using part code 27

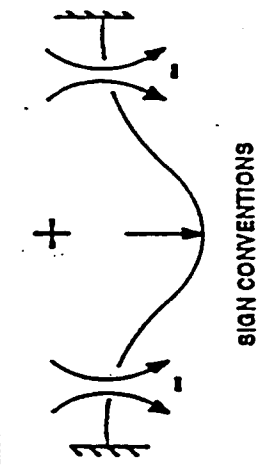
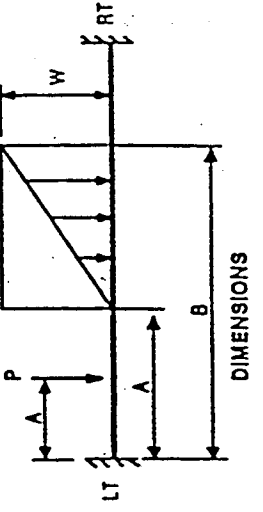
Diagram illustrating the coordinate system and part codes:

- REGANGLES: 1, 2, 3, 4, 5, 6, 7
- PARABOLA: 10, 11, 12, 13, 14, 15, 16, 17, 18, 19
- CIRCLES: 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77
- ANY SHAPE: 78, 79, 80

PART CODES:

LOAD DATA : 300 FORM

ACCOUNT		LOADS		FEM'S (1)		DEFLECTIONS	COMMENTS	SORT NO.
MEMBER NO.	W or P	CODE	A	B	LEFT			
TRIAL NO.	K/FT or K		FT	FT	FT · K	FT · K		
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45	8114	P	39.4				DIAPHRAGM	3100 71 71 88
46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77	8114	P	7.78				DIAPHRAGM	
	8114	P	39.2				DIAPHRAGM	
	8114	P	7.76				DIAPHRAGM	
	1179	U	117.0				FORMWORK	
	1179	U	117.0				FORMWORK	
	1114	U	117.0				ASPHALT; CURBS; RAIL	
	1114	U	117.0				ASPHALT; CURBS; RAIL	
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45								
46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77								



NOTES:
 (1) When FEMs are given, they are not calculated for any load on that member.
 (2) CODE:
 L = Max. W on left
 R = Max. W on right
 U = Uniform Load
 P = Point Load

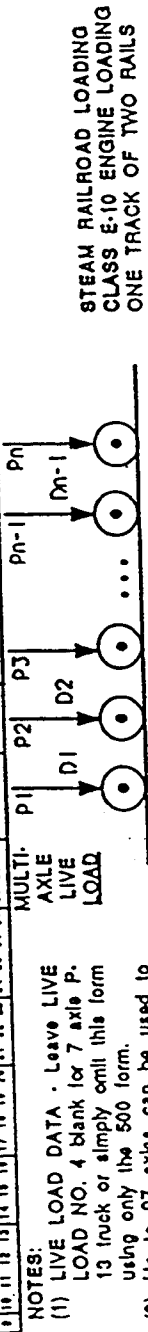
LIVE LOAD HS20-44 MEMBER DATA : 400 FORM

ACCOUNT		NUMBER OF LIVE LOAD LANES		SUB-STRUCTURE		PLOT DATA		RESISTING MOMENT OF UNIT STEEL	MOMENT & SHEAR SCALE	INFLUENCE LINES	COMMENTS	SORT NO.
MEMBER NO.	LT END	RT END	LT	RT	POSITIVE	NEGATIVE	MEMBER NO.					
01	2464	2464	20	20								400
02	2464	2464	20	20								75
												10
												15
												20
												25
												30
												35
												40
												45
												50
												55
												60
												65
												70
												75
												80
												85
												90
												95
												100

NOTES:
 (1) FRAME DESCRIPTION data with the horizontal members numbered consecutively starting with 01 must accompany this data.
 (2) MEMBER DATA - When the NUMBER OF L.L. LANES is given, it must be given for the left end of Superstructure Member 01. (Substructure Member 01 defaults to 1.0 when left blank). Thereafter, it is assumed to be constant until another entry is made.
 (3) INFLUENCE LINES - When a "1" is entered, a plot of the influence lines will be produced along with the printed results.

LIVE LOAD GENERATOR LIVE LOAD DATA : 501 FORM

ACCOUNT		MULTI-AXLE LIVE LOAD															OVER LOAD		LINE NO.	
G1-041-1A1L12		P1	D1	P2	D2	P3	D3	P4	D4	P5	D5	P6	D6	Color Code	No. of Axles	COOPER LOADING	NO IMPACT	(1)		
51011		FT	KIP	FT	KIP	FT	KIP	FT	KIP	FT	KIP	FT	KIP	Pn	KPS			(2)		
51011		270	40	250	40	250	120	250	40	250	350	217	40		08			PERMIT TRUCK		
51011		210	40	217																



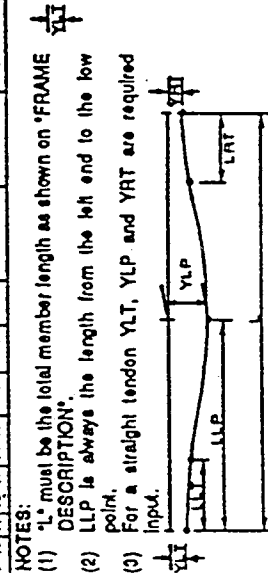
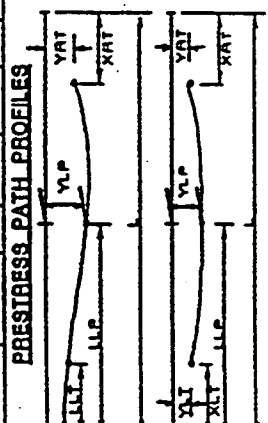
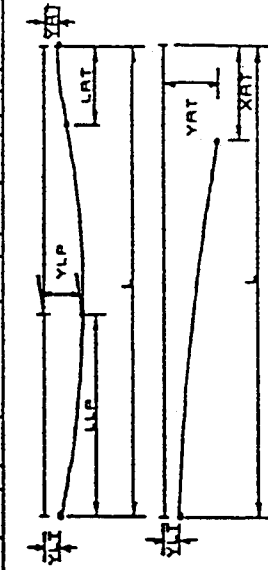
- NOTES:
- (1) LIVE LOAD DATA - Leave LIVE LOAD NO. 4 blank for 7 axle P-13 truck or simply omit this form using only the 500 form.
 - (2) Up to 97 axles can be used to describe the live load. The LINE NO. in column 76-77 must be from 1 thru 16.

PRESTRESS DATA (1) : 600 FORM

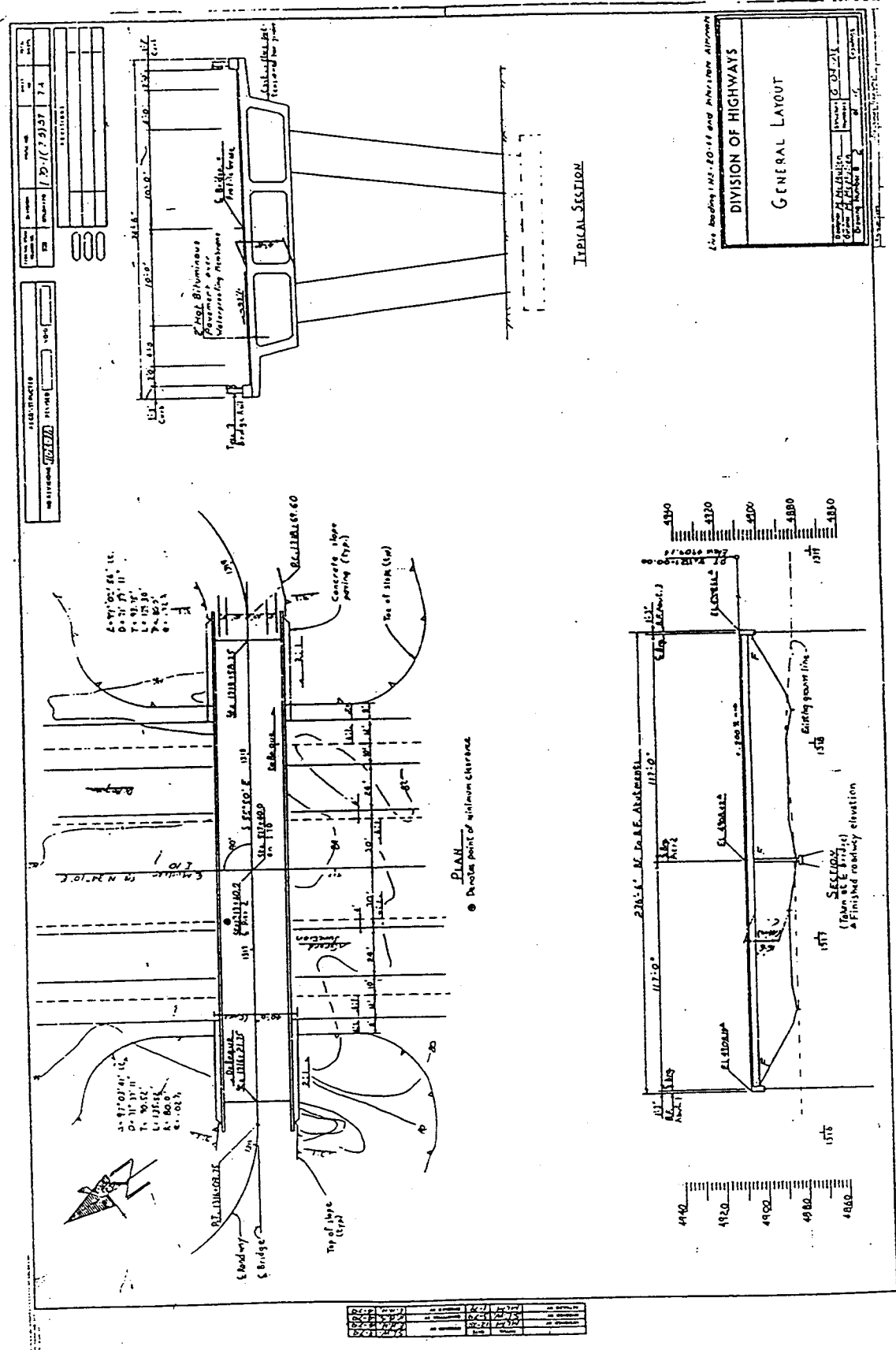
TRIAL NO.	FRAME NO.	PATH NO.	CABLE PATH														SPECIFICATIONS											P-JACK	F _o	SHORTENING	LOSSES	RELATIVE HUMIDITY	NO LOW-LAY	PLOT PATHS	PLOT STRESSES
			LLT	LLP	LRT	YLT	YLP	YRT	XLT	XRT	μ	K	i	% JACK	JACK END	ANCHOR SET		ALL. TENS.																	
																LT	RT		1/8 IN	%															
01	01	01	1.33	4.08	0.83					25	2.0		5	5			59.02	455	2.7													6,010	78 79 80		
01	01	02	1.06	4.08	1.33					25	2.0		5	5			59.02	455	2.7																

ACCOUNT

61041-A112

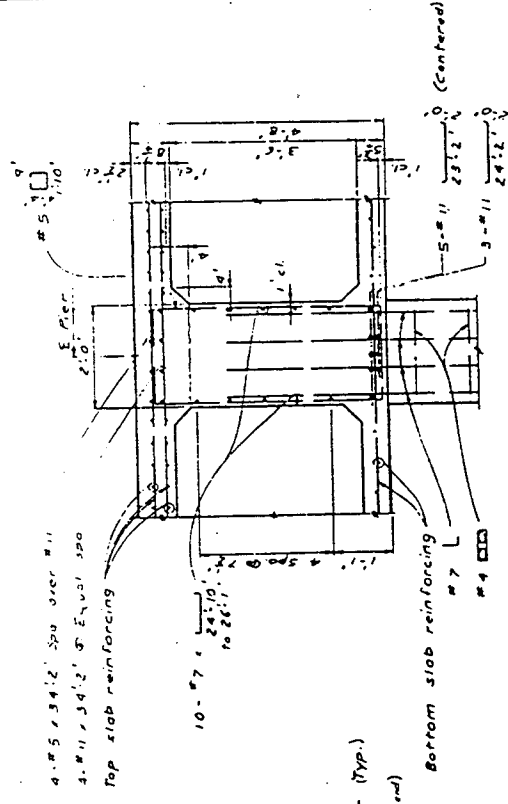
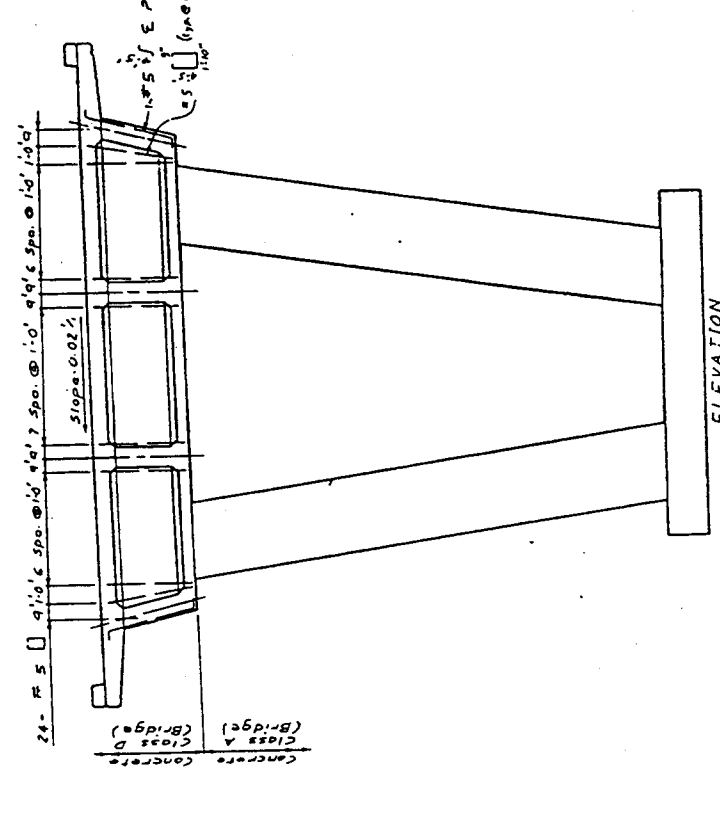
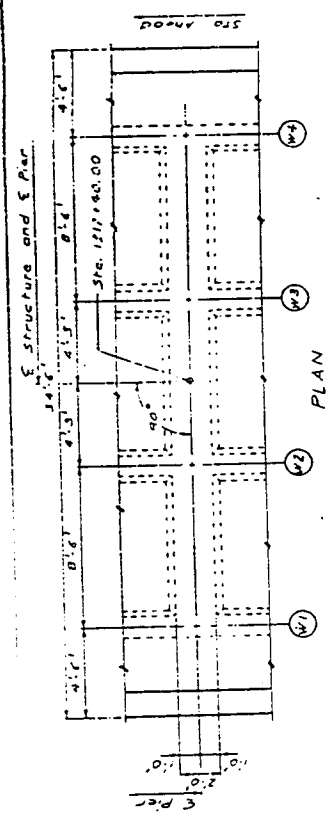


- NOTES:
- LL* must be the total member length as shown on *FRAME DESCRIPTION*.
 - LLP is always the length from the left end to the low point.
 - For a straight tendon YLT, YLP and YRT are required input.



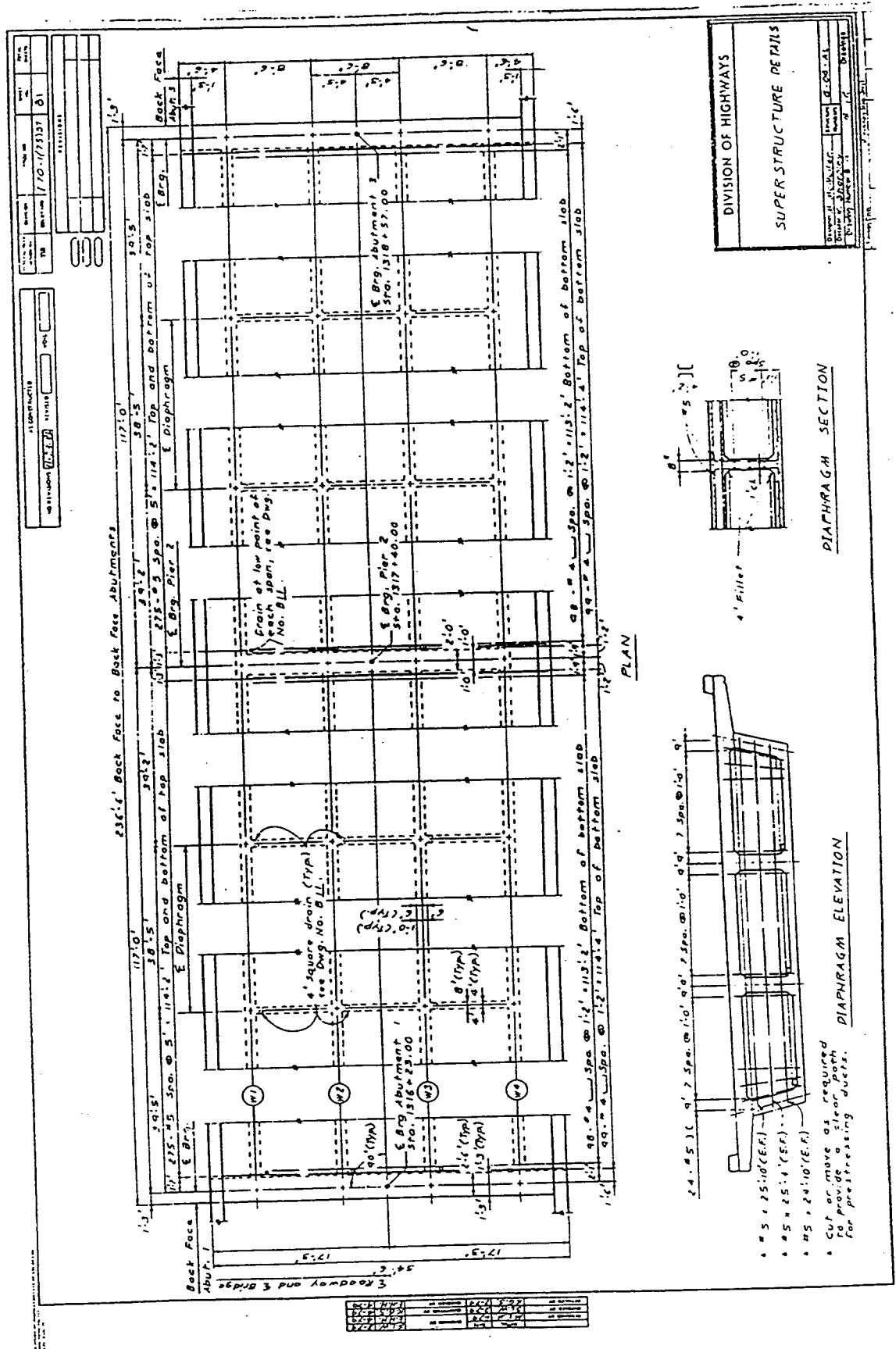
PROJECT NO.	170-174131
DATE	3/3
BY	
CHECKED BY	
APPROVED BY	

DESCRIPTION	PIER 2 DETAILS
DATE	
BY	
CHECKED BY	
APPROVED BY	



DIVISION OF HIGHWAYS	
PIER 2 DETAILS	
Checked by	M. J. McCall
Drawn by	M. J. McCall
Checked by	
Drawn by	

NO.	DATE	BY	DESCRIPTION
1	3/3	MJM	ISSUED FOR CONSTRUCTION
2			
3			



PROJECT NO.	10-1/23337
SHEET NO.	01
DATE	11/1/92

DIVISION OF HIGHWAYS

SUPSTRUCTURE DETAILS

DESIGNED BY: J. J. [Signature]

CHECKED BY: G. [Signature]

DATE: 11/1/92

DIAPHRAGM SECTION

DIAPHRAGM ELEVATION

- * 5 x 25-#6 (E.F.)
 - * 5 x 25-#8 (E.F.)
 - * 5 x 24-#10 (E.F.)
- * Cut or move as required to provide a clear path for prestressing ducts.

 * IAI-BDS *
 * Bridge Design System *
 * *
 * By: Imbsen and Associates, Inc. *
 * VERSION 4.0.1 25-AUG-93 *

***** Licensed to: Colorado DOT *****
 1 LISTING OF THE SORTED INPUT FILE

CARD NUMBER	1	2	3	4	5	6	7	8
1	12345678901	2345678901	2345678901	2345678901	2345678901	2345678901	2345678901	2345678901
2	G-04-AL,STRUCTURE	G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.						000
3	G-04-AL,010102	H1170	4066	150				100
4	G-04-AL,020203	H				01R		100
5	G-04-AL,030401P	V 71 4430	3320	150				100
6	G-04-AL,040502	V 256 540	3320	150				100
7	G-04-AL,050603	V				03		100
8	G-04-AL,01 00	00 00 345 467 825 575	212112091112091	40 812 40 812				200
9	G-04-AL,01 00	+ 5.3333.3333	1350.4792					201
10	G-04-AL,01 00	+ 5.3333.3333	632.4792					201
11	G-04-AL,01 00	+ 5.3333.3333	2200.4792					201
12	G-04-AL,01 00	+ 6.3333.3333	1250.4792					201
13	G-04-AL,01 00	+ 6.3333.3333	2100.4792					201
14	G-04-AL,01 00	+ 6.3333.3333	2818.4792					201
15	G-04-AL,0001	179U 001170			FORMWORK			300
16	G-04-AL,0001	8140P 394			DIAPHRAGM			300
17	G-04-AL,0001	8140P 778			DIAPHRAGM			300
18	G-04-AL,0002	179U 001170			FORMWORK			300
19	G-04-AL,0002	8140P 392			DIAPHRAGM			300
20	G-04-AL,0002	8140P 776			DIAPHRAGM			300
21	G-04-AL,0101	1140U 001170			ASPHALT; CURBS; RAIL			300
22	G-04-AL,0102	1140U 001170			ASPHALT; CURBS; RAIL			300
23	G-04-AL,01 2464	2464 20 20						400
24	G-04-AL,02 2464	2464 20 20						400
25	G-04-AL,1				HS20-44 TRUCK			401
26	G-04-AL,2 240 40 240				MILITARY ALTERNATE LOAD			401
27	G-04-AL, 216 40 217							02501
28	G-04-AL,01 2464 2464 20				LIVE LOAD DISTRIBUTION FACTOR FOR PERMIT TRUCK			500
29	G-04-AL,02 2464 2464 20							500
30	G-04-AL,4 270140	250 40 250120 250 40 250350 217 40			08 PERMIT TRUCK			01501
31	G-04-AL,0110101	4010 133 408 083	25 20	5 51	520945527			600
32	G-04-AL,01101021060	083 408 133	25 20	5 51	520945527			600

LI AI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:34 Page 1
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

MEM NO	JT. LT RT	END COND LT RT	DIR	SPAN	I	SUPPORT OR HINGE	E	DEAD LOAD UNI SEC	K LT RT	CARRY OVER FACTORS LT RT	RECALL MEM
1	1 2		H	117.0	0.00	0.0	4066.	0.000 .150	0.00 0.00	0.00 0.00	
2	2 3		H	0.0	0.00	0.0	4066.	0.000 .000	0.00 0.00	0.00 0.00	01R
3	4 1	P	V	7.1	44.30	0.0	3320.	0.000 .150	0.00 0.00	0.00 0.00	
4	5 2		V	25.6	5.40	0.0	3320.	0.000 .150	0.00 0.00	0.00 0.00	
5	6 3		V	0.0	0.00	0.0	3320.	0.000 .000	0.00 0.00	0.00 0.00	03

LI AI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:34 Page 2
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

MEM NO	LOC.	CALL	Z	Y	W	D	TOP	BOT	NO	W	T	W	FACT	T	W	FACT	L	EX	IN	L	EX	IN	E
1	0.0		0.0	0.0	34.5	4.67	8.25	5.75	2	12.	1	12.	0.91	1	12.	0.91	4.0	8.	12.	4.0	8.	12.	4066.
1	0.0		+	5	0.33	0.33	13.50	0.48	0.00	0.00	0.00	4066.00	0										
1	0.0		+	5	0.33	0.33	6.32	0.48	0.00	0.00	4066.00	0											
1	0.0		+	5	0.33	0.33	22.00	0.48	0.00	0.00	4066.00	0											
1	0.0		+	6	0.33	0.33	12.50	0.48	0.00	0.00	4066.00	0											
1	0.0		+	6	0.33	0.33	21.00	0.48	0.00	0.00	4066.00	0											
1	0.0		+	6	0.33	0.33	28.18	0.48	0.00	0.00	4066.00	0											

NO LOC. DEPTH Z-BAR Y-BAR AREA IZZ IYY E
 0 1 0.0 4.67 17.25 2.77 51.66 156.78 4478.44 4066.00
 OMEMBER 1 PROPERTIES
 0 LENGTH: 117.0 MIN E*I: 0.637E+06 STIFF: 4.000 LT 4.000 RT C.O.: 0.500 LT 0.500 RT

LI AI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:35 Page 3
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OFRAME PROPERTIES

MEM NO	JT		END COND		DIR	SPAN	MIN E*I	SUPPORT OR HINGE		E	CARRY OVER FACTORS		DISTRIBUTION FACTORS	
	LT	RT	LT	RT				LT	RT		LT	RT	LT	RT
1	1	2			H	117.0	0.6375E+06	0.0		4066.	0.500	0.500	0.260	0.470
2	2	3			H	117.0	0.6375E+06	0.0		4066.	0.500	0.500	0.470	0.260
3	4	1	P		V	7.1	0.1471E+06	0.0		3320.	0.500	0.000	0.000	0.740
4	5	2			V	25.6	0.1793E+05	0.0		3320.	0.500	0.500	0.000	0.060
5	6	3	P		V	7.1	0.1471E+06	0.0		3320.	0.500	0.000	0.000	0.740

0**** IF MEMBER IS HORIZONTAL SUPPORT OR HINGE FIELD EQUALS LOCATION OF HINGE FROM LEFT END OF MEMBER ****
 **** IF MEMBER IS VERTICAL SUPPORT OR HINGE FIELD EQUALS SUPPORT WIDTH USED FOR MOMENT REDUCTION ****

LI AI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:35 Page 4
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OLOAD DATA TRIAL 0

LINE MEM	W OR P	LOAD CODE	A		B		FIXED END MOMENTS			COMMENTS
			LEFT	RIGHT	LEFT	RIGHT	DEFLT			
1	0.179	U	0.0	117.0	0.0	0.0				FORMWORK
1	8.140	P	39.4	0.0	0.0	0.0				DIAPHRAGM
1	8.140	P	77.8	0.0	0.0	0.0				DIAPHRAGM
2	0.179	U	0.0	117.0	0.0	0.0				FORMWORK
2	8.140	P	39.2	0.0	0.0	0.0				DIAPHRAGM
2	8.140	P	77.6	0.0	0.0	0.0				DIAPHRAGM

OFIXED END MOMENTS TRIAL 0

MEM NO	FIXED END MOMENTS LT	FIXED END MOMENTS RT	MEM NO	FIXED END MOMENTS LT	FIXED END MOMENTS RT	MEM NO	FIXED END MOMENTS LT	FIXED END MOMENTS RT
1	-9256.	-9256.	2	-9257.	-9256.	3	0.	0.
4	0.	0.	5	0.	0.			

LI AI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:35 Page 5
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OSIDESWAY DIAGNOSTICS

0

RESULTS OF 1 INCH SWAY TO THE RIGHT

MEMBER	VERTICAL SHEAR (KIPS)		MOMENTS (FT-KIPS)	
	LT	RT	LT	RT
3	3181.0	0.	0.	22585.
4	249.2	-2783.	-2783.	3597.
5	3181.0	0.	0.	22585.

BASED ON E = 3320. KSI.

LI AI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:35 Page 6
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

*** SIDESWAY INCLUDED. ***

O HORIZONTAL MEMBER MOMENTS TRIAL 0

MEM NO	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
0 1	-6853.	-2235.	1298.	3746.	5048.	5230.	4327.	2305.	-864.	-5119.	-10458.
0 2	-10458.	-5119.	-864.	2305.	4327.	5230.	4327.	2305.	-864.	-5119.	-6853.

O HORIZONTAL MEMBER STRESSES TRIAL 0 BOTTOM FIBER

MEM NO	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
0 1	841.	274.	-159.	-460.	-620.	-642.	-531.	-283.	106.	628.	1284.
0 2	1284.	628.	106.	-283.	-531.	-642.	-620.	-460.	-159.	274.	841.

O HORIZONTAL MEMBER STRESSES TRIAL 0 TOP FIBER

MEM NO	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
0 1	-576.	-188.	109.	315.	424.	440.	364.	194.	-73.	-430.	-879.
0 2	-879.	-430.	-73.	194.	364.	440.	424.	315.	109.	-188.	-576.

OVERTICAL MEMBER MOMENTS TRIAL 0

MEM NO	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
0 3	0.	-685.	-1371.	-2056.	-2741.	-3426.	-4112.	-4797.	-5482.	-6167.	-6853.
0 4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0 5	0.	685.	1371.	2056.	2741.	3426.	4112.	4797.	5482.	6167.	6853.

O HORIZONTAL MEMBER SHEARS TRIAL 0

MEM NO	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
0 1	441.1	348.3	255.6	162.8	61.9	-30.8	-123.6	-224.5	-317.2	-410.0	-502.8
0 2	502.8	410.0	317.2	224.5	123.6	30.8	-61.9	-162.8	-255.6	-348.3	-441.1

OVERTICAL MEMBER SHEARS TRIAL 0

MEM NO	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
0 3	-965.2	-965.2	-965.2	-965.2	-965.2	-965.2	-965.2	-965.2	-965.2	-965.2	-965.2
0 4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0 5	965.2	965.2	965.2	965.2	965.2	965.2	965.2	965.2	965.2	965.2	965.2

OVERTICAL MEMBER REACTIONS TRIAL 0

MEM NO	LT REACTION	RT REACTION	MEMBER WEIGHT
3	441.1	441.1	0.0
4	1005.5	1005.5	0.0
5	441.1	441.1	0.0

LIAB-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:35 Page 7
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M. OTRIAL 0
 OTANGENTIAL ROTATIONS - RADIANS - CLOCKWISE POSITIVE
 SPAN LT. END RT. END SPAN LT. END RT. END SPAN LT. END RT. END
 0 1 0.000766 0.000000 2 0.000000 -0.000766 3 -0.000383 0.000766
 0 4 0.000000 0.000000 5 0.000383 -0.000766
 OHORIZONTAL MEMBER DEFLECTIONS IN FEET AT 1/ 4 POINTS FROM LEFT END - DOWNWARD POSITIVE
 0 MEMBER 1 E= 4066. 0.000 0.037 0.054 0.029 0.000
 0 MEMBER 2 E= 4066. 0.000 0.029 0.054 0.037 0.000
 OVERTICAL MEMBER DEFLECTIONS IN FEET AT 1/ 4 POINTS FROM LEFT END.
 0 MEMBER 3 E= 3320. 0.000 -0.001 -0.001 -0.001 0.000
 0 MEMBER 4 E= 3320. 0.000 0.000 0.000 0.000 0.000
 0 MEMBER 5 E= 3320. 0.000 0.001 0.001 0.001 0.000

LIAB-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:35 Page 8
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

LOAD DATA TRIAL 1
 LOAD
 LINE MEM W OR P CODE A B FIXED END MOMENTS
 LEFT RIGHT DEFLT COMMENTS
 1 1.140 U 0.0 117.0 0. 0. ASPHALT; CURBS; RAIL
 2 1.140 U 0.0 117.0 0. 0. ASPHALT; CURBS; RAIL
 OFIXED END MOMENTS TRIAL 1
 MEM FIXED END MOMENTS MEM FIXED END MOMENTS MEM FIXED END MOMENTS
 NO LT RT NO LT RT NO LT RT
 1 -1300. -1300. 2 -1300. -1300. 3 0. 0.
 4 0. 0. 5 0. 0.

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 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

*** FRAME DOES NOT SWAY WITH THIS LOADING ***
 HORIZONTAL MEMBER MOMENTS TRIAL 1
 MEM NO LEFT .1 PT .2 PT .3 PT .4 PT .5 PT .6 PT .7 PT .8 PT .9 PT RIGHT
 0 1 -963. -311. 184. 524. 707. 735. 606. 321. -120. -716. -1469. ←
 0 2 -1469. -716. -120. 321. 606. 707. 524. 184. -311. -963.
 OHORIZONTAL MEMBER STRESSES TRIAL 1 BOTTOM FIBER
 0 1 118. 38. -23. -64. -87. -90. -74. -39. 15. 88. 180.
 0 2 180. 88. 15. -39. -74. -87. -64. -39. 15. 88. 118.
 OHORIZONTAL MEMBER STRESSES TRIAL 1 TOP FIBER
 0 1 -81. -26. 15. 44. 59. 62. 51. 27. -10. -60. -124.
 0 2 -124. -60. -10. 27. 51. 62. 59. 44. 15. -26. -81.
 OVERTICAL MEMBER MOMENTS TRIAL 1
 0 3 0. -96. -193. -289. -385. -481. -578. -674. -770. -867. -963.
 0 4 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.
 0 5 0. 96. 193. 289. 385. 481. 578. 674. 770. 867. 963.
 OHORIZONTAL MEMBER SHEARS TRIAL 1
 0 1 62.4 49.0 35.7 22.3 9.0 -4.3 -17.7 -31.0 -44.3 -57.7 -71.0
 0 2 71.0 57.7 44.3 31.0 17.7 4.3 -9.0 -22.3 -35.7 -49.0 -62.4
 OVERTICAL MEMBER SHEARS TRIAL 1
 0 3 -135.6 -135.6 -135.6 -135.6 -135.6 -135.6 -135.6 -135.6 -135.6 -135.6 -135.6
 0 4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0 5 135.6 135.6 135.6 135.6 135.6 135.6 135.6 135.6 135.6 135.6 135.6
 OVERTICAL MEMBER REACTIONS TRIAL 1
 MEM NO LT RT MEMBER WEIGHT
 NO REACTION REACTION
 3 62.4 62.4
 4 142.0 142.0
 5 62.4 62.4

LIAB-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:35 Page 10
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OTRIAL 1
 OTANGENTIAL ROTATIONS - RADIANS - CLOCKWISE POSITIVE
 SPAN LT. END RT. END SPAN LT. END RT. END SPAN LT. END RT. END
 0 1 0.000108 0.000000 2 0.000000 -0.000108 3 -0.000054 0.000108
 0 4 0.000000 0.000000 5 0.000054 -0.000108
 OHORIZONTAL MEMBER DEFLECTIONS IN FEET AT 1/ 4 POINTS FROM LEFT END - DOWNWARD POSITIVE
 0 MEMBER 1 E= 4066. 0.000 0.005 0.008 0.004 0.000
 0 MEMBER 2 E= 4066. 0.000 0.004 0.008 0.005 0.000
 OVERTICAL MEMBER DEFLECTIONS IN FEET AT 1/ 4 POINTS FROM LEFT END.
 0 MEMBER 3 E= 3320. 0.000 0.000 0.000 0.000 0.000
 0 MEMBER 4 E= 3320. 0.000 0.000 0.000 0.000 0.000
 0 MEMBER 5 E= 3320. 0.000 0.000 0.000 0.000 0.000

LIAB-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:35 Page 11
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OLIVE LOAD DIAGNOSTICS
 OSUPERSTRUCTURE LIVE LOAD
 NUMBER OF LIVE LOAD LANES RESISTING MOMENT OF PLOT PLOT INFLU-
 MEM SUPERSTRUCTURE SUBSTRUCTURE UNIT STEEL M S SCALE ENCE
 NO. LT.END RT.END LT.END RT.END POSITIVE NEGATIVE ENV. LINES GEN

 1 2.464 2.464 2.0 2.0 0. 0. 0 0 NO NO
 2 2.464 2.464 2.0 2.0 0. 0. 0 0 NO NO
 OLIVE -----TRUCK-----LANE----- NO. LIVE

LOAD NO.	P1	D1	P2	D2	P3	UNIFORM	MOM. RIDER	SHEAR RIDER	IMPACT	LL LNS.	LOAD SIDESWAY
1.	8.0	14.0	32.0	14.0	32.0	0.640	18.0	26.0	YES	0.00	NO
COMMENTS: HS20-44 TRUCK											
+ WITHOUT ALTERNATIVE											
2.	24.0	4.0	24.0	0.0	0.0	0.000	0.0	0.0	YES	0.00	NO
COMMENTS: MILITARY ALTERNATE LOAD											

IMPACT FACTORS CALCULATED BY PROGRAM

MEM NO	IMPACT %
1	21.
2	21.

LI AI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:35 Page 12
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OLL NO. 1. NEGATIVE LIVE LOAD MOMENT ENVELOPE AND ASSOCIATED SHEARS

MEM NO	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
0 1	-3107.	-1542.	-397.	-41.	-290.	-540.	-789.	-1039.	-1289.	-1916.	-3432.
SHEAR	147.2	121.5	73.6	-21.3	-21.3	-21.3	-21.3	-21.3	-21.3	-45.2	-155.2
0 2	-3432.	-1916.	-1289.	-1039.	-789.	-540.	-290.	-41.	-397.	-1542.	-3107. ←
SHEAR	155.2	98.7	21.3	21.3	21.3	21.3	21.3	21.3	-73.6	-121.5	-147.2
OHORIZONTAL MEMBER STRESSES LL MAX NEG BOTTOM FIBER											
0 1	381.	189.	49.	5.	36.	66.	97.	128.	158.	235.	421. ←
0 2	421.	235.	158.	128.	97.	66.	36.	5.	49.	189.	381.
OHORIZONTAL MEMBER STRESSES LL MAX NEG TOP FIBER											
0 1	-261.	-130.	-33.	-3.	-24.	-45.	-66.	-87.	-108.	-161.	-289. ←
0 2	-289.	-161.	-108.	-87.	-66.	-45.	-24.	-3.	-33.	-130.	-261.

LI AI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:35 Page 13
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OLL NO. 1. DEAD LOAD PLUS NEGATIVE LIVE LOAD MOMENT ENVELOPE

MEM NO	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
0 1	-9960.	-3777.	901.	3705.	4758.	4690.	3537.	1266.	-2153.	-7035.	-13890.
0 2	-13890.	-7035.	-2153.	1266.	3537.	4690.	4758.	3705.	901.	-3777.	-9960.
OHORIZONTAL MEMBER STRESSES FOR DL+LL MAX NEG BOTTOM FIBER											
0 1	1223.	464.	-111.	-455.	-584.	-576.	-434.	-155.	264.	864.	1706.
0 2	1706.	864.	264.	-155.	-434.	-576.	-584.	-455.	-111.	464.	1223.
OHORIZONTAL MEMBER STRESSES FOR DL+LL MAX NEG TOP FIBER											
0 1	-837.	-317.	76.	311.	400.	394.	297.	106.	-181.	-591.	-1168.
0 2	-1168.	-591.	-181.	106.	297.	394.	400.	311.	76.	-317.	-837.

LI AI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:35 Page 14
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OLL NO. 1. POSITIVE LIVE LOAD MOMENT ENVELOPE AND ASSOCIATED SHEARS

MEM NO	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
0 1	708.	554.	1143.	2102.	2788.	3092.	3036.	2577.	1726.	588.	0.
SHEAR	-21.3	50.6	154.9	132.9	108.1	81.6	-90.2	-116.7	-141.8	-164.2	0.0
0 2	0.	588.	1726.	2577.	3036.	3092.	2788.	2102.	1143.	554.	708. ←
SHEAR	0.0	69.0	141.8	116.7	90.2	-81.6	-108.1	-132.9	-154.9	-50.6	21.3
OHORIZONTAL MEMBER STRESSES LL MAX POS BOTTOM FIBER											
0 1	-87.	-68.	-140.	-258.	-342.	-380.	-373.	-316.	-212.	-72.	0. ←
0 2	0.	-72.	-212.	-316.	-373.	-380.	-342.	-258.	-140.	-68.	-87.
OHORIZONTAL MEMBER STRESSES LL MAX POS TOP FIBER											
0 1	59.	47.	96.	177.	234.	260.	255.	217.	145.	49.	0.
0 2	0.	49.	145.	217.	255.	260.	234.	177.	96.	47.	59. ←

LI AI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:35 Page 15
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OLL NO. 1. DEAD LOAD PLUS POSITIVE LIVE LOAD MOMENT ENVELOPE

MEM NO	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
0 1	-6145.	-1681.	2441.	5848.	7836.	8322.	7363.	4882.	862.	-4531.	-10458.
0 2	-10458.	-4531.	862.	4882.	7363.	8322.	7363.	4882.	2441.	-1681.	-6145.
OHORIZONTAL MEMBER STRESSES FOR DL+LL MAX POS BOTTOM FIBER											
0 1	755.	206.	-300.	-718.	-962.	-1022.	-904.	-599.	-106.	556.	1284.
0 2	1284.	556.	-106.	-599.	-904.	-1022.	-962.	-718.	-300.	206.	755.
OHORIZONTAL MEMBER STRESSES FOR DL+LL MAX POS TOP FIBER											
0 1	-517.	-141.	205.	492.	659.	700.	619.	410.	72.	-381.	-879.
0 2	-879.	-381.	72.	410.	619.	700.	659.	492.	205.	-141.	-517.

LI AI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:35 Page 16
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OLL NO. 1. LIVE LOAD SHEAR ENVELOPES AND ASSOCIATED MOMENTS

MEMBER	1 LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
OPOS. V	204.6	190.1	170.5	147.2	121.5	94.9	68.5	43.8	22.1	6.9	0.0
MOM.	-1133.	-54.	1082.	2059.	2724.	2984.	2811.	2239.	1365.	300.	0.

NEG. V	-21.6	-22.0	-25.4	-36.7	-52.8	-77.2	-103.4	-130.1	-155.9	-179.6	-199.6
MOM.	454.	1162.	1174.	1712.	2524.	2932.	2950.	2535.	1710.	558.	-773.
RANGE	226.2	212.1	195.9	183.9	174.3	172.0	171.9	173.9	178.1	186.4	199.6

OLL NO. 1. LIVE LOAD SHEAR ENVELOPES AND ASSOCIATED MOMENTS

OMEMBER	2 LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
OPOS. V	199.6	179.6	155.9	130.1	103.4	77.2	52.8	36.7	25.4	22.0	21.6
MOM.	-773.	558.	1710.	2535.	2950.	2932.	2524.	590.	235.	1162.	454.
NEG. V	0.0	-6.9	-22.1	-43.8	-68.5	-94.9	-121.5	-147.2	-170.5	-190.1	-204.6
MOM.	0.	696.	1365.	2239.	2811.	2984.	2724.	2059.	1082.	-54.	-1133.
RANGE	199.6	186.4	178.1	173.9	171.9	172.0	174.3	183.9	195.9	212.1	226.2

LI AI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:35 Page 17
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OLL NO. 1. DEAD LOAD PLUS LIVE LOAD SHEAR ENVELOPE

OMEMBER	1 LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
OPOS. V	645.7	538.4	426.1	310.0	183.5	64.0	-55.1	-180.6	-295.1	-403.1	-502.8
NEG. V	419.5	326.3	230.2	126.1	9.2	-108.0	-227.0	-354.6	-473.2	-589.5	-702.4

OLL NO. 1. DEAD LOAD PLUS LIVE LOAD SHEAR ENVELOPE

OMEMBER	2 LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
OPOS. V	702.4	589.5	473.2	354.6	227.0	108.0	-9.2	-126.1	-230.2	-326.3	-419.5
NEG. V	502.8	403.1	295.1	180.6	55.1	-64.0	-183.5	-310.0	-426.1	-538.4	-645.7

LI AI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:35 Page 18
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OLL NO. 1.

		LIVE LOAD SUPPORT RESULTS			MAX. LONGITUDINAL MOMENT		
		MAX. AXIAL LOAD	AXIAL MOMENT	AXIAL MOMENT	MAX. AXIAL LOAD	AXIAL MOMENT	AXIAL MOMENT
		LOAD	TOP	BOT.	LOAD	TOP	BOT.
OMEMBER	3						
	POSITIVE	166.1	-919.	0.	-17.3	574.	0.
	NEGATIVE	-17.5	581.	0.	119.5	-2522.	0.
OMEMBER	4						
	POSITIVE	255.2	0.	0.	127.1	199.	-100.
	NEGATIVE	0.0	0.	0.	127.1	-199.	100.
OMEMBER	5						
	POSITIVE	166.1	919.	0.	119.5	2522.	0.
	NEGATIVE	-17.5	-581.	0.	-17.3	-574.	0.

0 THE RATIO OF SUBSTRUCTURE / SUPERSTRUCTURE LOADING IS 0.812

LI AI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:35 Page 19
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OLL NO. 2. NEGATIVE LIVE LOAD MOMENT ENVELOPE AND ASSOCIATED SHEARS

MEM LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT	
NO											
0 1	-2137.	-1075.	-285.	-28.	-200.	-371.	-543.	-714.	-886.	-1057.	-1398.
SHEAR	98.0	80.6	44.8	-14.7	-14.7	-14.7	-14.7	-14.7	-14.7	-14.7	-86.3
0 2	-1398.	-1057.	-886.	-714.	-543.	-371.	-200.	-28.	-285.	-1075.	-2137.
SHEAR	86.3	14.7	14.7	14.7	14.7	14.7	14.7	14.7	-44.8	-80.6	-98.0

OHORIZONTAL MEMBER STRESSES LL MAX NEG BOTTOM FIBER

0 1	262.	132.	35.	3.	25.	46.	67.	88.	109.	130.	172.
0 2	172.	130.	109.	88.	67.	46.	25.	3.	35.	132.	262.

OHORIZONTAL MEMBER STRESSES LL MAX NEG TOP FIBER

0 1	-180.	-90.	-24.	-2.	-17.	-31.	-46.	-60.	-74.	-89.	-117.
0 2	-117.	-89.	-74.	-60.	-46.	-31.	-17.	-2.	-24.	-90.	-180.

LI AI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:35 Page 20
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OLL NO. 2. DEAD LOAD PLUS NEGATIVE LIVE LOAD MOMENT ENVELOPE

MEM LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT	
NO											
0 1	-8990.	-3310.	1013.	3718.	4849.	4859.	3784.	1591.	-1750.	-6176.	-11856.
0 2	-11856.	-6176.	-1750.	1591.	3784.	4859.	4849.	3718.	1013.	-3310.	-8990.

OHORIZONTAL MEMBER STRESSES FOR DL+LL MAX NEG BOTTOM FIBER

0 1	1104.	406.	-124.	-457.	-595.	-597.	-465.	-195.	215.	758.	1456.
0 2	1456.	758.	215.	-195.	-465.	-597.	-595.	-457.	-124.	406.	1104.

OHORIZONTAL MEMBER STRESSES FOR DL+LL MAX NEG TOP FIBER

0 1	-756.	-278.	85.	313.	408.	408.	318.	134.	-147.	-519.	-997.
0 2	-997.	-519.	-147.	134.	318.	408.	408.	313.	85.	-278.	-756.

LI AI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:35 Page 21
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OLL NO. 2. POSITIVE LIVE LOAD MOMENT ENVELOPE AND ASSOCIATED SHEARS

MEM LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT	
NO											
0 1	486.	419.	1072.	1720.	2196.	2421.	2376.	2048.	1461.	692.	0.
SHEAR	-14.7	66.1	123.1	108.7	92.2	74.5	-80.1	-97.9	-114.6	-129.3	0.0
0 2	0.	692.	1461.	2048.	2376.	2421.	2196.	1720.	1072.	419.	486.
SHEAR	0.0	57.9	43.3	97.9	-62.6	-74.5	-92.2	-108.7	-123.1	-137.4	14.7

OHORIZONTAL MEMBER STRESSES LL MAX POS BOTTOM FIBER

0 1	-60.	-51.	-132.	-211.	-270.	-297.	-292.	-251.	-179.	-85.	0.
0 2	0.	-85.	-179.	-251.	-292.	-297.	-270.	-211.	-132.	-51.	-60.

OHORIZONTAL MEMBER STRESSES LL MAX POS TOP FIBER

0 1	41.	35.	90.	145.	185.	204.	200.	172.	123.	58.	0.
0 2	0.	58.	123.	172.	200.	204.	185.	145.	90.	35.	41.

LI AI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:36 Page 22
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OLL NO. 2. DEAD LOAD PLUS POSITIVE LIVE LOAD MOMENT ENVELOPE

MEM LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
NO										

0 1	-6366.	-1816.	2370.	5466.	7244.	7651.	6703.	4352.	597.	-4427.	-10458.
0 2	-10458.	-4427.	597.	4352.	6703.	7651.	7244.	5466.	2370.	-1816.	-6366.
HORIZONTAL MEMBER STRESSES FOR DL+LL MAX POS BOTTOM FIBER											
0 1	782.	223.	-291.	-671.	-890.	-939.	-823.	-534.	-73.	544.	1284.
0 2	1284.	544.	-73.	-534.	-823.	-939.	-890.	-671.	-291.	223.	782.
HORIZONTAL MEMBER STRESSES FOR DL+LL MAX POS TOP FIBER											
0 1	-535.	-153.	199.	459.	609.	643.	563.	366.	50.	-372.	-879.
0 2	-879.	-372.	50.	366.	563.	643.	609.	459.	199.	-153.	-535.

LI AI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:36 Page 23
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

LIVE LOAD SHEAR ENVELOPES AND ASSOCIATED MOMENTS											
OLL NO.	2.										
OMEMBER	1 LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
OPOS. V	141.8	134.4	123.1	108.7	92.2	74.5	56.4	38.9	22.8	9.1	0.0
MOM.	-205.	376.	1072.	1720.	2196.	2421.	2356.	2003.	1408.	656.	0.
NEG. V	-14.7	-14.7	-15.4	-28.8	-44.7	-62.1	-80.1	-97.9	-114.6	-129.3	-141.0
MOM.	486.	315.	1056.	1682.	2165.	2413.	2376.	2048.	1461.	692.	-142.
RANGE	156.5	149.1	138.4	137.5	136.9	136.6	136.5	136.8	137.4	138.3	141.0
LIVE LOAD SHEAR ENVELOPES AND ASSOCIATED MOMENTS											
OLL NO.	2.										
OMEMBER	2 LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
OPOS. V	141.0	129.3	114.6	97.9	80.1	62.1	44.7	28.8	15.4	14.7	14.7
MOM.	-142.	692.	1461.	2048.	2376.	2413.	2165.	1682.	1056.	315.	486.
NEG. V	0.0	-9.1	-22.8	-38.9	-56.4	-74.5	-92.2	-108.7	-123.1	-134.4	-141.8
MOM.	0.	656.	1408.	2003.	2356.	2421.	2196.	1720.	1072.	376.	-205.
RANGE	141.0	138.3	137.4	136.8	136.5	136.6	136.9	137.5	138.4	149.1	156.5

LI AI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:36 Page 24
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

DEAD LOAD PLUS LIVE LOAD SHEAR ENVELOPE											
OLL NO.	2.										
OMEMBER	1 LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
OPOS. V	582.9	482.7	378.6	271.5	154.1	43.7	-67.2	-185.6	-294.4	-400.9	-502.8
NEG. V	426.4	333.7	240.2	134.0	17.2	-92.9	-203.7	-322.4	-431.9	-539.3	-643.8
DEAD LOAD PLUS LIVE LOAD SHEAR ENVELOPE											
OLL NO.	2.										
OMEMBER	2 LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
OPOS. V	643.8	539.3	431.9	322.4	203.7	92.9	-17.2	-134.0	-240.2	-333.7	-426.4
NEG. V	502.8	400.9	294.4	185.6	67.2	-43.7	-154.1	-271.5	-378.6	-482.7	-582.9

LI AI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:36 Page 25
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

LIVE LOAD SUPPORT RESULTS							
OLL NO.	2.						
0		MAX. AXIAL LOAD	AXIAL LOAD		MAX. AXIAL LOAD	LONGITUDINAL MOMENT	
			TOP	BOT.		TOP	BOT.
OMEMBER	3						
	POSITIVE	115.1	-167.	0.	-11.9	395.	0.
	NEGATIVE	-11.9	395.	0.	79.6	-1735.	0.
OMEMBER	4						
	POSITIVE	115.7	14.	-7.	81.9	137.	-69.
	NEGATIVE	0.0	0.	0.	81.9	-137.	69.
OMEMBER	5						
	POSITIVE	115.1	167.	0.	79.6	1735.	0.
	NEGATIVE	-11.9	-395.	0.	-11.9	-395.	0.
0	THE RATIO OF SUBSTRUCTURE / SUPERSTRUCTURE LOADING IS 0.812						

LI AI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:36 Page 26
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OLIVE LOAD DIAGNOSTICS

0	LIVE LOAD GENERATOR									
0	NUMBER OF LIVE LOAD LANES					RESISTING MOMENT OF		PLOT	PLOT	INFLU-
MEM	SUPERSTRUCTURE		SUBSTRUCTURE		UNIT STEEL		M	S	ENCE	
NO.	LT.END	RT.END	LT.END	RT.END	POSITIVE	NEGATIVE	ENV.	SCALE	LINES	
									GEN	
1	2.464	2.464	2.0	2.0	0.	0.	0	0	NO NO	
2	2.464	2.464	2.0	2.0	0.	0.				
0	LIVE LOAD									
NO	TRUCK OR TRAIN LOADING									
4.	P1	D1	P2	D2	P3	D3	P4	D4	P5	D5
	27.0	14.0	25.0	4.0	25.0	12.0	25.0	4.0	25.0	35.0
	P7	D7	P8	D8	P9	D9	P10	D10	P11	D11
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	P13	D13	P14	D14	P15	D15	P16	D16	P17	D17
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	P19	D19	P20	D20	P21	D21	P22	D22	P23	D23
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	P25	D25	P26	D26	P27	D27	P28	D28	P29	D29
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

IMPACT FACTORS CALCULATED BY PROGRAM

MEM	IMPACT
NO	%
1	21.
2	21.

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 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OLL NO. 4. NEGATIVE LIVE LOAD MOMENT ENVELOPE AND ASSOCIATED SHEARS

MEMBER	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
NO											
0 1	-5689.	-2708.	-647.	-74.	-527.	-981.	-1434.	-1887.	-2340.	-2793.	-3739.
SHEAR	278.4	222.9	131.3	-38.7	-38.7	-38.7	-38.7	-38.7	-38.7	-38.7	-256.1
0 2	-3739.	-2793.	-2340.	-1887.	-1434.	-981.	-527.	-74.	-647.	-2708.	-5689.
SHEAR	256.1	38.7	38.7	38.7	38.7	38.7	38.7	38.7	-131.3	-222.9	-278.4
OHORIZONTAL MEMBER STRESSES LL MAX NEG BOTTOM FIBER											
0 1	699.	332.	79.	9.	65.	120.	176.	232.	287.	343.	459.
0 2	459.	343.	287.	232.	176.	120.	65.	9.	79.	332.	699.
OHORIZONTAL MEMBER STRESSES LL MAX NEG TOP FIBER											
0 1	-478.	-228.	-54.	-6.	-44.	-82.	-121.	-159.	-197.	-235.	-314.
0 2	-314.	-235.	-197.	-159.	-121.	-82.	-44.	-6.	-54.	-228.	-478.

LI AI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:36 Page 28
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OLL NO. 4. DEAD LOAD PLUS NEGATIVE LIVE LOAD MOMENT ENVELOPE

MEMBER	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
NO											
0 1	-12542.	-4942.	651.	3672.	4521.	4250.	2893.	418.	-3204.	-7912.	-14197.
0 2	-14197.	-7912.	-3204.	418.	2893.	4250.	4521.	3672.	651.	-4942.	-12542.
OHORIZONTAL MEMBER STRESSES FOR DL+LL MAX NEG BOTTOM FIBER											
0 1	1540.	607.	-80.	-451.	-555.	-522.	-355.	-51.	393.	971.	1743.
0 2	1743.	971.	393.	-51.	-355.	-522.	-555.	-451.	-80.	607.	1540.
OHORIZONTAL MEMBER STRESSES FOR DL+LL MAX NEG TOP FIBER											
0 1	-1054.	-415.	55.	309.	380.	357.	243.	35.	-269.	-665.	-1193.
0 2	-1193.	-665.	-269.	35.	243.	357.	380.	309.	55.	-415.	-1054.

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 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OLL NO. 4. POSITIVE LIVE LOAD MOMENT ENVELOPE AND ASSOCIATED SHEARS

MEMBER	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
NO											
0 1	1285.	832.	1649.	3329.	4596.	5123.	5044.	4188.	2607.	742.	0.
SHEAR	-38.7	-38.7	169.7	149.7	100.7	49.3	-67.3	-118.8	-193.2	-129.2	0.0
0 2	0.	742.	2607.	4188.	5044.	5123.	4596.	3329.	1649.	832.	1285.
SHEAR	0.0	129.2	193.2	118.8	67.3	-49.3	-100.7	-149.7	-169.7	38.7	38.7
OHORIZONTAL MEMBER STRESSES LL MAX POS BOTTOM FIBER											
0 1	-158.	-102.	-202.	-409.	-564.	-629.	-619.	-514.	-320.	-91.	0.
0 2	0.	-91.	-320.	-514.	-619.	-629.	-564.	-409.	-202.	-102.	-158.
OHORIZONTAL MEMBER STRESSES LL MAX POS TOP FIBER											
0 1	108.	70.	139.	280.	386.	431.	424.	352.	219.	62.	0.
0 2	0.	62.	219.	352.	424.	431.	386.	280.	139.	70.	108.

LI AI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:36 Page 30
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OLL NO. 4. DEAD LOAD PLUS POSITIVE LIVE LOAD MOMENT ENVELOPE

MEMBER	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
NO											
0 1	-5568.	-1403.	2947.	7075.	9645.	10353.	9371.	6493.	1743.	-4377.	-10458.
0 2	-10458.	-4377.	1743.	6493.	9371.	10353.	9645.	7075.	2947.	-1403.	-5568.
OHORIZONTAL MEMBER STRESSES FOR DL+LL MAX POS BOTTOM FIBER											
0 1	684.	172.	-362.	-869.	-1184.	-1271.	-1151.	-797.	-214.	537.	1284.
0 2	1284.	537.	-214.	-797.	-1151.	-1271.	-1184.	-869.	-362.	172.	684.
OHORIZONTAL MEMBER STRESSES FOR DL+LL MAX POS TOP FIBER											
0 1	-468.	-118.	248.	595.	811.	870.	788.	546.	146.	-368.	-879.
0 2	-879.	-368.	146.	546.	788.	870.	811.	595.	248.	-118.	-468.

LI AI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:36 Page 31
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OLL NO. 4. LIVE LOAD SHEAR ENVELOPES AND ASSOCIATED MOMENTS

MEMBER	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
OPOS. V	366.0	325.4	279.9	237.0	191.1	144.6	99.9	59.2	26.4	6.9	0.0
MOM.	-4262.	-1572.	1318.	3017.	4101.	4450.	4053.	3012.	1627.	500.	0.
NEG. V	-38.7	-38.7	-38.7	-42.0	-75.3	-115.4	-159.8	-206.2	-255.7	-301.2	-344.2
MOM.	1285.	832.	379.	2427.	3574.	4319.	4437.	3816.	2246.	56.	-2829.
RANGE	404.8	364.2	318.6	279.0	266.4	260.0	259.6	265.4	282.1	308.1	344.2
OHORIZONTAL MEMBER STRESSES FOR DL+LL MAX POS BOTTOM FIBER											
OPOS. V	344.2	301.2	255.7	206.2	159.8	115.4	75.3	42.0	38.7	38.7	38.7
MOM.	-2829.	56.	2246.	3816.	4437.	4319.	3574.	2427.	379.	832.	1285.
NEG. V	0.0	-6.9	-26.4	-59.2	-99.9	-144.6	-191.1	-237.0	-279.9	-325.4	-366.0
MOM.	0.	500.	1627.	3012.	4053.	4450.	4101.	3017.	1318.	-1572.	-4262.
RANGE	344.2	308.1	282.1	265.4	259.6	260.0	266.4	279.0	318.6	364.2	404.8

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 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OLL NO. 4. DEAD LOAD PLUS LIVE LOAD SHEAR ENVELOPE

MEMBER	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
OPOS. V	807.1	673.8	535.5	399.8	253.1	113.8	-23.7	-165.3	-290.8	-403.1	-502.8
NEG. V	402.4	309.6	216.9	120.9	-13.4	-146.2	-283.4	-430.7	-573.0	-711.2	-847.0
OHORIZONTAL MEMBER STRESSES FOR DL+LL MAX POS BOTTOM FIBER											
OPOS. V	847.0	711.2	573.0	430.7	283.4	146.2	13.4	-120.9	-216.9	-309.6	-402.4
NEG. V	502.8	403.1	290.8	165.3	23.7	-113.8	-253.1	-399.8	-535.5	-673.8	-807.1

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 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

0LL NO. 4.

		LIVE LOAD SUPPORT RESULTS					
		MAX. AXIAL	LOAD		MAX. LONGITUDINAL		
		AXIAL	-----MOMENT-----		AXIAL	-----MOMENT-----	
		LOAD	TOP	BOT.	LOAD	TOP	BOT.
0MEMBER	3						
	POSITIVE	297.1	-3460.	0.	-31.4	1043.	0.
	NEGATIVE	-31.4	1043.	0.	226.0	-4618.	0.
0MEMBER	4						
	POSITIVE	334.2	26.	-13.	239.1	362.	-181.
	NEGATIVE	0.0	0.	0.	239.1	-362.	181.
0MEMBER	5						
	POSITIVE	297.1	3460.	0.	226.0	4618.	0.
	NEGATIVE	-31.4	-1043.	0.	-31.4	-1043.	0.

0 THE RATIO OF SUBSTRUCTURE / SUPERSTRUCTURE LOADING IS 0.812

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 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

0 PRESTRESS COMBINATION DATA

0 NO PRESTRESS COMBINATION DATA GIVEN SO DEFAULTS WERE USED.
 0 LIVE LOAD NUMBER '1' RESULTS USED FOR P/S DESIGN AND OTHER LIVE LOADS, IF PRESENTED,
 ALSO WILL BE CHECKED TO DETERMINE THE ULTIMATE MOMENT CAPACITY.

0 THE FOLLOWING VALUES ARE BEING USED IN THE CALCULATION OF MOMENT & SHEAR REQUIREMENTS.
 0 D.L. LOAD FACTOR: 1.30

L.L. LOAD FACTOR: 2.17 OR 1.30

PHI FACTOR FOR SHEAR : 0.90

PHI FACTOR FOR MOMENT: 0.95

0	LL NO. 1	ULTIMATE MOMENT APPLIED = 1.30 X (DL+ADL) + 2.17 X (LL+I) + 1.00 X (P/S SEC. MOMENT)
0	LL NO. 2	ULTIMATE MOMENT APPLIED = 1.30 X (DL+ADL) + 2.17 X (LL+I) + 1.00 X (P/S SEC. MOMENT)
0	LL NO. 4	ULTIMATE MOMENT APPLIED = 1.30 X (DL+ADL) + 1.30 X (LL+I) + 1.00 X (P/S SEC. MOMENT)
0	LL NO. 1	ULTIMATE SHEAR APPLIED = 1.30 X (DL+ADL) + 2.17 X (LL+I) + 1.00 X (P/S SEC. SHEAR)
0	LL NO. 2	ULTIMATE SHEAR APPLIED = 1.30 X (DL+ADL) + 2.17 X (LL+I) + 1.00 X (P/S SEC. SHEAR)
0	LL NO. 4	ULTIMATE SHEAR APPLIED = 1.30 X (DL+ADL) + 1.30 X (LL+I) + 1.00 X (P/S SEC. SHEAR)

1IAI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:36 Page 35
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

0INPUT PRESTRESSED DATA

0TRIAL 1 FRAME 1 PATH 01

0 MEM

NO.	LLT/X	LLP/Y	LRT/Z	YLT/TYPE	YLP/SLOPE	YRT	U	K
0	1	0.00	0.40	0.10	1.33	4.08	0.83	0.25 0.0002
0	2	0.10	0.60	0.00	0.83	4.08	1.33	0.25 0.0002

0XLT(FT) = 0.0 XRT(FT) = 0.0 STEEL STRESS(KSI) = 270. JACKING % = 0.75 JACKING ENDS = B
 0ANCHOR SET(IN); LEFT = 0.625 RIGHT = 0.625 CONC. STRENGTH(Psi) = 4500. ALLOW. TENSION(Psi) = -402.
 0P-JACK(KIPS) = 5209. SHORTENING PERCENT= 50 TOTAL LOSSES(KSI) = 27 RELATIVE HUMIDITY % = 70.
 0LOW-LAX = YES PLOT PATHS = NO PLOT STRESSES = NO

0CABLE PATH OFFSETS

MEMBER	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
0 1	1.33	2.53	3.39	3.91	4.08	3.97	3.65	3.10	2.35	1.37	0.83
0 2	0.83	1.37	2.35	3.10	3.65	3.97	4.08	3.91	3.39	2.53	1.33

0CABLE PATH ECCENTRICITIES

0 1	-0.568	0.635	1.495	2.010	2.182	2.074	1.749	1.207	0.449	-0.526	-1.068
0 2	-1.068	-0.526	0.449	1.207	1.749	2.074	2.182	2.010	1.495	0.635	-0.568

0FORCE COEFFICIENTS

0 1	0.722	0.731	0.741	0.750	0.760	0.765	0.772	0.779	0.785	0.792	0.776
0 2	0.776	0.792	0.785	0.779	0.772	0.765	0.760	0.750	0.741	0.731	0.722

0THE POINT OF NO MOVEMENT FOR PRESTRESSING IS IN SPAN 1, 117.00 FEET FROM THE LEFT END OF THE SPAN

0THE LEFT ANCHOR SET LENGTH IS 107.90 THE RIGHT ANCHOR SET LENGTH IS 107.90

0THE FORCE COEF. AT THE LEFT END IS 0.722 THE FORCE COEF. AT THE RIGHT END IS 0.722

0INITIAL FORCE COEFF. AT POINT OF NO MOVEMENT = 0.910

1IAI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:37 Page 36
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

0SECONDARY MOMENT DUE TO PJACK = 1

0TRIAL 1 FRAME 1 PATH 01

FEM'S DUE TO SECONDARY EFFECTS BEFORE BALANCING

MEMBER	LEFT END	RIGHT END	MEMBER	LEFT END	RIGHT END	MEMBER	LEFT END	RIGHT END
0 1	1.321	0.281	2	0.281	1.321			
0			DEM'S DUE TO SECONDARY EFFECTS --- UNIT = K-FT					
0 1	0.978	0.452	2	0.452	0.978			
0			DEM'S DUE TO SECONDARY EFFECTS IN COLUMN --- UNIT = K-FT					
0 3	0.000	0.978	4	0.000	0.000	5	0.000	-0.978

0P/S MOMENT COEF.

*** SIDESWAY INCLUDED. DEAD LOAD WAS SWAYED. ***

ADJUSTED FOR LOSSES & SECONDARY MOMENTS BUT NO SHORTENING

MEM

NO LEFT .1 PT .2 PT .3 PT .4 PT .5 PT .6 PT .7 PT .8 PT .9 PT RIGHT
 0 1 1.3878 0.4610 -0.2342 -0.6877 -0.8897 -0.8722 -0.6877 -0.3300 0.2049 0.9213 1.2810
 0 2 1.2810 0.9213 0.2049 -0.3300 -0.6877 -0.8722 -0.8897 -0.6877 -0.2342 0.4610 1.3878
 0***** WARNING - THIS FRAME WILL NOT SHORTEN SO COEFF. WILL NOT BE ADJUSTED FOR SHORTENING. *****
 0***** WARNING - THIS FRAME WILL NOT SHORTEN SO COEFF. WILL NOT BE ADJUSTED FOR SHORTENING. *****

LI AI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:37 Page 37
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OTRIAL 1 FRAME 1 PATH 01
 OHORIZONTAL MEMBER STRESSES PRESTRESS ONLY BOTTOM FIBER AFTER ALL LOSSES (PSI)

MEM
 NO LEFT .1 PT .2 PT .3 PT .4 PT .5 PT .6 PT .7 PT .8 PT .9 PT RIGHT
 0 1 -382. 217. 668. 965. 1101. 1094. 980. 756. 419. -35. -276.
 0 2 -276. -35. 419. 756. 980. 1094. 1101. 965. 668. 217. -382.
 OHORIZONTAL MEMBER STRESSES PRESTRESS ONLY TOP FIBER AFTER ALL LOSSES (PSI)
 0 1 1113. 714. 416. 224. 142. 154. 240. 401. 640. 958. 1104.
 0 2 1104. 958. 640. 401. 240. 154. 142. 224. 416. 714. 1113.

LI AI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:37 Page 38
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OTRIAL 1 FRAME 1 PATH 01
 OHORIZONTAL MEMBER MOMENTS DUE TO P/S

MEM
 NO LEFT .1 PT .2 PT .3 PT .4 PT .5 PT .6 PT .7 PT .8 PT .9 PT RIGHT
 0 1 7229. 2401. -1220. -3582. -4634. -4543. -3582. -1719. 1067. 4799. 6673.
 0 2 6673. 4799. 1067. -1719. -3582. -4543. -4634. -3582. -1220. 2401. 7229.

OVERTICAL MEMBER MOMENTS DUE TO P/S

MEM
 NO LEFT .1 PT .2 PT .3 PT .4 PT .5 PT .6 PT .7 PT .8 PT .9 PT RIGHT
 0 3 0. 509. 1019. 1528. 2038. 2547. 3057. 3566. 4076. 4585. 5095.
 0 4 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.
 0 5 0. -509. -1019. -1528. -2038. -2547. -3057. -3566. -4076. -4585. -5095.

OTANGENTIAL ROTATIONS - RADIANS - CLOCKWISE POSITIVE

SPAN	LT. END	RT. END	SPAN	LT. END	RT. END	SPAN	LT. END	RT. END
0 1	-0.000569	0.000000	2	0.000000	0.000569	3	0.000285	-0.000569
0 4	0.000000	0.000000	5	-0.000285	0.000569			

OHORIZONTAL MEMBER DEFLECTIONS IN FEET AT 1/ 4 POINTS FROM LEFT END - DOWNWARD POSITIVE

0 MEMBER 1 E= 4066. 0.000 -0.032 -0.047 -0.023 0.000
 0 MEMBER 2 E= 4066. 0.000 -0.023 -0.047 -0.032 0.000

OVERTICAL MEMBER DEFLECTIONS IN FEET AT 1/ 4 POINTS FROM LEFT END.

0 MEMBER 3 E= 3320. 0.000 0.000 0.001 0.001 0.000
 0 MEMBER 4 E= 3320. 0.000 0.000 0.000 0.000 0.000
 0 MEMBER 5 E= 3320. 0.000 0.000 -0.001 -0.001 0.000

LI AI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:37 Page 39
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OTRIAL 1 FRAME 1
 OHORIZONTAL MEMBER STRESSES FOR ALL P/S PATHS BEFORE LOSSES BOTTOM FIBER (PSI)

MEM
 NO LEFT .1 PT .2 PT .3 PT .4 PT .5 PT .6 PT .7 PT .8 PT .9 PT RIGHT
 0 1 -448. 260. 791. 1137. 1294. 1284. 1149. 884. 488. -43. -324.
 0 2 -324. -43. 488. 884. 1149. 1284. 1294. 1137. 791. 260. -448.
 OHORIZONTAL MEMBER STRESSES FOR ALL P/S PATHS BEFORE LOSSES TOP FIBER (PSI)
 0 1 1315. 842. 490. 264. 167. 181. 282. 470. 749. 1120. 1295.
 0 2 1295. 1120. 749. 470. 282. 181. 167. 264. 490. 842. 1315.

LI AI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:37 Page 40
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OTRIAL 1 FRAME 1
 OHORIZONTAL MEMBER STRESSES FOR ALL P/S PATHS AFTER ALL LOSSES BOTTOM FIBER (PSI)

MEM
 NO LEFT .1 PT .2 PT .3 PT .4 PT .5 PT .6 PT .7 PT .8 PT .9 PT RIGHT
 0 1 -382. 217. 668. 965. 1101. 1094. 980. 756. 419. -35. -276.
 0 2 -276. -35. 419. 756. 980. 1094. 1101. 965. 668. 217. -382.
 OHORIZONTAL MEMBER STRESSES FOR ALL P/S PATHS AFTER ALL LOSSES TOP FIBER (PSI)
 0 1 1113. 714. 416. 224. 142. 154. 240. 401. 640. 958. 1104.
 0 2 1104. 958. 640. 401. 240. 154. 142. 224. 416. 714. 1113.

LI-BAI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:37 Page 41
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OTRIAL 1 FRAME 1
 OHORIZONTAL MEMBER STRESSES DL + P/S BEFORE ALL LOSSES BOTTOM FIBER (PSI)

MEM	NO	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
0	1	393.	534.	631.	677.	674.	641.	617.	601.	594.	586.	960.
0	2	960.	586.	594.	601.	617.	641.	674.	677.	631.	534.	393.

OHORIZONTAL MEMBER STRESSES DL + P/S BEFORE ALL LOSSESTOP FIBER (PSI)

0	1	739.	654.	599.	578.	592.	621.	645.	664.	677.	690.	415.
0	2	415.	690.	677.	664.	645.	621.	592.	578.	599.	654.	739.

LI-BAI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:37 Page 42
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OTRIAL 1 FRAME 1
 OHORIZONTAL MEMBER STRESSES DL + P/S AFTER ALL LOSSES BOTTOM FIBER (PSI)

MEM	NO	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
0	1	459.	491.	509.	505.	481.	452.	449.	473.	525.	594.	1008.
0	2	1008.	594.	525.	473.	449.	452.	481.	505.	509.	491.	459.

OHORIZONTAL MEMBER STRESSES DL + P/S AFTER ALL LOSSES TOP FIBER (PSI)

0	1	537.	526.	525.	539.	567.	594.	603.	594.	567.	528.	225.
0	2	225.	528.	567.	594.	603.	594.	567.	539.	525.	526.	537.

OHORIZONTAL MEMBER STRESSES DL + ADDED DL + P/S AFTER ALL LOSSES BOTTOM FIBER (PSI)

0	1	577.	530.	486.	441.	394.	361.	375.	434.	540.	682.	1189.
0	2	1189.	682.	540.	434.	375.	361.	394.	441.	486.	530.	577. ←

OHORIZONTAL MEMBER STRESSES DL + ADDED DL + P/S AFTER ALL LOSSES TOP FIBER (PSI)

0	1	456.	500.	541.	583.	626.	655.	654.	621.	557.	467.	102.
0	2	102.	467.	557.	621.	654.	655.	626.	583.	541.	500.	456. ←

LI-BAI-BDS Version 4.0.13 Licensed to: Colorado DOT Run time: 12-JUL-95 16:18:37 Page 43
 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OTRIAL 1 FRAME 1
 OHORIZONTAL MEMBER STRESSES DL + ADDED DL + MAX POS LL + I + P/S BOTTOM FIBER (PSI)

MEM	NO	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
0	1	490.	462.	346.	183.	52.	-18.	2.	117.	328.	609.	1189.
0	2	1189.	609.	328.	117.	2.	-18.	52.	183.	346.	462.	490.

OHORIZONTAL MEMBER STRESSES DL + ADDED DL + MAX POS LL + I + P/S TOP FIBER (PSI)

0	1	515.	546.	637.	760.	860.	915.	909.	838.	702.	517.	102.
0	2	102.	517.	702.	838.	909.	915.	860.	760.	637.	546.	515.

OHORIZONTAL MEMBER STRESSES DL + ADDED DL + MAX NEG LL + I + P/S BOTTOM FIBER (PSI)

0	1	959.	719.	535.	446.	430.	428.	472.	561.	698.	917.	1610.
0	2	1610.	917.	698.	561.	472.	428.	430.	446.	535.	719.	959.

OHORIZONTAL MEMBER STRESSES DL + ADDED DL + MAX NEG LL+ I + P/S FOR TOP FIBER (PSI)

0	1	195.	370.	507.	580.	602.	610.	588.	534.	449.	306.	-187.
0	2	-187.	306.	449.	534.	588.	610.	602.	580.	507.	370.	195.

0**** MIN PJACK = 5210. KIPS CONC STRENGTH AT 28 DAYS = 4025. PSI AT STRESSING = 1833. PSI ****

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 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OTOTAL PE MOMENTS FOR ALL MEMBERS.

MEM	NO	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
0	1	7229.	2401.	-1220.	-3582.	-4634.	-4543.	-3582.	-1719.	1067.	4799.	6673.
0	2	6673.	4799.	1067.	-1719.	-3582.	-4543.	-3582.	-1220.	2401.	7229.	7229.
0	3	0.	509.	1019.	1528.	2038.	2547.	3057.	3566.	4076.	4585.	5095.
0	4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0	5	0.	-509.	-1019.	-1528.	-2038.	-2547.	-3057.	-3566.	-4076.	-4585.	-5095.

OTOTAL P/S DEFLECTION FOR TRIAL
 OTANGENTIAL ROTATIONS - RADIANS - CLOCKWISE POSITIVE

SPAN	LT. END	RT. END	SPAN	LT. END	RT. END	SPAN	LT. END	RT. END	
0	1	-0.000569	0.000000	2	0.000000	0.000569	3	0.000285	-0.000569
0	4	0.000000	0.000000	5	-0.000285	0.000569			

OHORIZONTAL MEMBER DEFLECTIONS IN FEET AT 1/ 4 POINTS FROM LEFT END - DOWNWARD POSITIVE

0	MEMBER 1	E= 4066.	0.000	-0.032	-0.047	-0.023	0.000
0	MEMBER 2	E= 4066.	0.000	-0.023	-0.047	-0.032	0.000

OVERTICAL MEMBER DEFLECTIONS IN FEET AT 1/ 4 POINTS FROM LEFT END.

0	MEMBER 3	E= 3320.	0.000	0.000	0.001	0.001	0.000
0	MEMBER 4	E= 3320.	0.000	0.000	0.000	0.000	0.000
0	MEMBER 5	E= 3320.	0.000	0.000	-0.001	-0.001	0.000

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 STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

OTOTAL TOP PF FOR TRIAL

MEM	NO	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
0	1	3758.	0.	0.	0.	0.	0.	0.	0.	0.	4124.	4043.
0	2	4043.	4124.	0.	0.	0.	0.	0.	0.	0.	0.	3758.

OTOTAL BOTTOM PF FOR TRIAL

0	1	0.	3809.	3858.	3908.	3956.	3987.	4022.	4056.	4090.	0.	0.
0	2	0.	0.	4090.	4056.	4022.	3987.	3956.	3908.	3858.	3809.	0.

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STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

LONG TERM LOSSES

TOTAL LOSS (KSI) = SH + ES + CRC + CRS

MEM NO	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
0 1	17.5	17.8	18.7	19.3	19.3	18.9	18.8	18.9	19.1	19.1	16.2
0 2	16.2	19.1	19.1	18.9	18.8	18.9	19.3	19.3	18.7	17.8	17.5

SHEAR DESIGN - AASHTO 1980

MEMBER:	LEFT	.1 PT	.2 PT	.3 PT	.4 PT	.5 PT	.6 PT	.7 PT	.8 PT	.9 PT	RIGHT
MEMBER: 1											
OV-CABLE	425.	334.	226.	115.	3.	74.	149.	225.	302.	352.	47.
SECONDARY	-23.	-23.	-23.	-23.	-23.	-23.	-23.	-23.	-23.	-23.	-23.
VU	1107.	916.	725.	537.	333.	237.	431.	638.	832.	1023.	1217.
VC	1100.	1170.	1066.	697.	403.	273.	416.	659.	751.	873.	903.
REQD WEB	48.	48.	48.	48.	48.	48.	48.	48.	48.	48.	48.
AS(IN)/FT	0.58	0.48 *	0.48 *	0.48 *	0.48 *	0.48 *	0.48 *	0.48 *	0.48 *	0.77	1.18
MEMBER: 2											
OV-CABLE	47.	352.	302.	225.	149.	74.	3.	115.	226.	334.	425.
SECONDARY	23.	23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
VU	1217.	1023.	832.	638.	431.	237.	333.	537.	725.	916.	1107.
VC	903.	1125.	751.	659.	416.	273.	403.	697.	1066.	1170.	1100.
REQD WEB	48.	48.	48.	48.	48.	48.	48.	48.	48.	48.	48.
AS(IN)/FT	2.00	0.48 *	0.77	0.48 *	0.48 *	0.48 *	0.48 *	0.48 *	0.48 *	0.48 *	0.58

ONOTE: * AFTER REQD WEB INDICATES ADDITIONAL WEB WIDTH REQD. * AFTER AS(IN)/FT INDICATES MINIMUM REQD.

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STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

AASHTO ULTIMATE MOMENT

MEMBER:	SECOND MOMENT (K-FT)	ULT MOM APPLD (K-FT)	ULT MOM P/S CAP (K-FT)	AVERAGE FSU (KSI)	NEUTRAL AXIS (IN)	MILD STEEL REQD (SQ.IN)	COMBINED REINFORCEMENT INDEX	ULT MOM MILD CAP (K-FT)	ULT MOM TOTAL CAP (K-FT)
MEMBER: 1									
0 0.0 PT.	5095.	12461.	19309.	254.61	6.88	0.00	0.123	0.	19309.
0 0.1 PT.	4821.	2713.	14754.	255.39	4.92	0.00	0.116	0.	14754.
0 0.2 PT.	4547.	8955.	20394.	259.43	5.11	0.00	0.088	0.	20394.
0 0.3 PT.	4273.	14385.	23882.	261.95	5.16	0.00	0.077	0.	23882.
0 0.4 PT.	3999.	17531.	25058.	262.79	5.18	0.00	0.074	0.	25058.
0 0.5 PT.	3725.	18189.	24316.	262.26	5.16	0.00	0.076	0.	24316. ←
0 0.6 PT.	3451.	16453.	22106.	260.68	5.13	0.00	0.082	0.	22106.
0 0.7 PT.	3177.	12183.	18476.	258.00	5.08	0.00	0.096	0.	18476.
0 0.8 PT.	2903.	5371.	13535.	254.37	4.92	0.00	0.125	0.	13535.
0 0.9 PT.	2629.	9115.	19038.	254.44	6.88	0.00	0.124	0.	19038.
0 1.0 PT.	2355.	20598.	22593.	256.57	6.88	0.00	0.107	0.	22593.
MEMBER: 2									
0 0.0 PT.	2355.	20598.	22593.	256.57	6.88	0.00	0.107	0.	22593.
0 0.1 PT.	2629.	9115.	19038.	254.44	6.88	0.00	0.124	0.	19038.
0 0.2 PT.	2903.	5371.	13535.	254.37	4.92	0.00	0.125	0.	13535.
0 0.3 PT.	3177.	12183.	18476.	258.00	5.08	0.00	0.096	0.	18476.
0 0.4 PT.	3451.	16453.	22106.	260.68	5.13	0.00	0.082	0.	22106.
0 0.5 PT.	3725.	18189.	24316.	262.26	5.16	0.00	0.076	0.	24316. ←
0 0.6 PT.	3999.	17531.	25058.	262.79	5.18	0.00	0.074	0.	25058.
0 0.7 PT.	4273.	14385.	23882.	261.95	5.16	0.00	0.077	0.	23882.
0 0.8 PT.	4547.	8955.	20394.	259.43	5.11	0.00	0.088	0.	20394.
0 0.9 PT.	4821.	2713.	14754.	255.39	4.92	0.00	0.116	0.	14754.
0 1.0 PT.	5095.	12461.	19309.	254.61	6.88	0.00	0.123	0.	19309.

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STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

TENDON ELONGATION

0	PATH NO.	P-JACK (KIPS)	% JACK	FY (KSI)	AS (SQ IN)	AVE STRESS (KSI)	TENDON LENGTH (FT) *	ELONGATION (IN)
0	01	5210.	75.	270.	25.73	193.82	238.00	19.77

ONOTE: TENDON LENGTH INCLUDES 4 FEET FOR JACKS.
MODULUS USED FOR P/S STEEL IS 28000. KSI

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STRUCTURE G-04-AL; SH-70; CBGCP; PROJ#I70-1(75)57; M.M.

'APPROXIMATE QUANTITY'

***** CONCRETE SUPER 465 C.Y. *****

***** CONCRETE SUB 0 C.Y. *****

***** P/S TRIAL 20465 LBS. *****

THE SUPERSTRUCTURE CONCRETE QUANTITY IS BASED ON THE UNIT WEIGHT OF CONCRETE SUPPLIED ON THE FRAME DESCRIPTION CARD. IT ASSUMES THAT ALL THE DEAD LOAD IS GIVEN IN TRIAL 0.

THE CONCRETE SUBSTRUCTURE QUANTITY IS BASED ON TRIAL 0 ONLY.

THE P/S QUANTITIES FOR STRAND ONLY ARE FOR EACH TRIAL, THAT WAS ENTERED AND IN THAT ORDER. STRAND USE IS BASED ON THE LENGTH FROM ANCHOR TO ANCHOR.

END OF JOB - 022086
INCREMENTED CPU TIME (SECONDS)= 1. INCREMENTED CLOCK TIME (SECONDS)= 5.