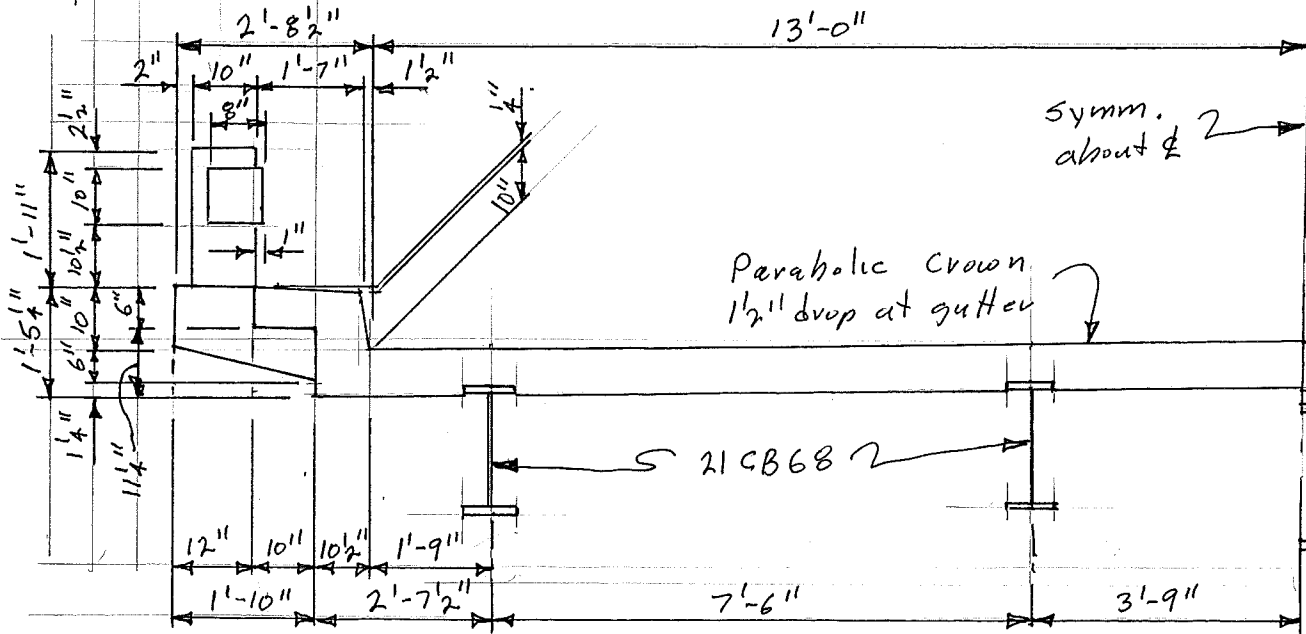
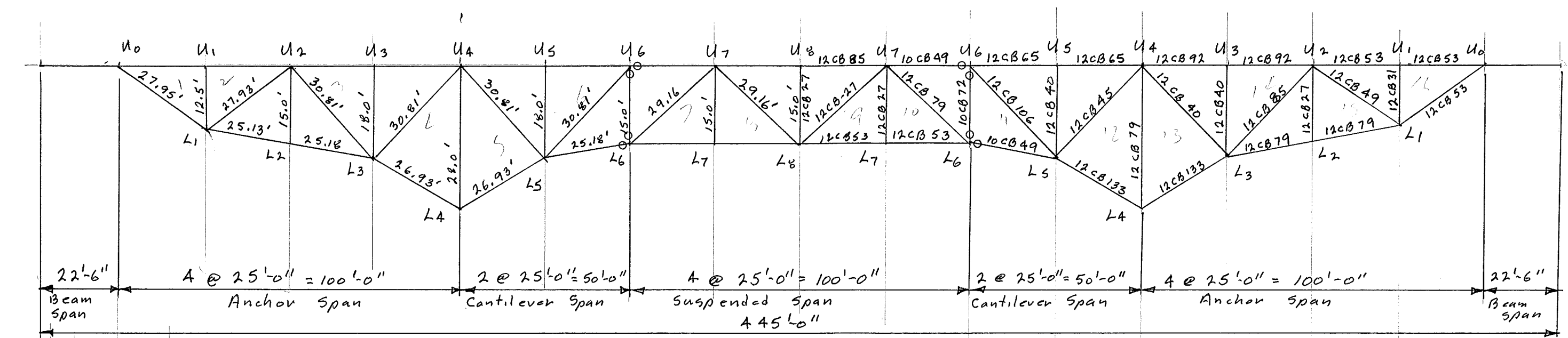
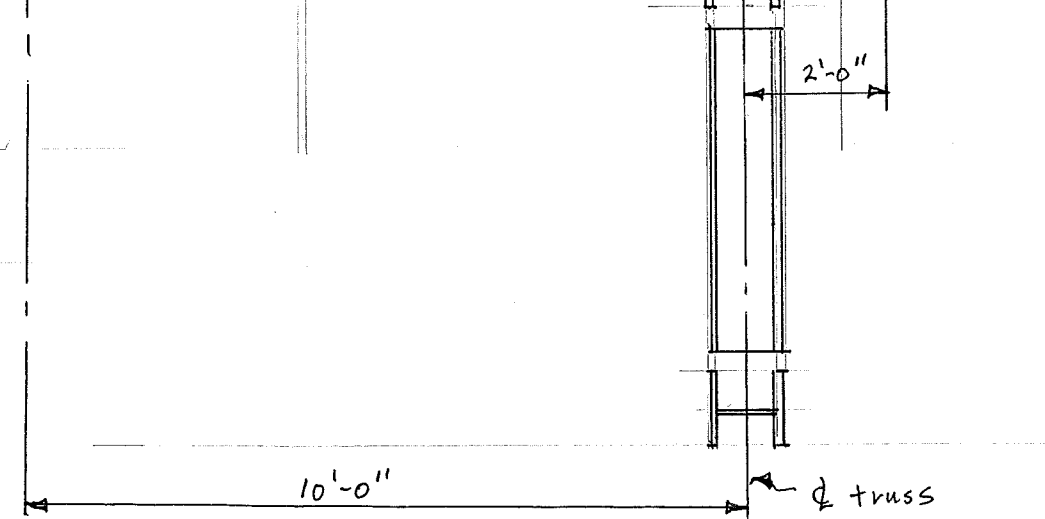


BRIDGE # 22 GASTON



Half-Section Beam Spans

Member Properties							
MEMBER	Area in ²	Depth in	Flange		Web Thick. in.	I in ⁴	S in ³
			Width in.	Thick. in.			
21CB68	20.02	21.13	8.27	.685	.430	1488.3	138.9
24CB84	24.71	24.09	9.025	.772	.470	2384.3	196.3
12CB27	7.97	11.96	6.5	.4	.240	204.1	34.1
12CB31	9.12	12.09	6.525	.465	.265	238.4	39.4
12CB40	11.87	11.94	8.005	.516	.294	310.1	51.9
12CB45	13.24	12.06	8.042	.576	.336	350.8	58.2
12CB49	14.69	12.19	8.077	.641	.375	393.0	64.5



Half-Section Truss Spans

Member Properties						
Member	Area in ²	Depth in	Flange		Web Thick. in	r in
			Width in	Thick. in		
12CB53	15.57	12.06	10.0	.576	.349	2.48
12CB65	19.09	12.12	12.0	.606	.395	3.02
12CB79	23.22	12.38	12.08	.736	.470	3.05
12CB85	24.98	12.5	12.105	.796	.495	3.07
12CB92	27.04	12.62	12.154	.856	.549	3.08
12CB106	31.2	12.89	12.22	.990	.610	3.11
12CB133	39.10	13.38	12.365	1.236	.76	3.16
10CB72	21.17	10.5	10.17	.808	.51	2.59
10CB49	14.38	10.0	10.0	.556	.34	2.54
6ST13.5						
16WF36	10.59	15.85	6.992	.428	.299	1.45
10CB33	9.72	9.75	7.965	.433	.295	1.94
8CB31	9.1	8.06	8.0	.43	.29	2.01
12C20.7						

$$DF-M = \frac{5}{5.5} = \frac{7}{5.5} = 1.2727$$

$$\pm 0.636$$

$$\text{Curb } (17.25)(10.5) = + 55.14$$

$$(10)(6) = + 60$$

$$I_2(4)(20.5) = - 2.56$$

$$I_2(1.5)(10) = - 7.5$$

$$\frac{105.08}{144} (150) = 109.5 \text{ \#/ft}$$

$$\text{Slab ext. } \left(\frac{6.75}{12} \right) \left(\frac{7.5}{2} + 1.75 \right) = + 3.094$$

$$- \text{flg. } \left[\frac{(8.27)(1.685)}{144} \right] = - .039$$

$$3.055 (150) = 458.3 \text{ \#/ft}$$

$$\text{Slab int. } \left(\frac{6.75}{12} \right) 7.5 = + 4.219$$

$$- \text{flg. } \left[\frac{(8.27)(1.685)}{144} \right] = - .039$$

$$4.18 (150) = 627.0 \text{ \#/ft}$$

$$\text{Unif. DL Int.} = 627.0 \text{ \#/ft} \quad \text{Conc. + slab} = 689$$

$$\text{Ext.} = 458.3 + 109.5 = 567.8 \text{ \#/ft} \quad \text{Conc. + 62} = 629.8$$

Steel Diaph. (Abut)

$$12 \times 20.7 \quad (20.7)(7.17) = 148.4$$

$$\text{clip } 6 \times 4 \times \frac{3}{8} \quad 2(12.3)(.75) = 18.5$$

$$\text{Bolts} \quad \frac{12.0}{178.9 \text{ \# int.}}$$

$$89.5 \text{ \# ext.}$$

Steel diaph. (Beam Span) At. 1

$$16 \text{ WF } 36 \quad (36)(7.17) = 258.1$$

$$\text{clip } 6 \times 4 \times \frac{3}{8} \quad (4)(12.3)(.75) = 36.9$$

$$\text{Bolts} \quad 18(1) = 18.0$$

$$313.0 \text{ \# int.}$$

$$156.5 \text{ \# ext.}$$

Span A or H (Beam Span)

FF. to 3" JT.

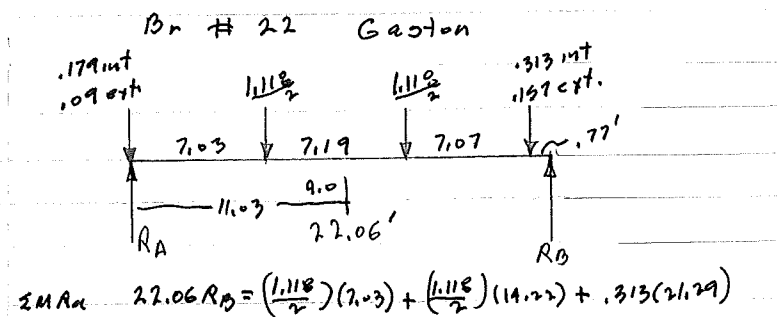
$$\text{Design span} = 23.32' - 1.33' + .51' - .44' = 22.06'$$

$$\text{Uniform DL } M_{\text{int}} = \frac{wL^2}{8} = \frac{.689(22.06)^2}{8} = 41.91 \text{ \#K int.}$$

$$= \frac{.689(22.06)^2}{8} = 38.31 \text{ \#K Ext.}$$

$$R_I = \frac{.689(22.06)}{2} + .60 + .313 = 8.51 \text{ \#K int.} \quad R_E = \frac{.689(22.06)}{2} + .53 + .16 = 7.74 \text{ \#K}$$

$$R_B = \frac{.689(8.51) + 13.75(8.51) + 21.25(8.51) - 1.75(7.74)}{20} = 16.75 \text{ \#K}$$



$$22.06 R_B = \left(\frac{1.118}{2} \right) (7.03) + \left(\frac{1.118}{2} \right) (14.22) + .313(21.29)$$

$$R_B = .60 \text{ K} \quad R_A = 1.01 \text{ K}$$

$$M_{\text{int}} = 1.01(11.03) - \frac{1.118}{2}(4) - .179(11.03)$$

$$M_{\text{ext}} = 6.93 \text{ \#K int.}$$

$$22.06 R_B = \left(\frac{1.118}{2} \right) (7.03) + \left(\frac{1.118}{2} \right) (14.22) + .157(21.29)$$

$$R_B = .53 \text{ K} \quad R_A = .84 \text{ K}$$

$$M_{\text{int}} = .84(11.03) - \frac{1.118}{2}(4) - .09(11.03)$$

$$M_{\text{ext}} = 6.04 \text{ \#K}$$

$$M_{\text{int}} = 41.91 + 6.93 = 48.84 \text{ \#K int.}$$

$$= 38.31 + 6.04 = 44.35 \text{ \#K ext.}$$

$$W \quad 21 \times 62 \quad S = 127 \text{ in}^3$$

$$\text{Allow } I = 18 \text{ Ksi; } O = 24.5 \text{ Ksi}$$

$$\text{Avail. LL Capacity} = \frac{18(127)(.95)}{12} - 48.84 = 132.63 \text{ \#K int.}$$

$$= \frac{24.5(127)(.95)}{12} - 48.84 = 197.49 \text{ \#K op.}$$

$$@ 95\% \quad \frac{18(127)(.95)}{12(1.5)} - 44.35 = 136.63 \text{ \#K I}$$

$$\frac{24.5(127)}{12} - 40.35 = 201.98 \text{ \#K O}$$

$$I = \frac{50}{2+1.25} = \frac{50}{3.25} = 15.38 \text{ in}^3$$

$$DF = \frac{5}{2.5} = \frac{2.2}{3.5} = 1.36 \quad F = \frac{1.36(1.3)}{2} = .884$$

$$\text{Inv. HIS } \frac{132.63}{132(.884)} \text{ IS} = 16.99 \text{ T}$$

$$\text{HSIS } \frac{132.63}{132(.884)} \text{ IS} = 16.99 \text{ T}$$

$$95\% \text{ TR } 2 \quad \frac{132.63}{115.8(.884)} \text{ IS } 15.75 = 20.80 \text{ T}$$

$$\text{TR } 3 \quad \frac{132.63}{122.7(.884)} \text{ IS } 24.9375 = 27.58 \text{ T}$$

$$\text{TR } 4 \quad \frac{132.63}{241(.884)} \text{ IS } 33.6 = 20.84 \text{ T}$$

$$\text{TR } 5 \quad \frac{132.63}{186.8(.884)} \text{ IS } 36.75 = 29.41 \text{ T}$$

$$@ 98\% \quad \frac{18(127)(.98)}{12} - 48.84 = 137.85 \text{ \#K I}$$

$$\frac{24.5(127)(.98)}{12} - 48.84 = 205.27 \text{ \#K O}$$

$$\frac{18(127)(.98)}{12} - 44.35 = 142.34 \text{ \#K I}$$

$$\frac{24.5(127)(.98)}{12} - 40.35 = 209.76 \text{ \#K O}$$

$$H = \frac{137.85}{132(.884)} \text{ IS} = 17.7 \text{ T} \quad H = \frac{205.27}{132(.884)} (15) = 26.39 \text{ T}$$

$$HS = \frac{137.85}{132(.884)} \text{ IS} = 17.7 \text{ T} \quad HS = 26.39 \text{ T}$$

$$\text{TR } 2 = \frac{137.85}{115.8(.884)} \text{ IS } 15.75 = 21.21 \text{ T} \quad \text{TR } 2 = 31.58 \text{ T}$$

$$\text{TR } 3 = \frac{137.85}{122.7(.884)} \text{ IS } 24.9375 = 22.52 \text{ T} \quad \text{TR } 3 = 33.53 \text{ T}$$

$$\text{TR } 4 = \frac{137.85}{241(.884)} \text{ IS } 33.6 = 21.74 \text{ T} \quad \text{TR } 4 = 32.37 \text{ T}$$

$$\text{TR } 5 = \frac{137.85}{186.8(.884)} \text{ IS } 36.75 = 30.68 \text{ T} \quad \text{TR } 5 = 45.68 \text{ T}$$

$$98\% \text{ Int. Inv.}$$

$$98\% \text{ Int. Oper.}$$

$$H = \frac{142.34}{132(.884)} \text{ IS} = 18.30 \text{ T} \quad H = \frac{209.76}{132(.884)} \text{ IS} = 26.96 \text{ T}$$

$$HS = 18.30 \text{ T} \quad HS = 26.96 \text{ T}$$

$$\text{TR } 2 = 21.90 \text{ T} \quad \text{TR } 2 = 32.27 \text{ T}$$

$$\text{TR } 3 = 23.25 \text{ T} \quad \text{TR } 3 = 34.26 \text{ T}$$

$$\text{TR } 4 = 22.45 \text{ T} \quad \text{TR } 4 = 33.08 \text{ T}$$

$$\text{TR } 5 = 31.68 \text{ T} \quad \text{TR } 5 = 46.68 \text{ T}$$

$$98\% \text{ Ext. Inv.}$$

$$98\% \text{ Ext. Oper.}$$

$$H = \frac{136.63}{132(.884)} \text{ IS} = 17.56 \text{ T} \quad H = \frac{201.98}{132(.884)} \text{ IS} = 25.96 \text{ T}$$

$$HS = 17.56 \text{ T} \quad HS = 25.96 \text{ T}$$

$$\text{TR } 2 = 21.02 \text{ T} \quad \text{TR } 2 = 31.08 \text{ T}$$

$$\text{TR } 3 = 22.32 \text{ T} \quad \text{TR } 3 = 32.99 \text{ T}$$

$$\text{TR } 4 = 21.55 \text{ T} \quad \text{TR } 4 = 31.86 \text{ T}$$

$$\text{TR } 5 = 30.41 \text{ T} \quad \text{TR } 5 = 44.95 \text{ T}$$

$$95\% \text{ Ext. Inv.}$$

$$95\% \text{ Ext. Oper.}$$

$$H = \frac{132.63}{132(.884)} \text{ IS} = 25.39 \text{ T}$$

$$HS = 25.39 \text{ T}$$

$$\text{TR } 2 = 30.39 \text{ T}$$

$$\text{TR } 3 = 32.76 \text{ T}$$

$$\text{TR } 4 = 31.15 \text{ T}$$

$$\text{TR } 5 = 43.95 \text{ T}$$

95%

Int.

Oper.

Stringers (truss)

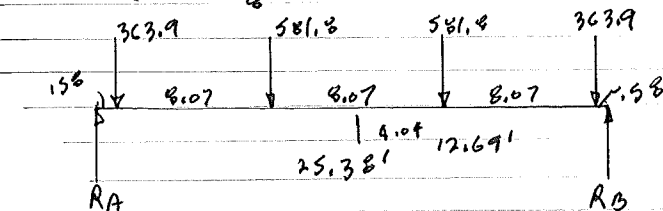
design span = 25'

Uniform DL Int. $w = 677 + 68 = 695 \text{ \#/ft}$

Ext. $w = 567.8 + 68 = 635.8 \text{ \#/ft}$

$$M = \frac{wL^2}{8} = \frac{695(25)^2}{8} = 54,301 \text{ K int}$$

$$\frac{635.8(25)^2}{8} = 49,671 \text{ K ext.}$$



$$\sum M_A = 0 \quad 25.38 R_B = 363.9(15) + 581.8(8.69) + 581.8(16.77) + 363.9(24.79)$$

$$R_B = 945 \quad R_A = 946$$

$$M_{CL} = 945(12.69) - 581.8(4.04) - 363.9(12.11) = 3,971 \text{ K}$$

$$M_{DL} = 54,301 + 3,971 = 58,271 \text{ K int}$$

$$49,671 + 3,971 = 53,641 \text{ K ext.}$$

$$\text{Live Load Capac. } I = \frac{18(139.9)(.95)}{12} - 58,271 = 141,091 \text{ K int}$$

$$O = \frac{24.5(139.9)(.95)}{12} - 58,271 = 213,081 \text{ K int}$$

$$\text{@ } 95\% \quad I = \frac{18(139.9)(.95)}{12} - 53,641 = 145,721 \text{ K ext}$$

$$O = \frac{24.5(139.9)(.95)}{12} - 53,641 = 217,711 \text{ K ext}$$

$$\text{@ } 98\% \quad I = \frac{18(139.9)(.98)}{12} - 58,271 = 147,381 \text{ K int}$$

$$O = \frac{24.5(139.9)(.98)}{12} - 58,271 = 221,651 \text{ K int}$$

$$I = \frac{18(139.9)(.98)}{12} - 53,641 = 152,011 \text{ K ext.}$$

$$O = \frac{24.5(139.9)(.98)}{12} - 53,641 = 226,781 \text{ K ext.}$$

$$H = \frac{141,091}{150(.684)} \quad 15 = 15,96T \quad H = \frac{213,081}{170(.684)} \quad 15 = 24,10T$$

$$HS = \frac{141,091}{155.5(.684)} \quad 15 = 15,40T \quad HS = \frac{213,081}{170(.684)} \quad 15 = 23,75T$$

$$TR2 = \frac{141,091}{138.7(.684)} \quad 15.75 = 18,12T \quad TR2 = \frac{213,081}{170(.684)} \quad 15.75 = 27,37T$$

$$TR3 = \frac{141,091}{709(.684)} \quad 24.9375 = 19,04T \quad TR3 = \frac{213,081}{170(.684)} \quad 24.9375 = 28,76T$$

$$TR4 = \frac{141,091}{784.5(.684)} \quad 33.6 = 18,85T \quad TR4 = \frac{213,081}{170(.684)} \quad 33.6 = 28,47T$$

$$TR5 = \frac{141,091}{731.5(.684)} \quad 36.75 = 25,39T \quad TR5 = \frac{213,081}{170(.684)} \quad 36.75 = 38,76T$$

95% int. ↑ int

Bn. # 22 Gaston

$$H = \frac{145,72}{170(.684)} \quad 15 = 16,98T \quad H = \frac{217,71}{170(.684)} \quad 15 = 24,163T$$

$$HS = 15,90T \quad HS = 23,76T$$

$$TR2 = 18,72T \quad TR2 = 27,97T$$

$$TR3 = 19,67T \quad TR3 = 29,39T$$

$$TR4 = 19,47T \quad TR4 = 29,09T$$

$$TR5 = 26,17T \quad TR5 = 39,10T$$

95% ext. ↑ inv 95% ext. ↑ open

$$H = 147,38 = 16,67T \quad H = 221,65 = 25,07T$$

$$HS = 16,08T \quad HS = 24,19T$$

$$TR2 = 18,93T \quad TR2 = 28,97T$$

$$TR3 = 19,89T \quad TR3 = 29,92T$$

$$TR4 = 19,69T \quad TR4 = 29,61T$$

$$TR5 = 26,47T \quad TR5 = 39,80T$$

98% int. ↑ inv 98% int. ↑ open

$$H = 152,01 = 17,20T \quad H = 226,28 = 25,60T$$

$$HS = 16,59T \quad HS = 24,69T$$

$$TR2 = 19,53T \quad TR2 = 29,07T$$

$$TR3 = 20,52T \quad TR3 = 30,54T$$

$$TR4 = 20,31T \quad TR4 = 30,23T$$

$$TR5 = 27,30T \quad TR5 = 40,63T$$

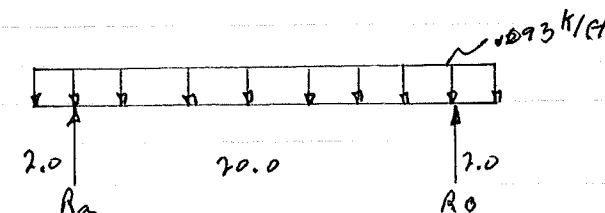
98% Ext. ↑ inv 98% Ext. ↑ open

Floor Beams (truss)

Floor Bm. @ Comp. Joint

$$\text{conc } \frac{(9.015)(1)(.15)}{144} = .009$$

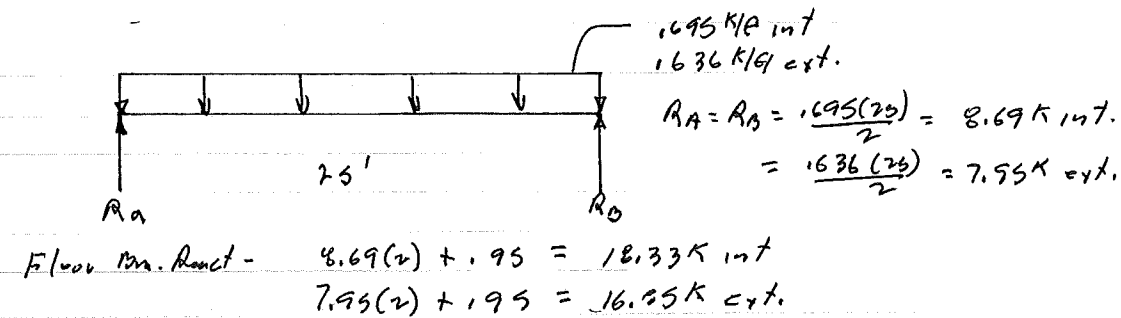
$$w_{DL} = .084 + .009 = .093 \text{ K/ft}$$



$$R_A = R_B = .093(2 + \frac{20}{2}) = 1.12K$$

$$-M_{RA} = -M_{RB} = \frac{.093(2)^2}{2} = .186K$$

$$+M = \frac{.093}{8} [20^2 - 4(2)^2] = 4.464K$$



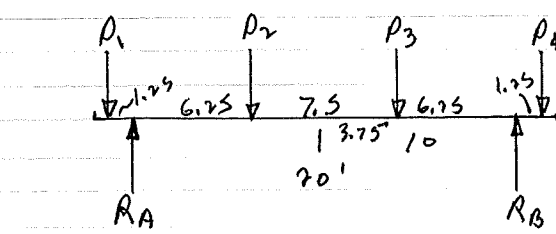
.695 K/ft int
1.636 K/ft ext.

$$R_A = R_B = \frac{.695(25)}{2} = 8.69K \text{ int.}$$

$$= \frac{1.636(25)}{2} = 7.55K \text{ ext.}$$

$$\text{Floor Bm. React - } 8.69(2) + .95 = 18,33K \text{ int}$$

$$7.55(2) + .95 = 16,55K \text{ ext.}$$



$$\sum M_A = 0 \quad 20R_B = 6.25P_2 + 13.75P_3 + 21.25P_4 - 1.25P_1$$

$$R_B = \frac{6.25P_2 + 13.75P_3 + 21.25P_4 - 1.25P_1}{20}$$

$$R_B = \frac{6.25(18.33) + 13.75(18.33) + 21.25(18.33) - 1.25(16.55)}{20} = 35,18K = R_A$$

$$-M = -1.25(16.55) = -21,06K$$

$$+M_{CL} = 35,18(10) - 3.75(18,33) - 11.25(16,55) = +93,51K$$

$$\text{DL Mom} = -21,06 - .19 = -21,25K$$

$$+ 93,5 + 4,46 = +97,96K$$

$$\text{Tension Avail LL Cap. } I = \frac{18(196.3)(.95)}{12} = 97,96 = 181,77K$$

$$O = \frac{24.5(196.3)(.95)}{12} = 97,96 = 282,78K$$

$$I = \frac{18(196.3)(.98)}{12} = 97,96 = 205,79K$$

$$O = \frac{24.5(196.3)(.98)}{12} = 97,96 = 294,50K$$

$$\text{Comp } \frac{Q}{b} = \frac{20(12)}{9.015} = 26,62 < 32OK$$

$$\text{Allow} = 18,000 - 6.3\left(\frac{Q}{b}\right)^2 = 18,000 - 6.3(26,62)^2 = 13,535Ksi \quad 1.31 = 18,543$$

$$I = \frac{13,535(196.3)(.95)}{12} - 21,25 = 189,09K$$

$$O = \frac{18,543(196.3)(.95)}{12} - 21,25 = 266,92K$$

$$I = \frac{13,535(196.3)(.98)}{12} - 21,25 = 195,73K$$

$$O = \frac{18,543(196.3)(.98)}{12} - 21,25 = 297,27K$$

$$H = \frac{189.09}{33.29} (15) = 85.20 \text{ T} \quad H = \frac{266.92}{189.09} \times 100 = 140.77 \text{ T}$$

$$HS = \frac{189.09}{96.98} (15) = 61.02T \quad \% 14T$$

$$TR_2 = \frac{189.09}{33.03} (15.78) = 90.17T \quad 127.28T$$

$$TR_3 = \frac{189.09}{51.98} (249376) = 90.72T \quad 12\%, 06T$$

$$TR_4 = \frac{189.09}{70.17} (336) = 90.54T \quad 127.81T$$

$$TR S = \frac{189.09}{67.9} (36.75) = 103.10 T \quad 145.54 T$$

95% 12V

9570 3per

$$H = \frac{195.73}{189.09} \times 140 = 88.19 \text{ T} \quad H = \frac{297.27}{189.09} \times 140 = 133.94 \text{ T}$$

$$H_S = 63.16T \quad 95.93T$$

$$TAZ = 93.34T = 191.761$$

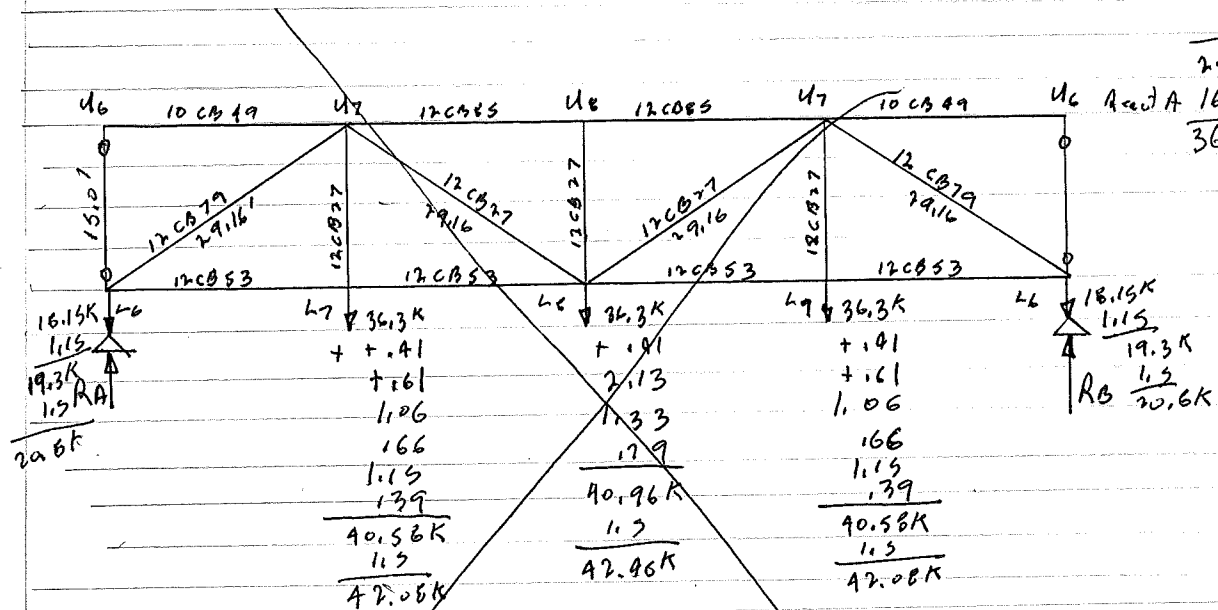
TR3 = 93.91T 142.62T

TR4 = 93.72T 192.34T

PRS = 106.72 T 167.00 T

TRUSS

Fl. Bm. React = $35.18 + 1.12 = 36.3K$ not including Truss

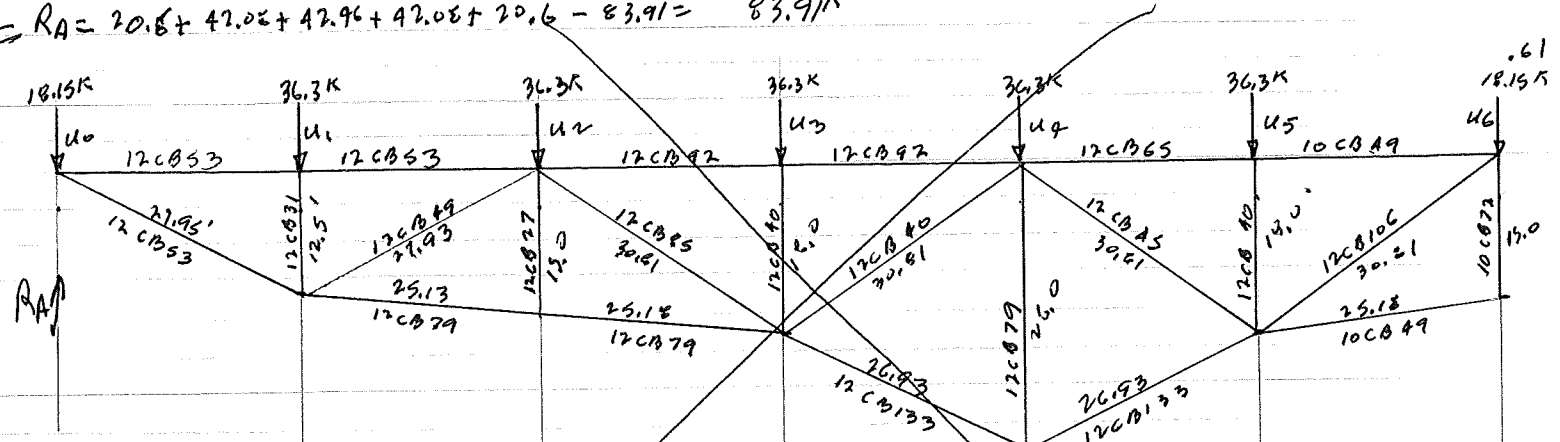


Top Sway bracing	WT 6x13.5	$2(.0135)(32.02) = .86K$
Bot. Sway brace	WT 6x13.5	$2(.0135)(32.02) = .86K$
Sway frame	8 CB 31	$.031(20) = .62K$
	$2L 4x3 \times \frac{5}{8}$	$2(25)(.0072) = .36K$
	joints & Bolts	$.3K$
		3K = 221.5K

Br #22 Gaston

$$R_B = \frac{42.08(25) + 42.46(50) + 42.08(75) + 20.16(100)}{100} = 83.91/K$$

$$DL \leq R_A = 20.6 + 42.06 + 42.96 + 42.06 + 20.6 - 83.91 = 83.91 \text{ K}$$



Top End from susp.
F. B. M. React.

.66	1.38	1.21	2.3	1.96	1.43	.61	Top chond
.74	1.73	1.99	2.79	3.58	2.41	.62	Bottom chond
	.68	1.99	1.93	1.31	2.33	1.63	Dragon.
	.39	.41	.72	2.21	.72	1.08	Vent.
.43	.86	1.07	1.3	1.52	1.44	.64	Top Sway.
.48	.29	.86	.88	.90	.88	.43	Both Sway
.25	.48	.49	.50	1.32	.50	.49	Vent Sway
	.5	.5	.5	.5	.5	.5	Both, etc
20.69K	43.16K	45.36K	47.22K	49.6K	46.51K	24.76K	
16.75K						83.91	React. Sump.
36.94K						108.67K	

Top Sway	65713.5	$2(0.135)(32.01) \div 2 =$	.43	u ₀ u ₂
	65718	$2(0.18)(32.01) \div 2 =$	.58	u ₂ u ₃
	65722.5	$2(0.225)(32.01) \div 2 =$	.72	u ₃ u ₄
	65725	$2(0.25)(32.01) \div 2 =$	.80	u ₄ u ₅
	65720	$2(0.20)(32.01) \div 2 =$	.64	u ₅ u ₆

~~Botth sway 65713.5 2(10135) 34.38 $\div$ 2 = .46 UoL1
 32.12 = .43 L1L2
 32.16 = .43 L2L3
 33.54 = .45 L3L5
 32.16 = .43 L5L6~~

Vent Survey L4 u#

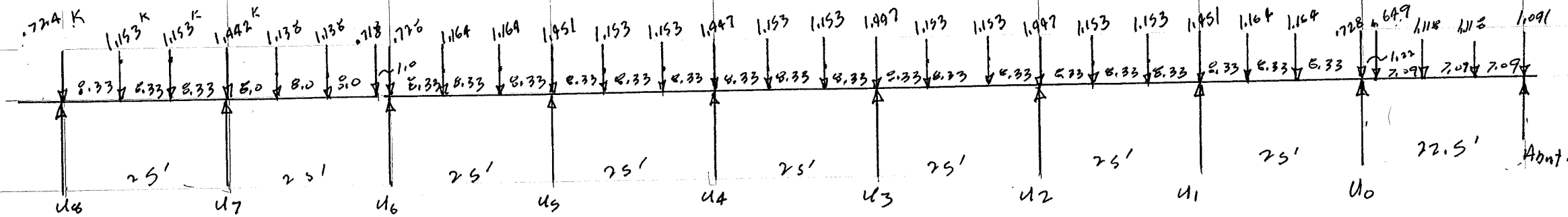
8031 = .03(20) = .62
10E33 = 2(.033) 34.98 = 2.01
<u>2.63</u> ÷ 2 = 1.32

$2 \angle 4 \times 3 \times 3_{16} \quad 2(.0077)(23.58) = .48 \quad u_1 - L_1$
 $2(.0077)(25) = .49 \quad u_2 - L_2, u_6 - L_6$
 $" \quad " \quad 26.91 = .50 \quad u_3 - L_3, u_4 - L_4$

$$R_B = \frac{\cancel{2.17(25)} + 43.16(25) + 45.36(50) + 17.22(75) + 49.16(100) + 46.51(125) + 108.67(150)}{150} = 339.63 \text{ K}$$

$$R_A = \overset{16.25+}{20.69} + 43.16 + 45.36 + 47.22 + 49.6 + 46.51 + \overset{150}{108.67} - 339.63 = 37.83 \text{ K}$$

Br #22 Gaston



$$R_{u6} = \frac{2[7.24(25) + 1.153(16.66) + 1.153(8.33)]}{25} = 3.75K$$

$$R_{u7} = \frac{1.153(8.33) + 1.153(16.66) + 1.718(1) + 1.138(9) + 1.138(17)}{25} + 1.442 = 3.81K$$

$$R_{u6} = \frac{1.138(8) + 1.138(16) + 1.718(24) + 1.164(8.33) + 1.164(16.66)}{25} + 1.728 = 3.67K$$

$$R_{u5} = \frac{1.164(8.33) + 1.164(16.66) + 1.153(8.33) + 1.153(16.66)}{25} + 1.451 = 3.77K$$

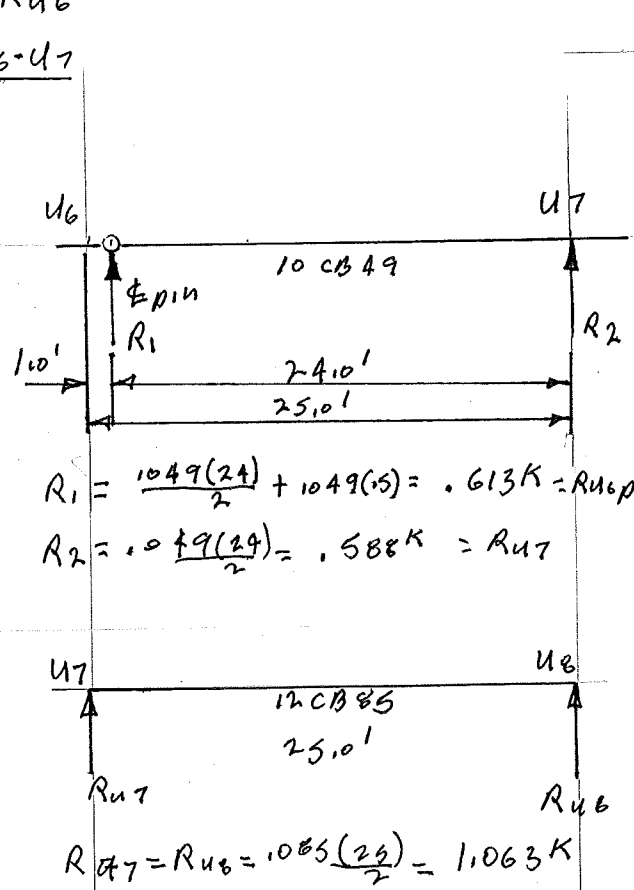
$$R_{u4} = R_{u3} = R_{u2} = \frac{2(1.153)(8.33) + 2(1.153)(16.66)}{25} + 1.447 = 3.75K$$

$$R_{u1} = \frac{1.153(8.33) + 1.153(16.66) + 1.164(8.33) + 1.164(16.66)}{25} + 1.451 = 3.77K$$

$$R_{u0} = \frac{1.164(8.33) + 1.164(16.66) + 1.118(209) + 1.118(14.16) + 1.649(21.27)}{22.06} + 1.728 = 3.60K$$

$$\begin{aligned} R_{u8} &= 20.69 + 19.27 + 1.82 = 41.78K \\ R_{u7} &= 20.75 + 19.33 + 1.82 = 41.9K \\ R_{u6} &= 20.93 + 19.36 + 1.82 = 42.11K \end{aligned} \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} \text{apply @ Top chord}$$

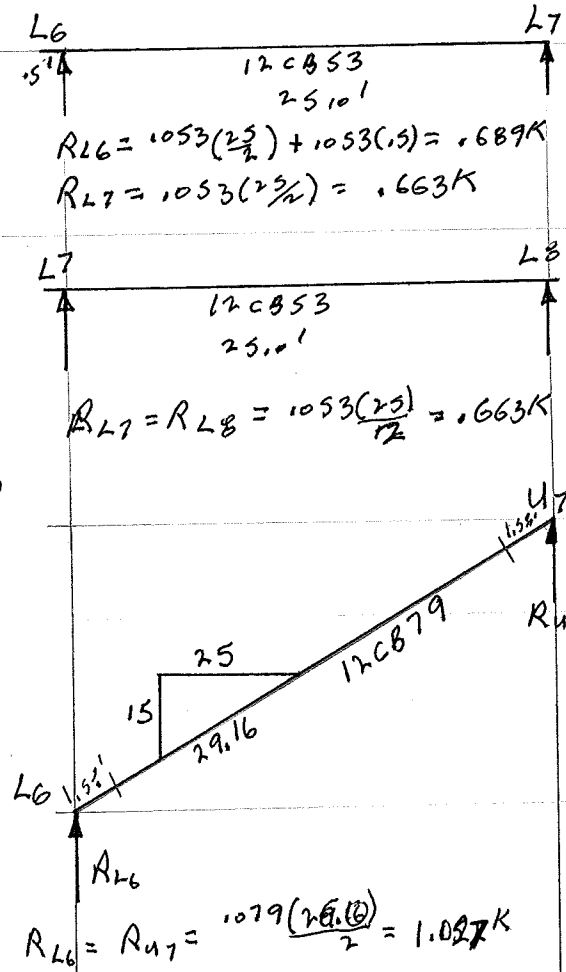
U6-U7



$$R_1 = \frac{1049(24)}{2} + 1049(5) = .613K = R_{u6}$$

$$R_2 = .0 + \frac{9(24)}{2} = .588K = R_{u7}$$

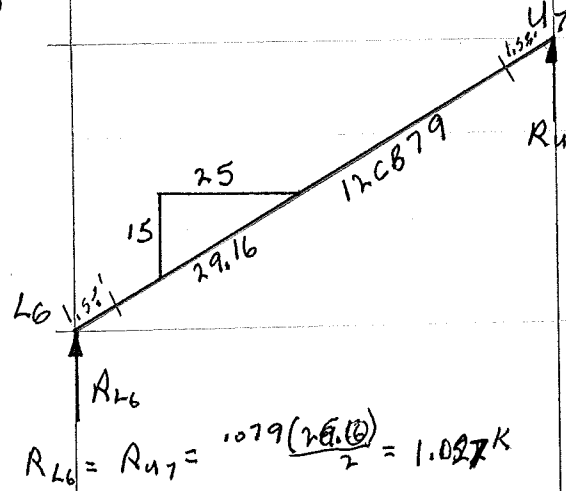
$$R_{u7} = R_{u6} = 1085 \left(\frac{24}{2} \right) = 1.063K$$



$$R_{L6} = 1053 \left(\frac{24}{2} \right) + 1053(5) = .689K$$

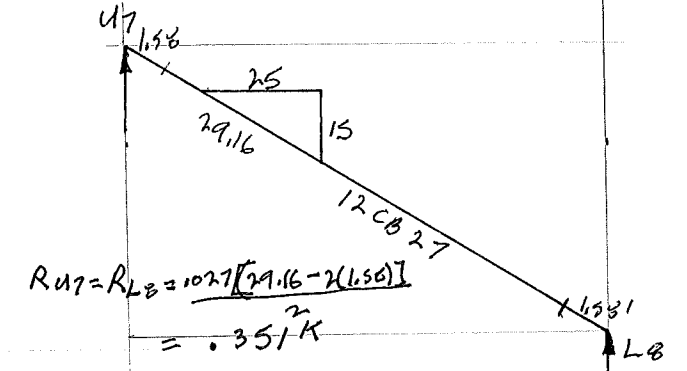
$$R_{L7} = 1053 \left(\frac{24}{2} \right) = .663K$$

$$R_{L7} = R_{L8} = 1053 \left(\frac{24}{2} \right) = .663K$$

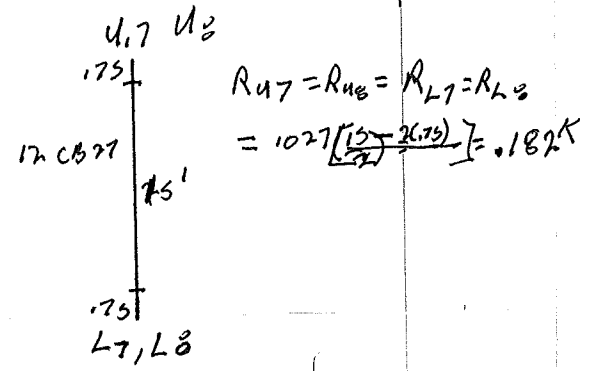


$$R_{L6} = R_{u7} = 1079 \left(\frac{24.0}{2} \right) = 1.027K$$

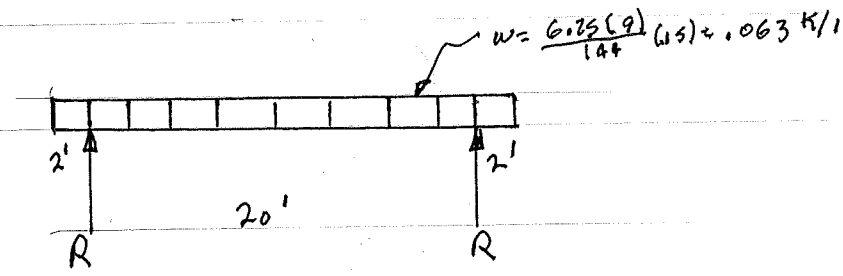
$$\begin{aligned} R_{u8} &= 16.94 + 3.75 = 20.69K \text{ int.} \\ &15.52 + 3.75 = 19.27K \text{ ext.} \\ R_{u7} &= 16.94 + 3.81 = 20.75K \text{ int.} \\ &15.52 + 3.81 = 19.33K \text{ ext.} \\ R_{u6} &= 17.26 + 3.67 = 20.93K \text{ int.} \\ &15.69 + 3.67 = 19.36K \text{ ext.} \end{aligned}$$



$$R_{u7} = R_{L8} = 1027 \left(\frac{24.16 - 2(1.58)}{2} \right) = .351K$$

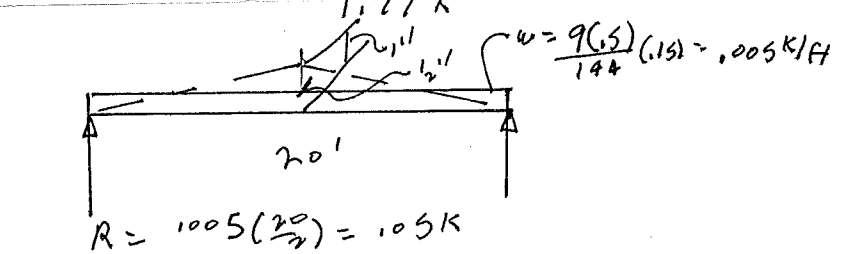


$$R_{u7} = R_{u8} = R_{L7} = R_{L8} = 1027 \left(\frac{12 + 2(7.5)}{2} \right) = .182K$$



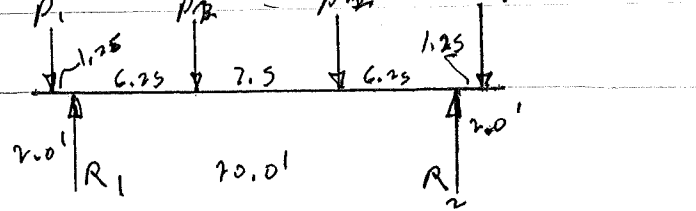
$$R = .063 \left(2 + \frac{20}{2} \right) = .76K \text{ conc.}$$

$$= .084 \left(2 + \frac{20}{2} \right) = 1.01K \text{ Bm}$$



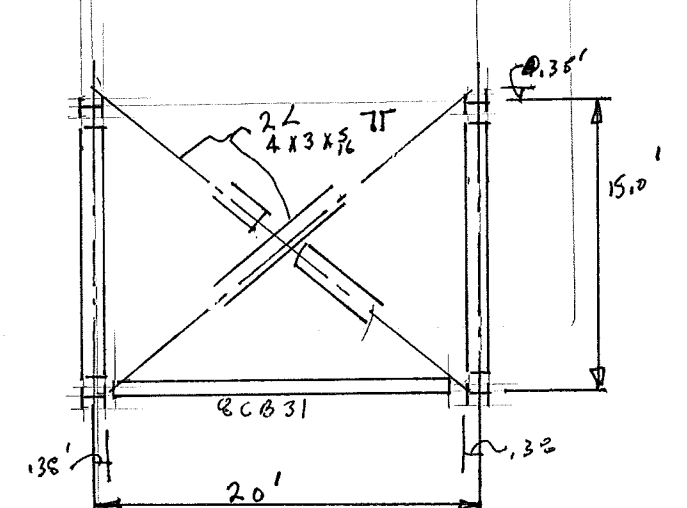
$$R = 1005 \left(\frac{20}{2} \right) = 105K$$

$$R = 1.77 + .05 = 1.82K$$



$$R_1 = R_2 = \frac{P_1(6.25 + 13.75) + (21.25 - 1.25) P_2}{20}$$

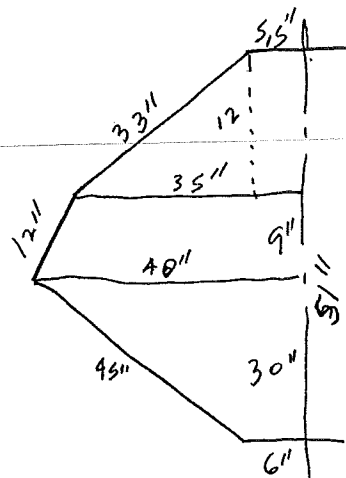
$$R_1 = R_2 = P_1 + P_2$$



$$L = \sqrt{[20 - 2(1.35)]^2 + (15.38)^2} = 24.63'$$

US 2,9K

L4



$$A = \frac{5.5+35}{2} (12) = 243$$

$$\frac{35+40}{2} (9) = 495$$

$$\frac{40+6}{2} (30) = 690$$

$$1478$$

$$\frac{2(2)(1428)(1)}{1728} (.49) = 1.62K$$

$$Pin A .5(167) = .81K$$

$$Full P \frac{(1)(33)(12)}{1728} (.49) = .112K$$

$$Gusset .089K$$

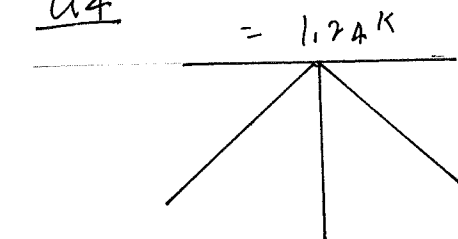
$$Vert. 2(.096) = .052K$$

$$L15 .085K$$

$$Bolts 240(100) = 1.740$$

$$3.003K$$

U4



U0

$$\frac{45(15+24)(.5)}{1728} (.49) = .124K$$

$$\frac{2(5)(18)(9)}{1728} (.49) = .1046K$$

$$2L 2x4x36 \frac{2(10098)(1)}{1728} = .070$$

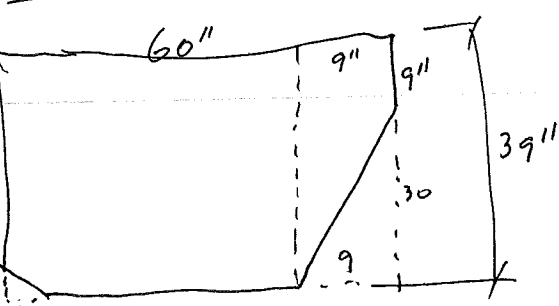
$$Latex gusset .1076$$

$$Latex .1035$$

$$Bolts 92(100) = 1.092$$

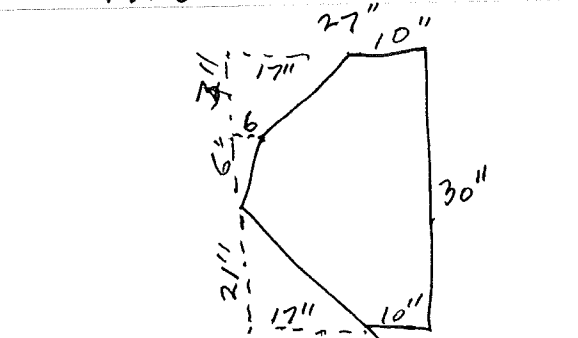
$$.343K$$

U6



$$A = 60(39) - \frac{1}{2}(2)[6^2 + 9(30)] = 2039m^2$$

$$\frac{2(2039)(175)}{1728} (.49) = .865K$$



$$A = 30(27) - \frac{(7+6)}{2}(3) - \frac{1}{2}(6)(6) - \frac{1}{2}(2)(17)$$

$$A = 594m^2$$

$$\frac{594(.5)}{1728} (.49) = .084K$$

$$Full P \frac{(57)(1375)(12)}{1728} (.49) = .1019K$$

$$Pin A \frac{2(2)(10)(5625)}{1728} (.49) = .1067K$$

$$\frac{2(15)(15)(1625)}{1728} (.49) = .1080K$$

$$L 4x3\frac{1}{2}x\frac{3}{8} \frac{(10092)(175)}{1728} = .007K$$

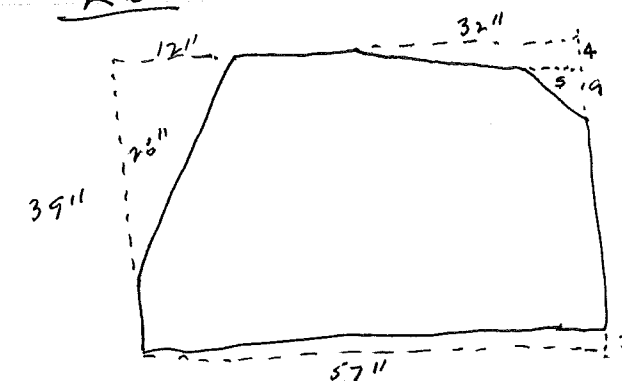
$$A \frac{12(10)(1375)}{1728} (.49) = .1013K$$

$$L .1015K$$

$$Bolts 196(100) = .196K$$

$$1.306K$$

L6



$$A = 39(57) - \frac{1}{2}[(12)(26) + (32)(9) + 5(9) + (10)(57)] = 1853m^2$$

$$\frac{2(1853)(175)}{1728} (.49) = .801K$$

$$\frac{2(15)(15)(1625)}{1728} (.49) = .1080K$$

$$\frac{2(21)(10)(1275)}{1728} (.49) = .104K$$

$$L .1007$$

$$A .013$$

$$Bolts 112(100) = .112K$$

$$1.117K$$

Fl. Bm React.

$$U5, U4, U3, U2 R = 7.6K \text{ int}$$

$$R = 6.89K \text{ ext.}$$

$$R = 16.94K \text{ int}$$

$$R = 15.52K$$

$$R_{U5} = 16.94 + 2(3.77) + 15.52 + 1.82 = 41.82K$$

$$R_{U4} = 16.94 + 2(3.77) + 15.52 + 1.82 = 41.78K$$

$$R_{U3} = 17.76 + 15.69 + 1.82 + 2(3.77) = 42.31K$$

$$R_{U2} = 17.76 + 15.69 + 1.82 + 2(3.77) = 42.31K$$

$$R_{U1} = 17.76 + 15.69 + 1.82 + 2(3.77) = 42.31K$$

$$R_{U0} = 17.76 + 15.69 + 1.82 + 2(3.77) = 42.31K$$

$$R_{U5} = 16.94 + 2(3.77) + 15.52 + 1.82 = 41.82K$$

$$R_{U4} = 16.94 + 2(3.77) + 15.52 + 1.82 = 41.78K$$

$$Span A-U-H R_{U0} = \frac{.627(22.5)}{2} = 7.054K \text{ int}$$

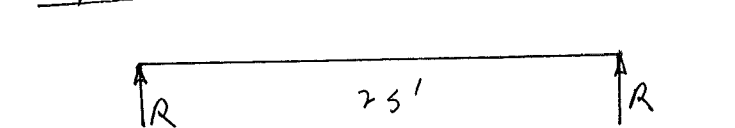
$$\frac{.568(22.5)}{2} = 6.39K$$

$$B_m = \frac{1068(22.5)}{2} = .765K$$

$$R = 7.054 + 6.39 + 2(.765) = 14.974K$$

$$R_{U0} = 14.974 + 7.6 + 6.89 + 2(.84) + 2(3.6) + 1.82 = 40.16K$$

Top chord



$$US U6 12CB65 R_{U5} = \frac{.065(25)}{2} = .813K$$

$$R_{U6} = .813 + .065(5) = .846K$$

$$U4 U5 12CB65 R_{U4} = R_{U5} = .813K$$

$$U3 U4 12CB92 R_{U3} = R_{U4} = \frac{1092(25)}{2} = 1.15K$$

$$U2 U3 12CB92 R_{U2} = R_{U3} = 1.15K$$

$$U1 U2 12CB53 R_{U1} = R_{U2} = \frac{1053(25)}{2} = .663K$$

$$U0 U1 " R_{U0} = R_{U1} = .663K$$

$$L5 L6 10CB49 R_{L5} = \frac{1049(25.18-1.25)}{2} = .586K$$

$$R_{L6} = .586 + 1049(5) = .611K$$

$$L4 L5 12CB133 R_{L4} = R_{L5} = \frac{1133(26.93)}{2} = 1.791K$$

$$L3 L4 R_{L3} = R_{L4} = 1.791K$$

$$L2 L3 12CB79 R_{L2} = R_{L3} = \frac{1079(25.12)}{2} = .995K$$

$$L1 L2 12CB79 R_{L1} = R_{L2} = \frac{1079(25.13)}{2} = .998K$$

$$L0 L1 12CB53 R_{L0} = R_{L1} = \frac{1053(27.95)}{2} = .741K$$

$$U6 L5 12CB106 R_{U6} = R_{L5} = \frac{106(30.81)}{2} = 1.633K$$

$$L5 U4 12CB45 R_{L5} = R_{U4} = \frac{1045(30.81)}{2} = .693K$$

$$L3 U4 12CB40 R_{L3} = R_{U4} = \frac{1040(30.81)}{2} = .616K$$

$$L3 U2 12CB45 R_{L3} = R_{U2} = \frac{1085(30.81)}{2} = 1.309K$$

$$L1 U2 12CB40 R_{L1} = R_{U2} = \frac{1049(27.93)}{2} = .684K$$

$$U5 L5 = 12CB40 R_{U5} = R_{L5} = \frac{104(18)}{2} = .36K$$

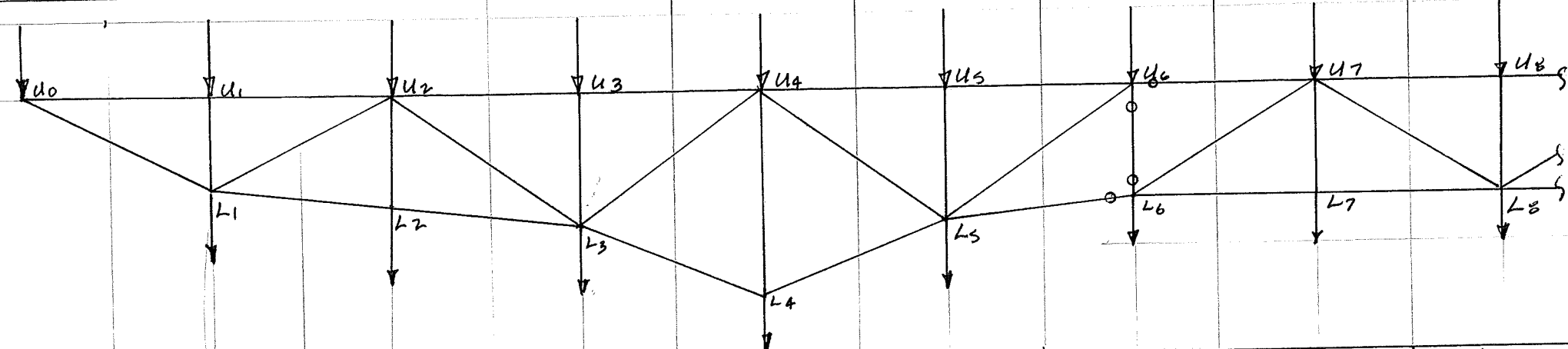
$$U4 L4 = 12CB79 R_{U4} = R_{L4} = \frac{1079(28)}{2} = 1.106K$$

$$U3 U3 12CB40 R_{U3} = R_{L3} = .36K$$

$$U2 U2 12CB37 R_{U2} = R_{L2} = \frac{1027(15)}{2} = .703K$$

$$U1 U1 12CB31 R_{U1} = R_{L1} = \frac{1031(12.5)}{2} = .194K$$

Item	Ru0	Ru1	Ru2	Ru3	Ru4	Ru5	Ru6	Ru7	Ru8	Item
Fl. Bm.	40.16	42.31	41.78	41.78	41.78	41.82	42.11	41.19	41.78	Floor beam react.
	.66	1.33	1.81	2.30	1.96	1.63	—	1.65	2.13	Top chord
	—	—	1.99	—	1.31	—	1.63	1.38	.70	Diagonal
	—	.19	.20	.36	1.11	.36	—	.18	.18	Vert.
	—	.18	.16	.20	1.17	.20	—	.16	.16	Sway Frame
	.21	.42	.47	.64	.74	.70	.52	.42	.42	Top lateral Bracing
	.34	.77	1.24	.77	1.24	.90	1.306	1.24	.77	Connections
Total	41.37K	45.20	47.67	46.05	49.31	45.61	45.57	46.22	46.14	Total (Apply to joint)
							.91			Apply to pin L6L7
							.52			" " " L6UG



Item	Ru0	Ru1	Ru2	Ru3	Ru4	Ru5	Ru6	Ru7	Ru8	Item
	.74	1.73	1.99	2.79	3.58	2.38	.69	1.33	1.33	Lower chord
	—	.68	—	1.93	—	2.33	1.03	1.38	.70	Diagonal
	—	.19	.20	.36	1.11	.36	—	.18	.18	Vert.
	—	.47	.46	.50	1.59	.50	.46	.46	.46	Sway Frame
	.21	.42	.42	.42	.42	.42	.42	.42	.42	Both. Lateral Bracing
	—	1.40	.98	1.82	3.00	1.82	1.12	.81	.91	Connections
	.95	4.89	4.05	7.82	9.70	7.81	3.72	4.58	4.00	Total (Apply to joint)
							.75			Apply to pin L6L7
							.52			" " " L6UG

Sway Frame

$$L = \sqrt{10^2 + 17.5^2} = 23.55'$$

$$L \times 3 \times \frac{5}{16} \quad \frac{2(23.55)(1.0072)}{2} = .370$$

$$L1U1 \quad \text{upper} \quad .370 + .01 = .18K$$

$$\text{lower} \quad .792 + .370 + .01 = .472K$$

$$L = \sqrt{10^2 + 18^2} = 26.91'$$

$$\frac{2(26.91)(1.0072)}{2} = .194K$$

$$L3U3 \quad \text{upper} \quad .194 + .01 = .204K$$

$$L5U5 \quad \text{lower} \quad .792 + .194 + .01 = .496K$$

$$L = \sqrt{10^2 + 23^2} = 30.175$$

$$L4U4 \quad \frac{2(30.175)(1.033)}{2} = 1.006K$$

$$\text{upper} \quad 1.006$$

$$\frac{2(18)(27)(1.375)}{1728} (.49) = .080$$

$$L4 \times 3 \times \frac{5}{16} \quad .0091(2)(2.75) = .050$$

$$\text{bolts} \quad 34(.001) = .034$$

$$\text{upper} \quad 1.17K$$

$$\text{Lower} \quad .792 + 1.17 + .125 = 1.587K$$

Pin L6L7

$$3" \phi \text{ pin} \quad A = \pi r^2 = \pi (1.5)^2 = 7.069 \text{ in}^2$$

$$\frac{7.069(17)}{1776} (.490) = .034K$$

$$R_{u6} p_m = .034 + .613 + .16 + .10 = .907K$$

L6L7

Pin L5L6

$$R_{L6} p_m = .034 + .611 + .1 = .745K$$

L5L6

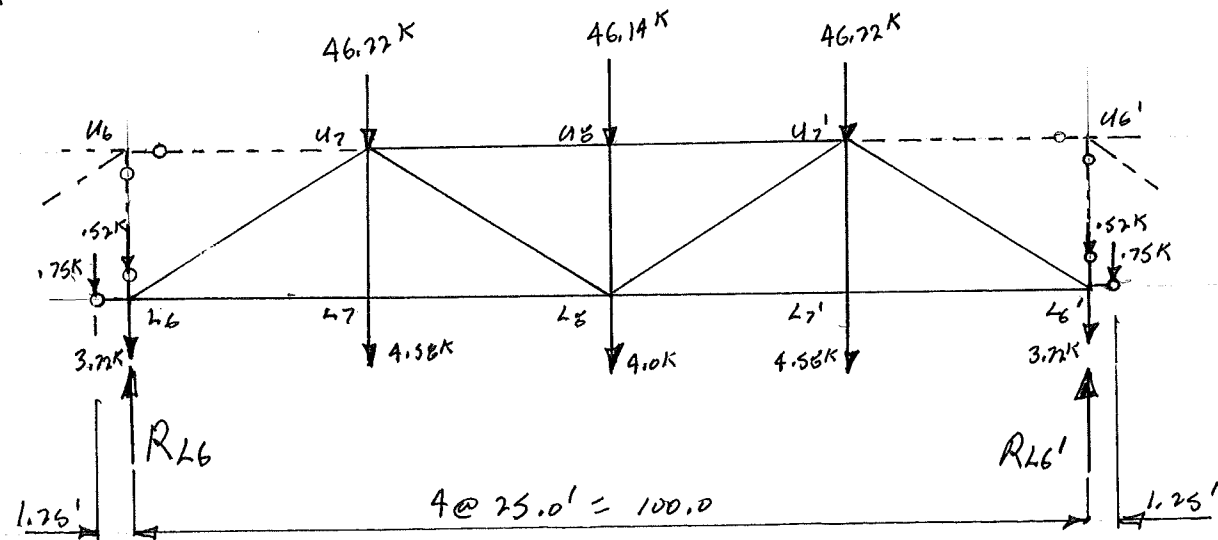
Pin L6U6

$$\frac{1072[15 - 2.75(2)]}{2} = .378K$$

Pin L6U6

$$R_{L6} p_m = .034 + .378 + .1 = .512K$$

L6U6

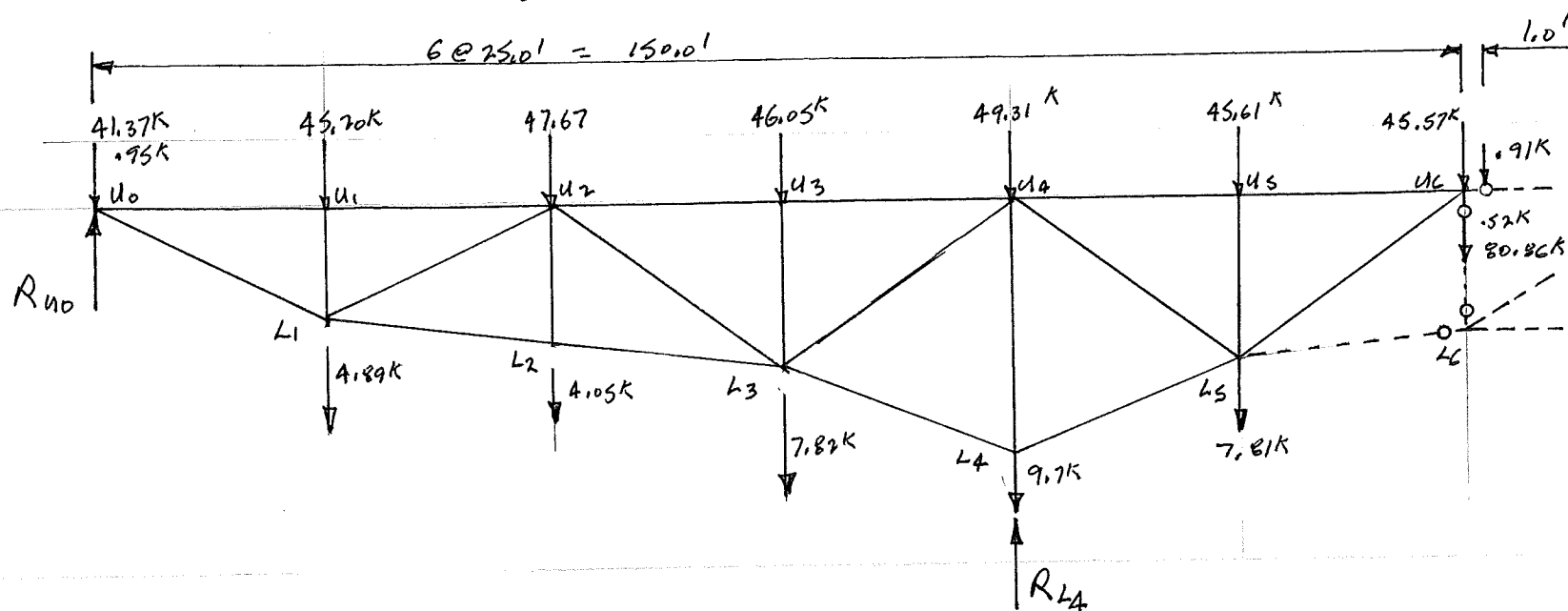


$$\sum M @ R_{L6} \quad 25(46.72 + 4.58) + 50(46.14 + 4) + 75(46.72 + 4.58) + 100(.52) + 101.25(.75) + 100(3.72) - 1.25(.75) - 100 R_{L6}' = 0$$

$$R_{L6}' = R_{L6} = 80.86K$$

$$\sum F_v = .75 + 3.72 + .52 + 46.72 + 4.58 + 46.14 + 4 + 46.72 + 4.58 + 3.72 + .52 + .75 - 2(80.86) = 0$$

$$0 = 0$$



$$\sum M @ U_0 \quad 25(45.20 + 4.89) + 50(47.67 + 4.05) + 75(46.05 + 7.82) + 100(49.31 + 9.7) - 100 R_{L4} + 125(45.61 + 7.81) + 150(45.57 + .52 + 80.86) + 151(.91) = 0$$

$$R_{L4} = 396.38K$$

React. plans 398

$$\sum M @ R_A = 0 \quad 25(45.61 + 7.81) + 50(45.57 + .52 + 80.86) + 51(.91) + 100 R_{u0} - 25(46.05 + 7.82) - 50(47.67 + 4.05) - 75(45.20 + 4.89) - 100(41.37 + .95) = 0$$

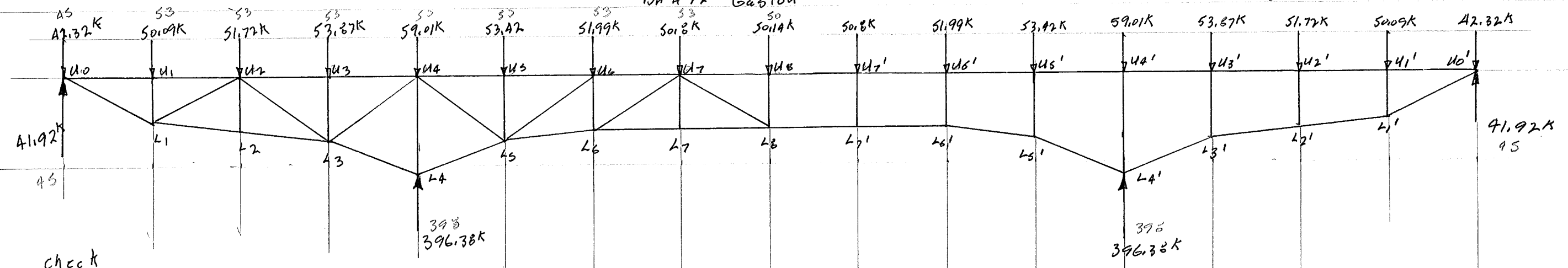
$$R_{u0} = 41.92K$$

React. plans 45K

$$\sum F_v = 0 \quad 41.37 + .95 + 45.2 + 4.89 + 47.67 + 4.05 + 46.05 + 7.82 + 49.31 + 9.7 + 45.61 + 7.81 + 45.57 + .52 + 80.86 + .91 - 41.92 - 396.38 = 0$$

$$= 0.51 \neq 0 \text{ OK}$$

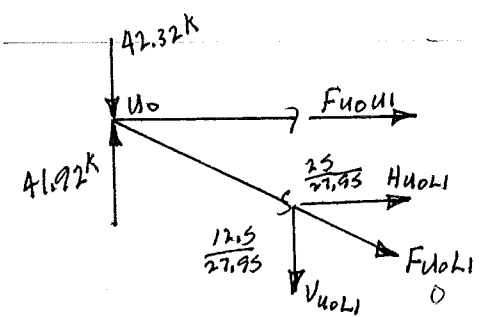
Bn #72 Gaston



check

$$\sum F_v = 0 \quad 42.32 + 50.09 + 51.72 + 53.67 + 59.01 + 53.42 + 51.99 + 50.8 + 50.14 + 50.8 + 51.99 + 53.42 + 59.01 + 53.67 + 51.72 + 50.09 + 42.32 - 41.92 - 396.38 - 396.38 - 41.92 = 0 \quad -0.02 \approx 0 \text{ K}$$

$$\sum M @ U_0 = 0 \quad +25(50.09) + 50(51.72) + 75(53.67) + 100(59.01) + 125(53.42) + 150(51.99) + 175(50.8) + 200(50.14) + 225(50.8) + 250(51.99) + 275(53.42) + 300(59.01) + 325(53.67) + 350(51.72) + 375(50.09) + 400(42.32) - 100(396.38) - 300(396.38) - 400(41.92) = 0 \quad -4 \approx 0 \text{ OK}$$



$$\sum F_v = 0 \quad 41.92 - 42.32 - V_{u0L1} = 0$$

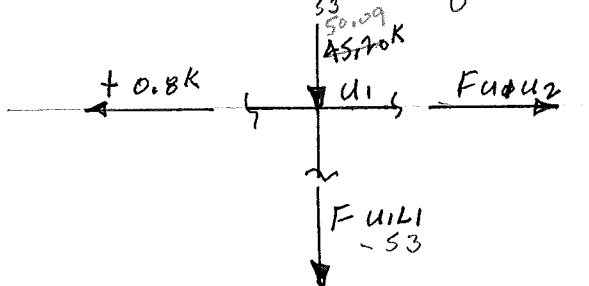
$$V_{u0L1} = -0.40 \text{ K}$$

$$F_{u0L1} = \frac{27.95}{12.5} (-0.40) = -0.89 \text{ K}$$

$$H_{u0L1} = \frac{25}{27.95} (-0.89) = -0.80 \text{ K}$$

$$\sum F_H = 0 \quad -0.8 + F_{u0U1} = 0$$

$$F_{u0U1} = +0.8 \text{ K}$$

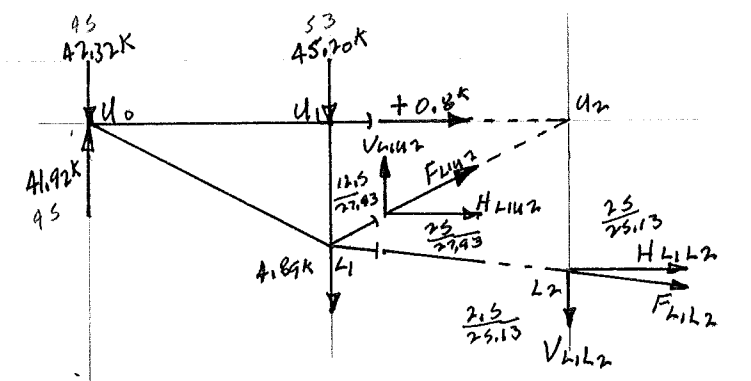


$$\sum F_H = 0 \quad -(0.8) + F_{u1U2} = 0$$

$$F_{u1U2} = +0.8 \text{ K}$$

$$\sum F_v = 0 \quad -45.20 - F_{u1L1} = 0$$

$$F_{u1L1} = -45.20 \text{ K}$$



$$\sum M @ U_2 \quad 41.92(50) - 42.32(50) - 45.20(25) - 41.92(25) - 15 H_{L1L2} = 0$$

$$H_{L1L2} = -84.81 \text{ K} \quad 88.33$$

$$F_{L1L2} = \frac{25.13}{25} (-84.81) = -85.26 \text{ K} \quad 88.79$$

$$V_{L1L2} = \frac{25}{25.13} (-85.26) = -8.48 \text{ K} \quad 8.83$$

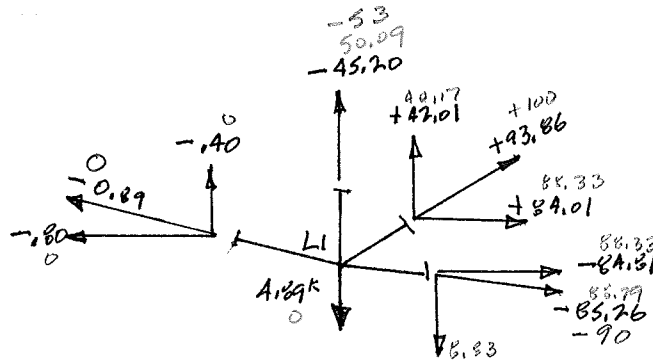
$$\sum F_H = 0 \quad 0.8 + H_{L1U2} + (-84.81) = 0$$

$$H_{L1U2} = +84.01 \text{ K} \quad 88.33$$

$$F_{L1U2} = \frac{27.93}{25} (+84.01) = +93.86 \text{ K} \quad 98.68$$

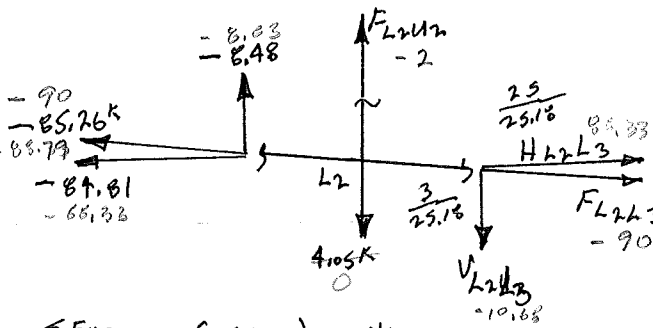
$$V_{L1U2} = \frac{12.5}{27.93} (+93.86) = +42.01 \text{ K} \quad 40.17$$

$$\sum F_v = 0 \quad 41.92 - 42.32 - 45.20 - 4.89 + 42.01 - (-8.48) = 0 \quad 0 = 0$$



$$\sum F_v = 0 \quad +(-0.8) + (-45.20) - 41.89 + 42.01 - (-8.48) = 0 \quad 0 = 0$$

$$\sum F_H = 0 \quad -(-0.8) + 84.01 + (-84.81) = 0 \quad 0 = 0$$



$$\sum F_H = 0 \quad -(-84.81) + H_{L2L3} = 0$$

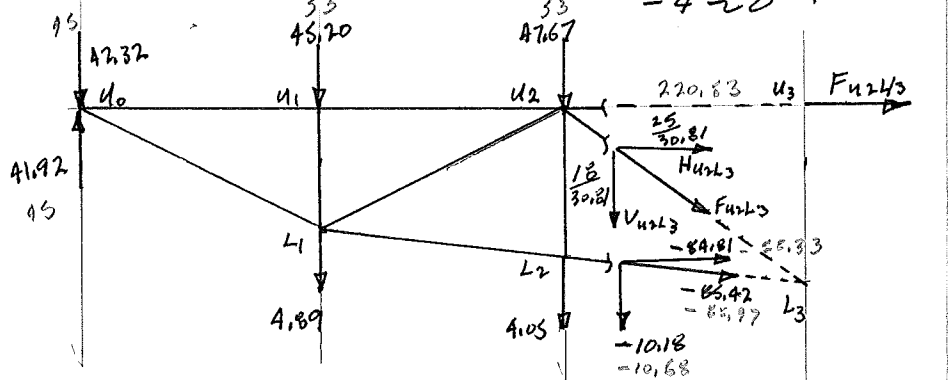
$$H_{L2L3} = -84.81 \text{ K} \quad 88.33$$

$$F_{L2L3} = \frac{25.18}{25} (-84.81) = -85.42 \text{ K} \quad 88.97$$

$$V_{L2L3} = \frac{3}{25.18} (-85.42) = -10.18 \text{ K} \quad 10.68$$

$$\sum F_v = 0 \quad +(-8.48) - 4.05 + F_{L2U2} - (-10.18) = 0$$

$$F_{L2U2} = +2.35 \text{ K} \quad -1.70$$



$$\sum M @ L_3 = 0 \quad 75(41.92) + 18 F_{u2U3} - 75(42.32) - 50(45.20 + 41.89) - 25(47.67 + 4.05) = 0$$

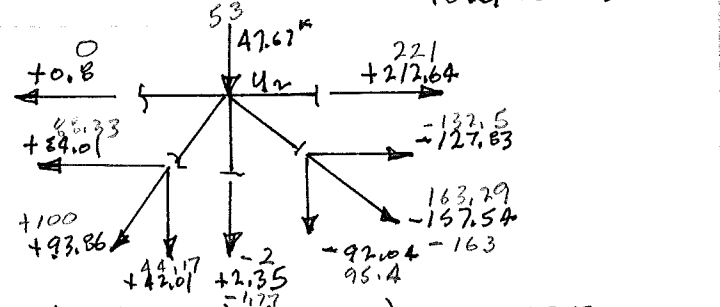
$$F_{u2U3} = +212.64 \text{ K}$$

$$\sum F_H = 0 \quad +212.64 + (-84.81) + H_{u2L3} = 0 \quad H_{u2L3} = -127.83 \text{ K} \quad 132.5$$

$$F_{u2L3} = \frac{30.81}{25} (-127.83) = -157.54 \text{ K} \quad 163.29$$

$$V_{u2L3} = \frac{18}{30.81} (-157.54) = -92.04 \text{ K} \quad 95.4$$

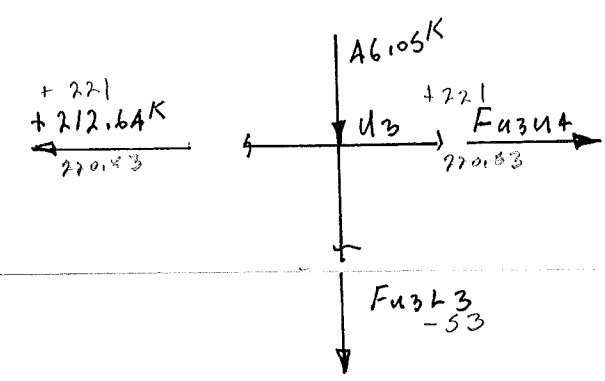
$$\sum F_v = 0 \quad 41.92 - 42.32 - 45.20 - 4.89 - 47.67 - 4.05 - (-92.04) - (-10.18) = 0 \quad +0.01 \approx 0 \text{ OK}$$



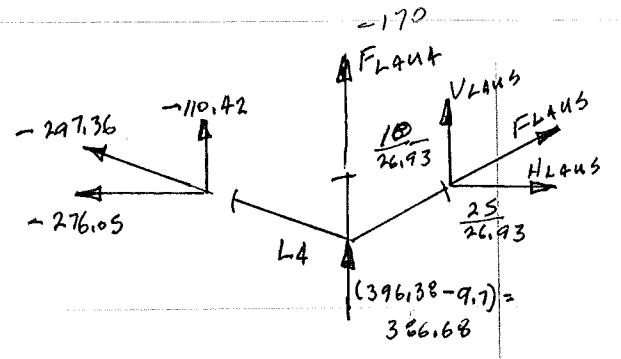
$$\sum F_H = 0 \quad -(-0.8) - (-84.01) + (+212.64) + (-127.83) = 0 \quad 0 = 0$$

$$\sum F_v = 0 \quad -(+42.01) - (+2.35) - 47.67 - (-92.04) = 0 \quad +0.01 = 0 \text{ OK}$$

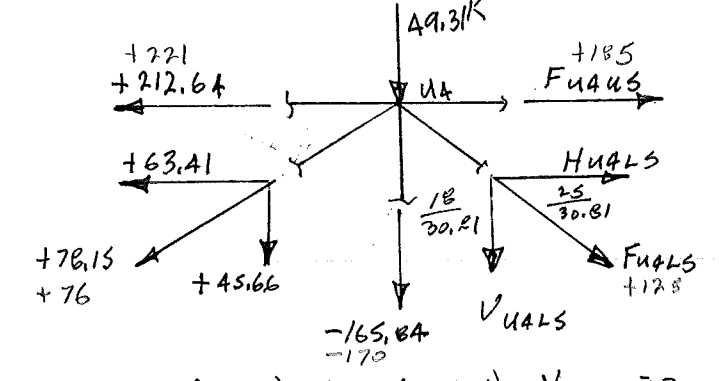
By H 22 Gordan



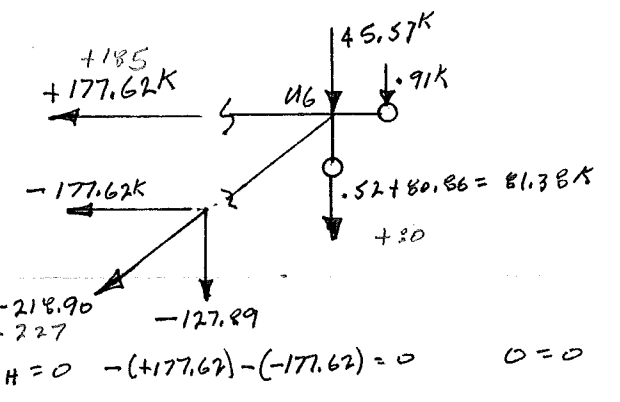
$$\sum F_H = 0 \quad -(+212.64) + F_{U3U4} = 0$$
$$\boxed{F_{U3U4} = +212.64 \text{ K}}$$
$$\sum F_V = 0 \quad -46.05 - (+F_{U3L3}) = 0$$
$$\boxed{F_{U3L3} = -46.05 \text{ K}}$$



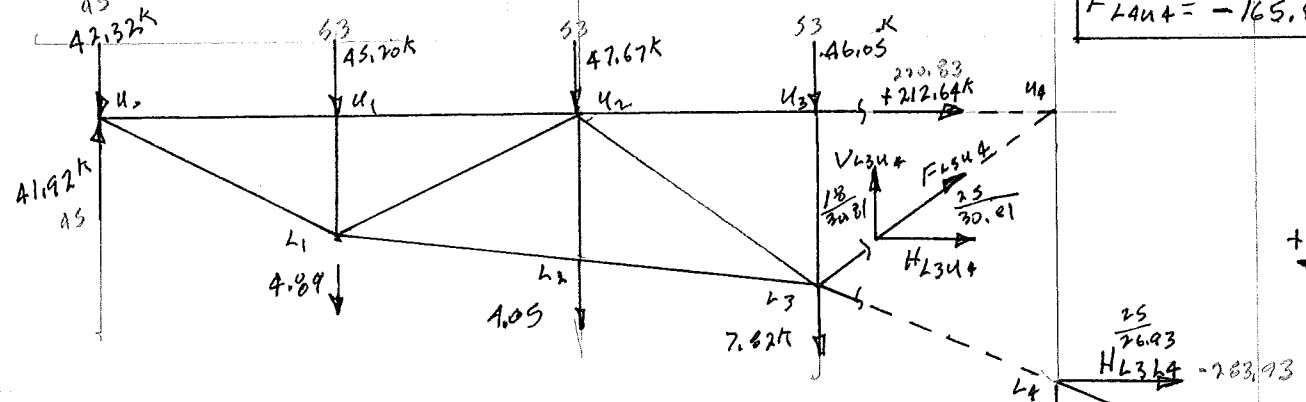
$$\sum F_H = 0 \quad -(-276.05) + H_{L4U5} = 0$$
$$H_{L4U5} = -276.05 \text{ K}$$
$$F_{L4U5} = \frac{26.93}{25} (-276.05) = -297.36 \text{ K}$$
$$V_{L4U5} = \frac{10}{26.93} (-297.36) = -110.42 \text{ K}$$
$$\sum F_V = 0 \quad +(-110.42) + 386.68 + F_{L4U4} + (-10.42) = 0$$
$$F_{L4U4} = -165.84 \text{ K}$$



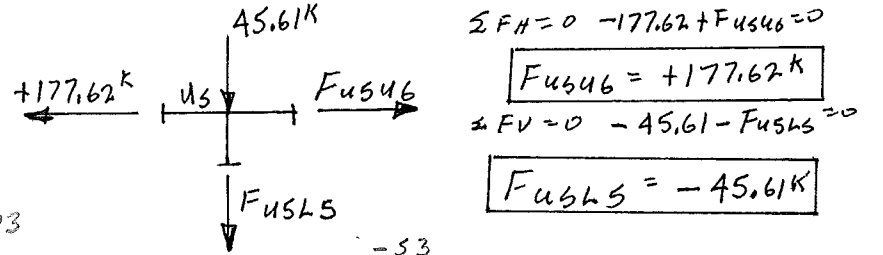
$$\sum F_V = 0 \quad -(+45.66) - 49.31 - (-165.84) - V_{U4L5} = 0$$
$$V_{U4L5} = +70.87$$
$$F_{U4L5} = \frac{30.81}{18} (70.87) = +121.31 \text{ K}$$
$$H_{U4L5} = \frac{25}{30.81} (+121.31) = +98.43 \text{ K}$$
$$\sum F_H = 0 \quad -212.64 - 63.41 + 98.43 + F_{U4U5} = 0$$
$$\boxed{F_{U4U5} = +177.62 \text{ K}}$$



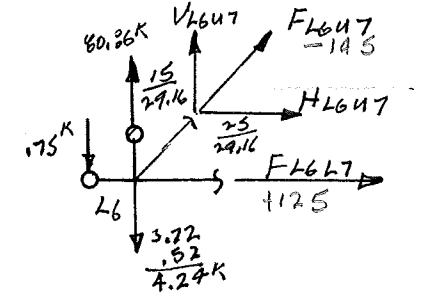
$$\sum F_H = 0 \quad -(+177.62) - (-177.62) = 0 \quad 0 = 0$$
$$\sum F_V = 0 \quad -(-127.89) - 45.57 - 91 - 81.38 = 0$$
$$+0.03 \approx 0 \quad \text{OK}$$
$$\boxed{F_{U6L6} = +81.38 \text{ K}}$$



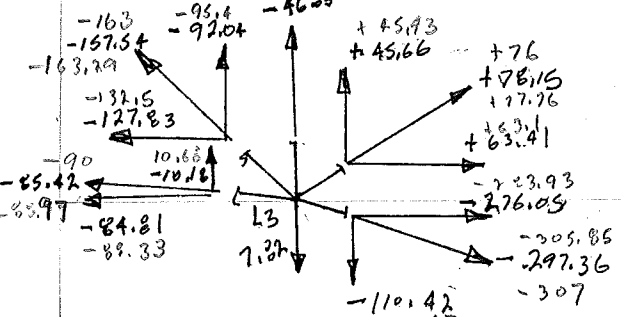
$$\sum M_{U4} = 0 \quad 100(41.92 - 42.32) - 75(45.70 + 4.89) - 50(47.67 + 4.05) - 25(46.05 + 7.82) - 25H_{L3L4} = 0$$
$$H_{L3L4} = -276.05 \text{ K} - 283.93$$
$$F_{L3L4} = \frac{26.93}{25} (-276.05) = -297.36 \text{ K}$$
$$V_{L3L4} = \frac{10}{26.93} (-297.36) = -110.42 \text{ K}$$
$$\sum F_H = 0 \quad +212.64 + H_{L3U4} + (-276.05) = 0$$
$$H_{L3U4} = +63.41 \text{ K}$$
$$F_{L3U4} = \frac{30.81}{25} (+63.41) = +78.15 \text{ K}$$
$$V_{L3U4} = \frac{18}{30.81} (+78.15) = +45.66 \text{ K}$$



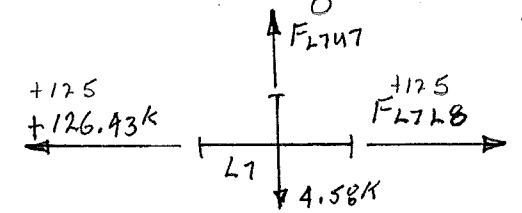
$$\sum F_H = 0 \quad -177.62 + F_{U5U6} = 0$$
$$\boxed{F_{U5U6} = +177.62 \text{ K}}$$
$$\sum F_V = 0 \quad -45.61 - F_{U5L5} = 0$$
$$\boxed{F_{U5L5} = -45.61 \text{ K}}$$
$$\sum F_H = 0 \quad -(+98.43) - (-276.05) + H_{L5U6} = 0$$
$$H_{L5U6} = -177.62 \text{ K}$$
$$F_{L5U6} = \frac{30.81}{25} (-177.62) = -218.90 \text{ K}$$
$$V_{L5U6} = \frac{18}{30.81} (-218.90) = -127.89 \text{ K}$$



$$\sum F_V = 0 \quad -75 - 42.5 + 80.26 + V_{L6U7} = 0$$
$$V_{L6U7} = -75.26 \text{ K}$$
$$F_{L6U7} = \frac{29.16}{15} (-75.26) = -147.47 \text{ K}$$
$$H_{L6U7} = \frac{25}{29.16} (-147.47) = -126.43 \text{ K}$$
$$\sum F_H = 0 \quad +(-126.43) + F_{L6L7} = 0$$
$$\boxed{F_{L6L7} = +126.43 \text{ K}}$$



$$\sum F_H = 0 \quad -(-127.83) - (-84.81) + (+63.41) + (-276.05) = 0$$
$$0 = 0$$
$$\sum F_V = 0 \quad +(-10.12) + (-92.04) + (+46.05) - 7.82 + (+45.66) - (-110.42) = 0$$
$$-0.01 \approx 0 \quad \text{OK}$$



$$\sum F_H = 0 \quad -(126.43) + F_{L7L8} = 0$$
$$\boxed{F_{L7L8} = +126.43 \text{ K}}$$
$$\sum F_V = 0 \quad -4.58 + F_{L7U7} = 0$$
$$\boxed{F_{L7U7} = +4.58 \text{ K}}$$

Bl. # 22 Gaston

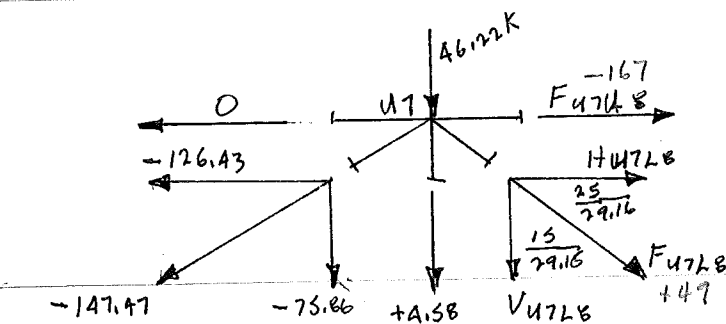
MEMBER	DEAD LOAD		MEMBER CAPACITY														
	BAR FORCE		MEMBER	TENSION				COMPRESSION									
	TENSION +	COMP. -		Area A _G in ²	Holes (N)(d)(t) in ²	NET AREA A _N in ²	BAR CAPACITY C _B = A _N f _s		K	LENGTH L (Joint to Joint) in	r in	KL r	INV. F _a = 15,570 - 0.45(KL/r) ² Ksi	OPER. F _a = 19,410 - 0.56(KL/r) ² Ksi	BAR Cap. (Kips) C _B = A _G F _a		I
							Inv. f _s = 18 Ksi	OPER. f _s = 24.5							INV.	OPER.	
U ₀ U ₁	+ 0.80		12CB53	15.57	(4)(.94)(.576) = 2.17	13.40	241.20	328.30	.75	300.00	2.48	90.73	11.866	14.800	184.75	230.44	426.2
U ₁ U ₂	+ 0.80		12CB53	"	" " " " = 2.17	13.40	241.20	328.30	↑	↑	2.48	90.73	11.866	14.800	"	"	
U ₂ U ₃	+ 212.64		12CB92	27.04	(4)(.94)(.866) = 3.22	23.82	428.76	583.59	↑	↑	3.08	73.05	13.169	16.422	356.09	444.05	800
U ₃ U ₄	+ 212.64		12CB92	"	" " " " = 3.22	23.82	428.76	583.59	↓	↓	3.08	73.05	13.169	16.422	"	"	
U ₄ U ₅	+ 177.62		12CB65	19.09	(4)(.94)(.606) = 2.28	16.81	302.58	411.85	↓	↓	3.02	74.50	13.072	16.302	249.54	311.21	521.3
U ₅ U ₆	+ 177.62		12CB65	"	" " " " = 2.28	16.81	302.58	411.85	.75	300.00	3.02	74.50	13.072	16.302	"	"	
U ₆ U ₇	0	0	10CB49	14.38	(6)(.94)(.556) = 3.15	11.23	202.14	275.14	.875	288.0	2.54	99.21	11.141	13.898	160.21	199.85	- 373.2 6.515 12.25
U ₇ U ₈		- 84.66	12CB85	24.98	(4)(.94)(.796) = 2.99	21.99	395.82	538.76	.75	300.00	3.07	73.29	13.153	16.402	328.56	409.72	772 12.106 12.5
U ₀ L ₁		- 0.89	12CB53	15.57	(4)(.94)(.576) = 2.17	13.40	241.20	328.30	.75	335.40	2.48	101.43	10.940	13.649	170.34	212.51	
L ₁ L ₂		- 85.26	12CB79	23.22	(4)(.94)(.736) = 2.77	20.45	368.10	501.03	↑	301.56	3.05	74.15	13.096	16.331	304.09	379.21	661.9 17.02 12.28
L ₂ L ₃		- 85.42	12CB79	23.22	" " " " = 2.77	20.45	368.10	501.03	↓	302.16	3.05	74.30	13.054	16.319	303.11	378.93	
L ₃ L ₄		- 297.36	12CB133	39.10	(4)(.94)(1.236) = 4.65	34.45	620.10	844.03	↓	323.16	3.16	76.70	12.923	16.116	505.29	630.14	1219.9 12.365 13.34
L ₄ L ₅		- 297.36	12CB133	"	" " " " = 4.65	34.45	620.10	844.03	.75	323.16	3.16	76.70	12.923	16.116	"	"	
L ₅ L ₆	0	0	10CB49	14.38	(4)(.94)(.556) = 2.10	12.28	221.04	300.86	.875	287.16	2.54	98.92	11.167	13.930	160.58	200.31	373.2 6.12 12.25
L ₆ L ₇	+ 126.43		12CB53	15.57	2.17	13.40	241.20	328.30	.75	300.00	2.48	90.73	11.866	14.800	"	"	
L ₇ L ₈	+ 126.43		12CB53	"	2.17	13.40	241.20	328.30	↑	300.00	2.48	90.73	11.866	14.800	"	"	- 232.3 6.27 12.25
U ₁ L ₁		- 45.20	12CB31	9.12	(4)(.94)(.466) = 1.75	7.37	132.66	180.57		150.00	1.47	76.53	12.934	16.130	117.96	147.11	
U ₂ L ₂	+ 2.35		12CB27	7.97	(4)(.94)(.40) = 1.50	6.47	116.46	158.52		180.00	1.44	93.75	11.615	14.488	92.57	115.47	
U ₃ L ₃		- 46.05	12CB40	11.77	(4)(.94)(.516) = 1.94	9.83	176.94	240.84		216.00	1.94	83.51	12.432	15.505	146.32	182.49	
U ₄ L ₄		- 165.84	12CB79	23.22	2.77	20.45	368.10	501.03	↓	336.00	3.05	82.62	12.492	15.587	290.20	361.93	
U ₅ L ₅		- 45.61	12CB40	11.77	1.94	9.83	116.46	240.84	.75	216.00	1.94	83.51	12.432	15.505	146.32	182.49	
U ₆ L ₆	+ 81.38		10CB72	21.17	(4)(.94)(.808) = 3.04	18.13	326.34	444.19	.875	126.00	2.59	42.57	14.755	18.396	312.36	389.44	
U ₇ L ₇	+ 4.58		12CB27	7.97	1.50	6.47	116.46	158.52	.75	180.00	1.44	93.75	11.615	14.488	92.57	115.47	
U ₈ L ₈		- 46.14	12CB27	"	1.50	6.47	116.46	158.52	↑	180.00	1.44	93.75	11.615	14.488	92.57	115.47	125.23
L ₁ U ₂	+ 93.86		12CB40	14.69	(4)(.94)(.516) = 1.94	12.75	229.50	312.38		335.16	1.94	129.57	8.015	10.009	117.74	147.03	- 310.1 12 8
U ₂ L ₃		- 157.54	12CB85	24.98	2.99	21.99	395.82	538.76		369.72	3.07	90.32	11.899	14.842	297.24	370.75	
L ₃ U ₄	+ 78.15		12CB40	11.77	1.94	9.83	176.94	240.84	↑	↑	1.94	142.93*	6.609*	8.241*	77.79	92.00	
U ₄ L ₅	+ 121.31		12CB45	13.24	(4)(.94)(.576) = 2.17	11.07	199.26	271.22	↓	↓	1.94	142.93*	6.609*	8.241*	87.50	109.11	- 341.5 8.042 12.26
L ₅ U ₆		- 218.90	12CB106	31.20	(4)(.94)(.94) = 3.72	27.48	494.64	673.26		369.72	3.11	89.16	11.993	14.958	374.18	466.69	93.17 12.22 12.49
L ₆ U ₇		- 147.47	12CB79	23.22	2.77	20.45	368.10	501.03	↓	349.92	3.05	86.05	12.738	15.263	284.17	354.41	
U ₇ L ₈	+ 48.72		12CB27	7.97	1.50	6.47	116.46	158.52	.75	349.92	1.44	182.25*	4.065*	5.069*	32.40	40.10	204.1 6.129 11.9

* $F_a = \frac{135,000,710}{(\frac{KL}{r})^2} = \frac{L3U4}{U4L5} > 142.93 \quad 6.609 \text{ ksi}$

* $F_a = \frac{160,363,840}{(\frac{KL}{r})^2} = \frac{L3U4}{U4L5} > 2.741$

$U7L8 \quad 132.23 \quad 4.065 \text{ ksi}$

$U7L8 \quad 5.069$



$$\sum F_v = 0 \quad -(-75.86) - 46.12 - (+4.58) - V_{U7L8} = 0$$

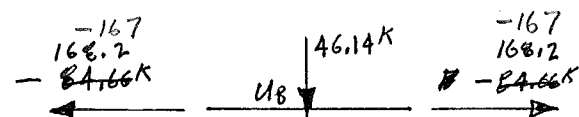
$$V_{U7L8} = +126.66 \text{ K}$$

$$F_{U7L8} = \frac{29.16}{15} \left(\frac{29.06}{126.66} \right) = +48.72 \text{ K}$$

$$H_{U7L8} = \frac{25}{29.16} (+48.72) = +41.77 \text{ K}$$

$$\sum F_H = 0 \quad -0 - (-126.43) + (+41.77) + F_{U7L8} = 0$$

$$F_{U7L8} = -188.2 \text{ K}$$

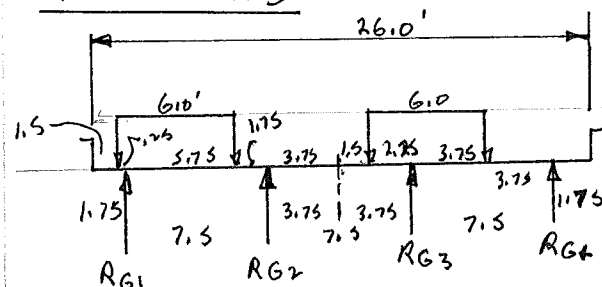


$$\sum F_H = 0 \quad -(-168.2) + (-84.66) - 0 = 0$$

$$\sum F_v = 0 \quad -46.14 - F_{U8L8} = 0$$

$$F_{U8L8} = -46.14 \text{ K}$$

Live Loads

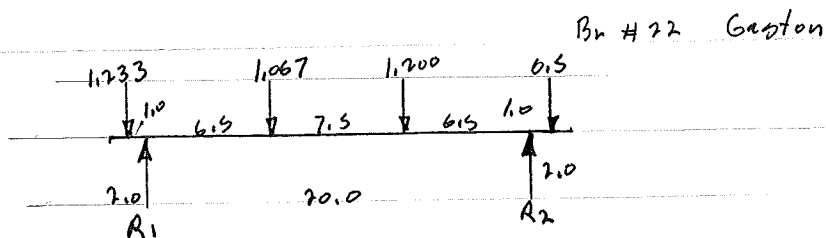


$$R_{G1} = \frac{1.75}{7.5} + 1 = 1.233$$

$$R_{G2} = \frac{5.75 + 2.25}{7.5} = 1.067$$

$$R_{G3} = \frac{5.75 + 3.75}{7.5} = 1.200$$

$$R_{G4} = \frac{3.75}{7.5} = 0.5$$



$$\sum M @ R_2 = 0 \quad 20 R_1 + 5(1) - 1.2(6.5) - 1.067(14.0) - 1.233(21.5) = 0$$

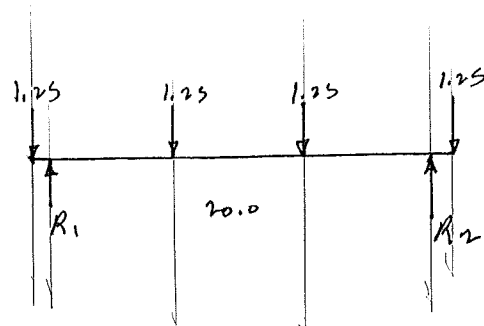
$$R_1 = 2.437 \text{ wheels/truss}$$

$$\sum M @ R_1 = 0 \quad 6.067(6.5) + 1.2(14.0) + 0.5(21.5) - 1.233(1) - 20 R_2 = 0$$

$$R_2 = 1.663 \text{ wheels/truss}$$

$$\text{Live Load Distribution Factor} = 2.437 \text{ wheels/truss}$$

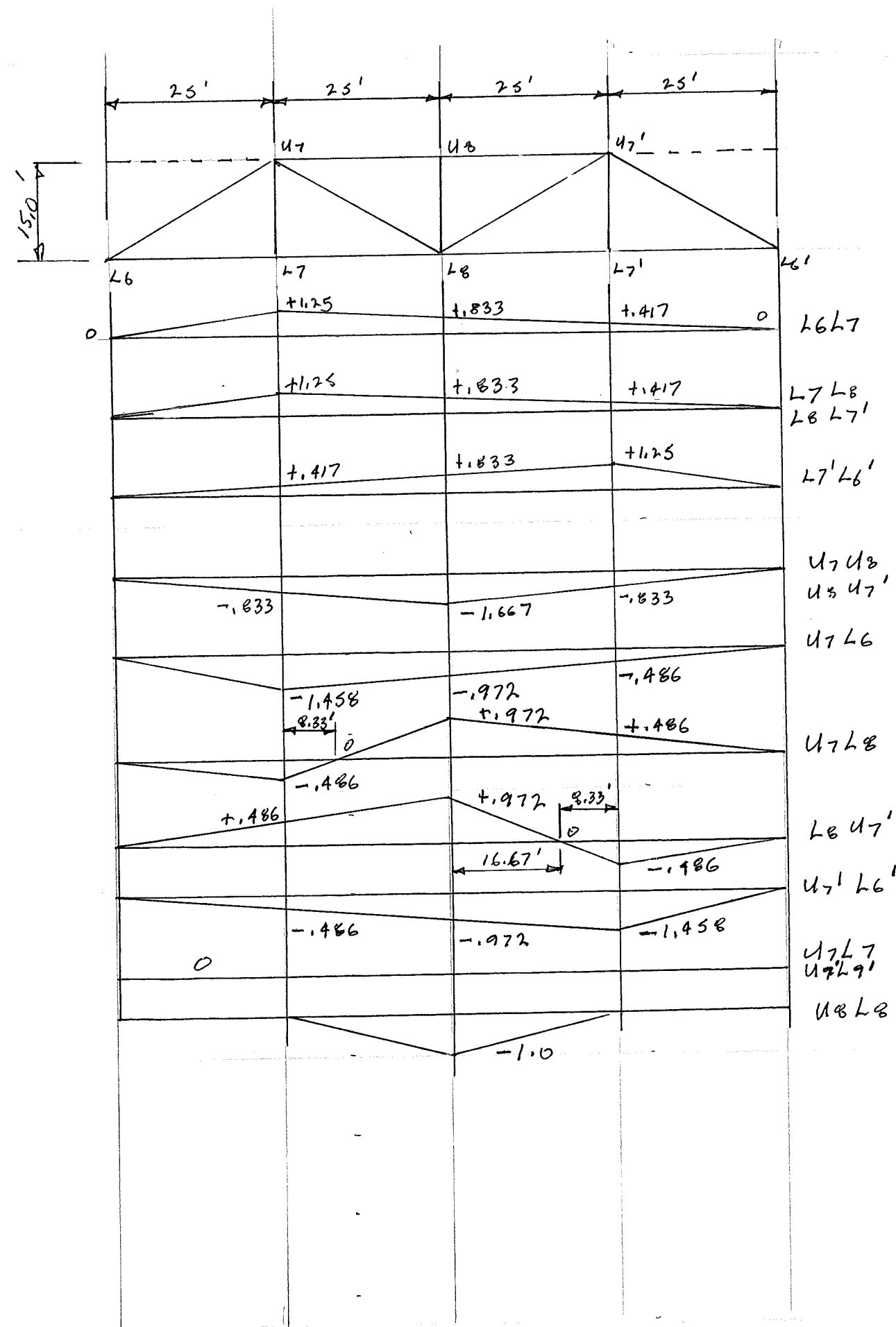
$$5/6 = \frac{7.5}{6} = 1.25$$



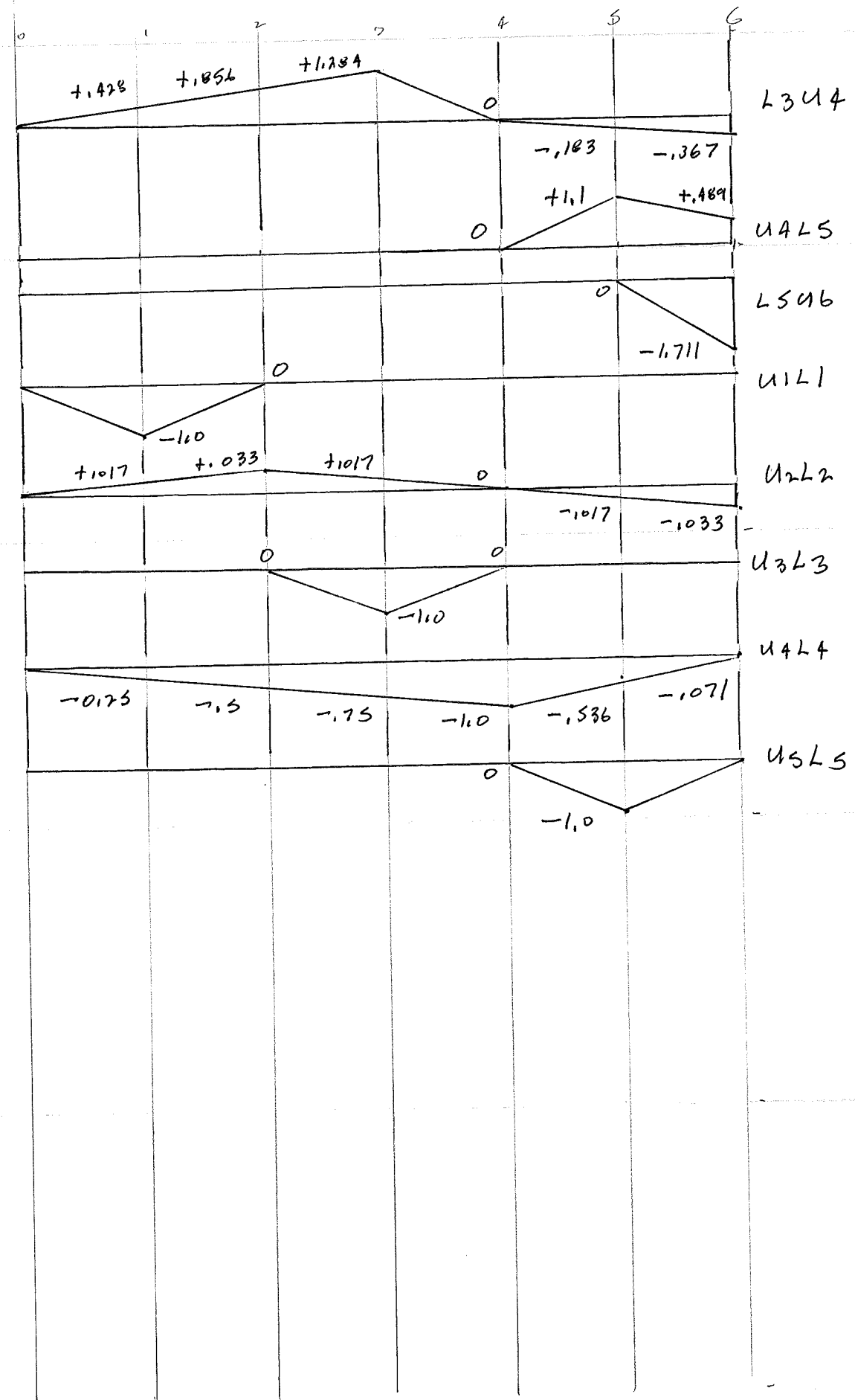
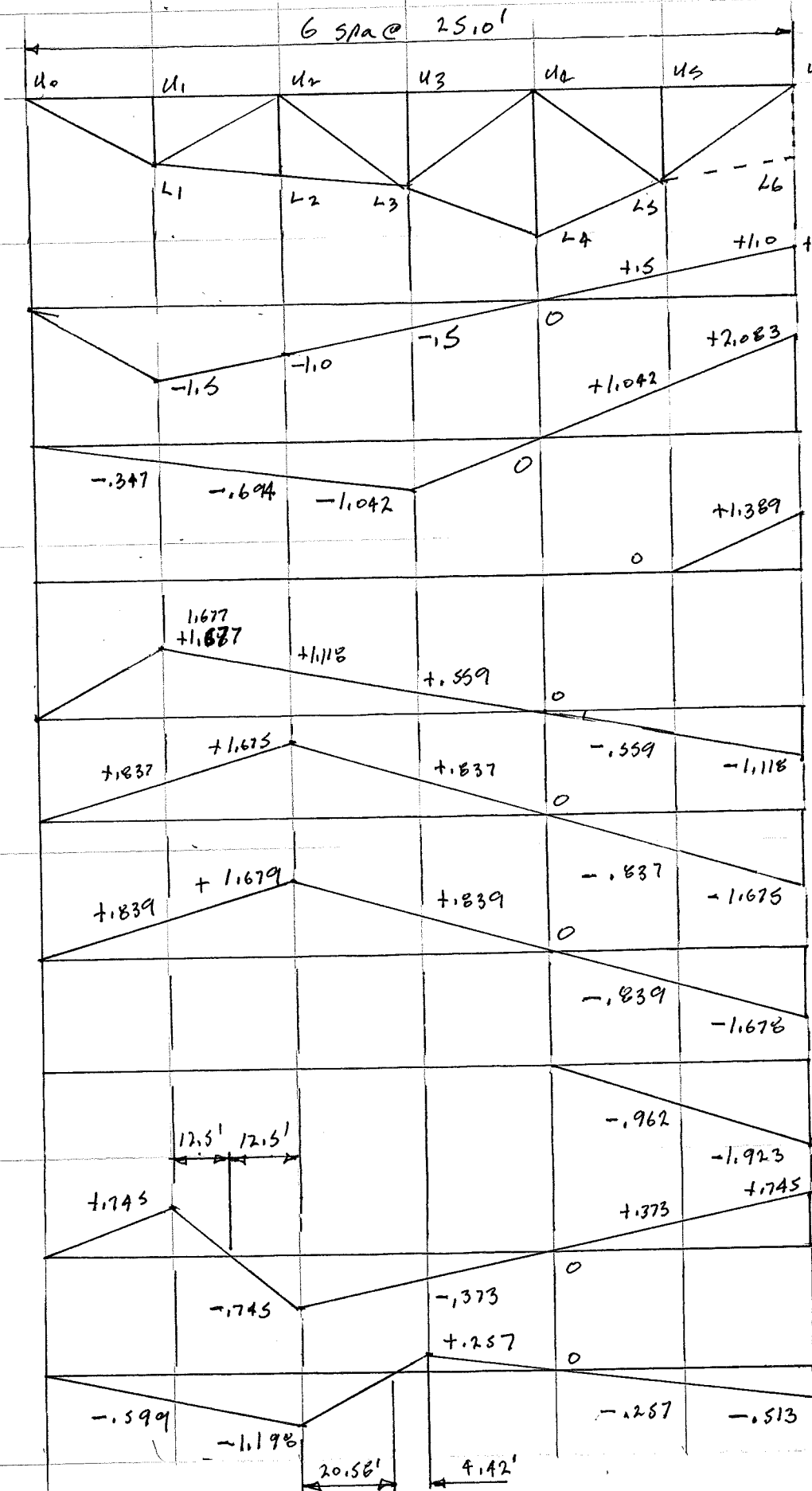
$$\sum M @ R_1$$

$$6.5(1.25) + 14.0(1.25) + 21.5(1.25) - 1(1.25) - 20 R_2 = 0$$

$$R_2 = 2.563 \text{ wheels per truss}$$



Br # 22 Gaston



Br. # 22 Gaston

16 spa @ 25.0'

U₀ U₁ U₂ U₃ U₄ U₅ U₆ U₇ U₈ U₇' U₆' U₅' U₄' U₃' U₂' U₁' U₀
 L₁ L₂ L₃ L₄ L₅ L₆ L₇ L₈ L₇' L₆' L₅' L₄' L₃' L₂' L₁'

+1.5 +1.0 +1.75 +1.5 +1.25 0

-1.5 -1.0 -1.5

+1.042 +2.087 +1.562 +1.042 +1.521 0

-1.347 -1.694 -1.042

+1.389 +1.042 +1.695 +1.347 0

+1.677 +1.118 +1.659

-1.559 -1.118 -1.861 -1.559 -1.280

+1.837 +1.675 +1.837

-1.837 -1.678 -1.359 -1.839 -1.42

+1.839 +1.679 +1.839

-1.839 -1.679 -1.359 -1.84 -1.42

-1.962 -1.923 -1.442 -1.962 -1.481

+1.745

+1.373 +1.745 +1.559 +1.373 +1.186 0

-1.745 -1.373

+1.257

-1.599 -1.198

-1.257 -1.513 -1.385 -1.257 -1.178 0

+1.428 +1.856 +1.284

-1.183 -1.367 -1.275 -1.183 -1.092 0

U₀ U₁
 U₁ U₂

U₂ U₃
 U₃ U₄

U₄ U₅
 U₅ U₆

U₀ L₁

L₁ L₂

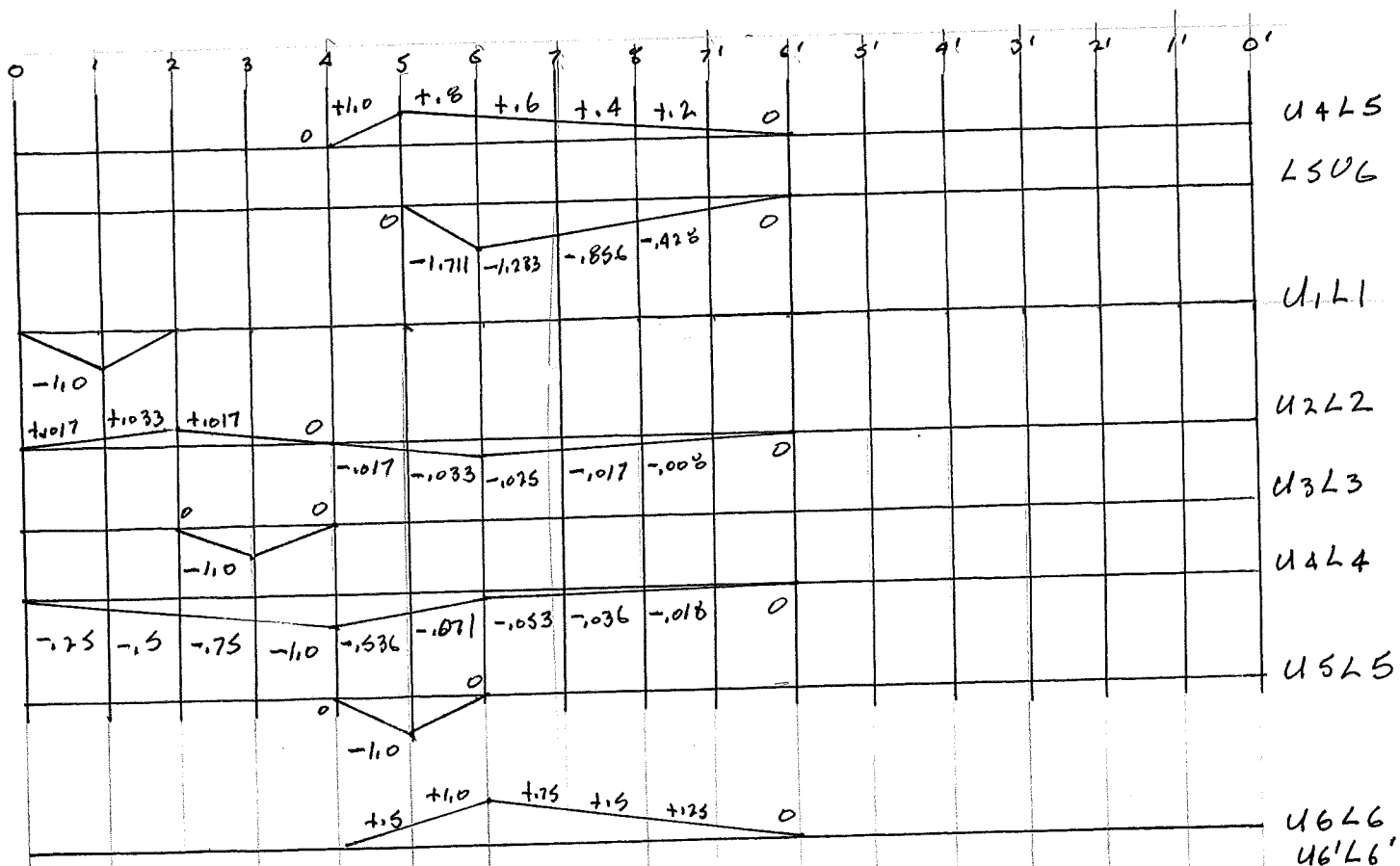
L₂ L₃

L₃ L₄
 L₄ L₅

L₁ U₂

U₂ L₃

L₃ U₄



U₄ L₅

L₅ U₆

U₁ L₁

U₂ L₂

U₃ L₃

U₄ L₄

U₅ L₅

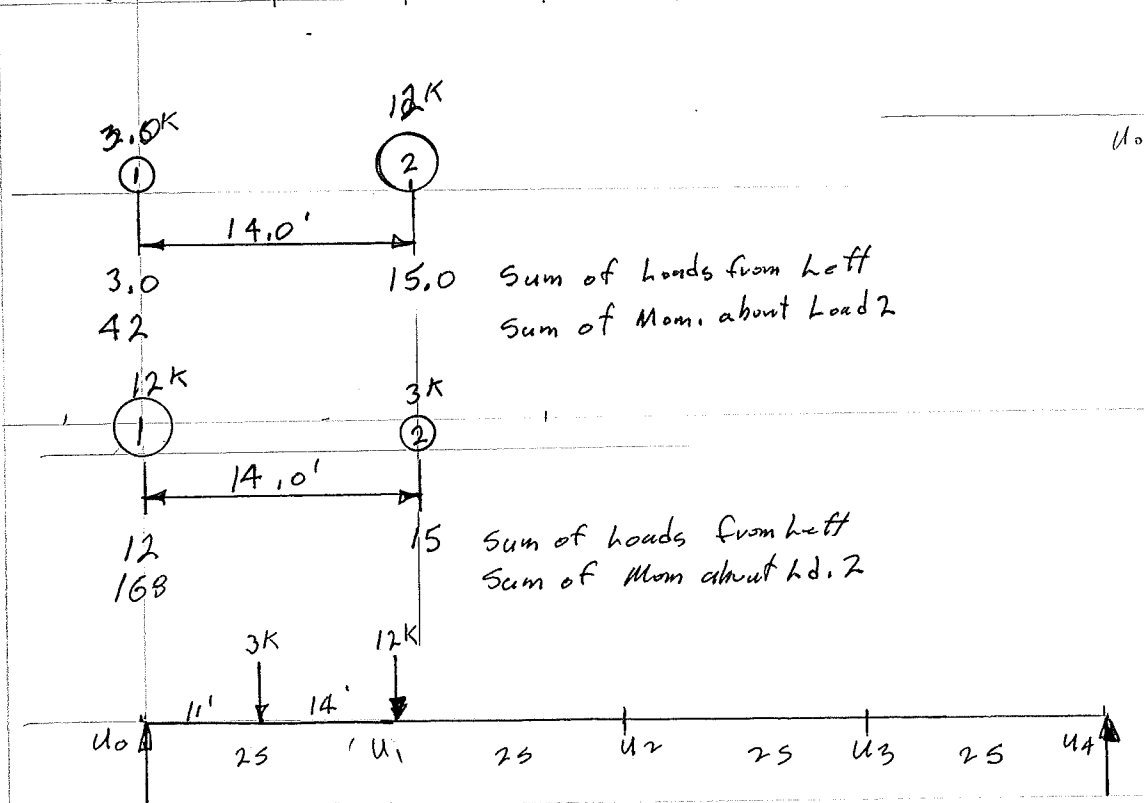
U₆ L₆
 U₆' L₆'

INFLUENCE TABLE FOR TRUSS												SUM OF ORDINATES			MAX ORDINATES		LOADED LENGTH FOR		IMPACT	
BAR	BAR FORCE DUE TO UNIT LOAD AT																		$I = \frac{50}{L+125}$	
	U ₀	U ₁	U ₂	U ₃	U ₄	U ₅	U ₆	U ₇	U ₈	U _{7'}	U _{6'}	+	-	All	+	-	TEN. +	COMP. -	TEN. +	COMP. -
U ₀ U ₁	0	-1.500	-1.000	-.500	0	+1.500	+1.000	+1.750	+1.500	+1.250	0	+3.000	-3.000	0	+1.000	-1.500	150	100	1.182	1.222
U ₁ U ₂	0	-1.500	-1.000	-.500	0	+1.500	+1.000	+1.750	+1.500	+1.250	0	+3.000	-3.000	0	+1.000	-1.500	150	100	1.182	1.222
U ₂ U ₃	0	-1.347	-.694	-1.042	0	+1.042	+2.083	+1.562	+1.042	+1.521	0	+6.250	-2.083	+4.167	+2.083	-1.042	150	100	1.182	1.222
U ₃ U ₄	0	-1.347	-.694	-1.042	0	+1.042	+2.083	+1.562	+1.042	+1.521	0	+6.250	-2.083	+4.167	+2.083	-1.042	150	100	1.182	1.222
U ₄ U ₅	0	0	0	0	0	0	+1.389	+1.042	+1.695	+1.347	0	+3.473	0	+3.473	+1.389	0	125	0	1.20	0
U ₅ U ₆	0	0	0	0	0	0	+1.389	+1.042	+1.695	+1.347	0	+3.473	0	+3.473	+1.389	0	125	0	1.20	0
U ₆ U ₇	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
U ₇ U ₈	0	0	0	0	0	0	0	-.833	-1.667	-.833	0	0	-3.333	-3.333	0	-1.667	0	100	0	1.222
U ₈ U _{7'}	0	0	0	0	0	0	0	-.833	-1.667	-.833	0	0	-3.333	-3.333	0	-1.667	0	100	0	1.222
U _{7'} U _{6'}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
U ₀ L ₁	0	+1.677	+1.118	+1.559	0	-.559	-1.118	-.831	-.559	-.280	0	+3.354	-3.347	+1.007	+1.677	-1.118	100	150	1.222	1.182
L ₁ L ₂	0	+1.837	+1.675	+1.837	0	-.837	-1.678	-1.759	-.839	-.420	0	+3.349	-5.033	-1.684	+1.675	-1.678	100	150	1.222	1.182
L ₂ L ₃	0	+1.839	+1.679	+1.839	0	-.839	-1.679	-1.759	-.840	-.420	0	+3.357	-5.037	-1.680	+1.679	-1.679	100	150	1.222	1.182
L ₃ L ₄	0	0	0	0	0	-.839	-1.679	-1.759	-.840	-.420	0	0	-5.037	-5.037	0	-1.679	0	150	0	1.182
L ₄ L ₅	0	0	0	0	0	-.962	-1.923	-1.442	-.962	-.481	0	0	-5.770	-5.770	0	-1.923	0	150	0	1.182
L ₅ L ₆	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L ₆ L ₇	0	0	0	0	0	0	0	+1.25	+1.833	+1.417	0	+2.5	0	+2.5	+1.25	0	100	0	1.222	0
L ₇ L ₈	0	0	0	0	0	0	0	+1.25	+1.833	+1.417	0	+2.5	0	+2.5	+1.25	0	100	0	1.222	0
L ₈ L _{7'}	0	0	0	0	0	0	0	+1.25	+1.833	+1.417	0	+2.5	0	+2.5	+1.25	0	100	0	1.222	0
L _{7'} L _{6'}	0	0	0	0	0	0	0	+1.417	+1.833	+1.25	0	+2.5	0	+2.5	+1.25	0	100	0	1.222	0
L ₁ U ₂	0	+1.745	-.745	-.373	0	+1.373	+1.745	+1.559	+1.373	+1.186	0	+2.981	-1.118	+1.863	+1.745	-.745	87.5	162.5	1.235	1.174
U ₂ L ₃	0	-.599	-1.198	+1.757	0	-.257	-.513	-.385	-.257	-.128	0	+1.257	-3.337	-3.080	+1.257	-1.198	29.42	220.58	1.30	1.145
L ₃ U ₄	0	+1.428	+1.856	+1.284	0	-.183	-.367	-.275	-.183	-.092	0	+2.568	-1.100	+1.468	+1.284	-.367	100	150	1.222	1.182
U ₄ L ₅	0	0	0	0	0	+1.000	+1.800	+1.600	+1.400	+1.200	0	+3.000	0	+3.000	+1.000	0	150	0	1.182	0
L ₅ U ₆	0	0	0	0	0	0	-1.711	-1.283	-.856	-.428	0	0	-4.278	-4.278	0	-1.711	0	125	0	1.20
L ₆ U ₇	0	0	0	0	0	0	0	-1.458	-.972	-.486	0	0	-2.916	-2.916	0	-1.458	0	100	0	1.222
U ₇ L ₈	0	0	0	0	0	0	0	-.486	+1.972	+1.486	0	+1.458	-.486	+1.972	+1.972	-.486	100	100	1.222	1.222
L ₈ U _{7'}	0	0	0	0	0	0	0	+1.486	+1.972	-.486	0	+1.458	-.486	+1.972	+1.972	-.486	100	100	1.222	1.222
U _{7'} L _{6'}	0	0	0	0	0	0	0	-.486	-.972	-1.458	0	+1.458	-.486	+1.972	+1.972	-.486	100	100	1.222	1.222
U ₁ L ₁	0	+1.0	0	0	0	0	0	0	0	0	0	+1.000	0	+1.000	+1.000	0	50	50	1.286	0
U ₂ L ₂	0	+1.017	+1.033	+1.017	0	-.017	-.033	-.025	-.017	-.008	0	+1.067	-.100	-.033	+1.033	-.033	100	150	1.222	1.182
U ₃ L ₃	0	0	0	+1.000	0	0	0	0	0	0	0	0	-1.000	-1.000	0	-1.000	0	50	0	1.286

Br #72 Gaston

INFLUENCE TABLE FOR TRUSS

BAR	BAR FORCE DUE TO UNIT LOAD AT											SUM OF ORIGINATES			MAX ORIGINATES		LOADED LENGTH FOR		IMPACT	
	U ₀	U ₁	U ₂	U ₃	U ₄	U ₅	U ₆	U ₇	U ₈	U _{7'}	U _{6'}	+	-	All	+	-	TEN +	COMP. -	I = $\frac{50}{125+L}$	
																			TEN. +	Comp. -
U4L4	0	-0.250	-0.500	-0.750	-1.000	-1.536	-0.071	-0.053	-0.036	-0.018	0	0	-3.214	-3.214	0	-1.000	0	250	0	1.133
U5L5	0	0	0	0	0	-1.000	0	0	0	0	0	0	-1.000	-1.000	0	-1.000	0	50	0	1.286
U6L6	0	0	0	0	0	+0.5	+1.0	+0.75	+0.5	+0.25	0	+3.000	0	+3.000	+1.000	0	150	0	1.182	0
U7L7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
U8L8	0	0	0	0	0	0	0	0	-1.0	0	0	0	-1.0	-1.0	0	-1.0	0	50	0	1.286
U7'L7'	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
U6'L6'	0	0	0	0	0	+0.50	+1.0	+0.75	+0.5	+0.25	0	+3.00	0	+3.00	+1.00	0	150	0	1.182	0



$$F_{u3u4} = 12(-1.042) + 3\left[\left(\frac{11}{25}\right)(-0.348) - 0.694\right] = -13.351K$$
$$F_{u3u4} = 12(-1.042) + 3\left[\frac{11}{25}(-1.042)\right] = -12.962K$$
$$F_{u3u4} = 12(2.087) + 3\left[\frac{11}{25}(0.52) + 1.042\right] = 28.856K$$
$$F_{u2u3} = -13.351K$$
$$F_{u3u4} = +28.856K$$
$$F_{u4u5} = 12(1.339) + 3\left[\frac{11}{25}(+1.339)\right] = 18.501K$$
$$F_{u4u5} = 12(1.339) + 3\left[\frac{11}{25}(0.347) + 1.042\right] = 20.262K$$

$$12 F_{u0u1} = 12(-1.5) + (3)\left(\frac{11}{25}\right)(-1.5) = -19.98K$$

$$F_{u1u2} = 12(-1.5) + 3\left[\frac{11}{25}(0.5) - 1\right] = F_{u1u2} = -21.66K$$
$$F_{u0u1}$$

$$F_{u0u1} \text{ } F_{u1u2} = -21.66K$$

Br. # 22 Gaston

LIVE LOAD BAR FORCES

BAR	VEHICLE	TRUCK (T) or Unif. (U)	BAR FORCE	CONTROL		IMPACT		Dist. Fact.	TOTAL LIVE BAR FORCE	
				TEN +	COMP -	TEN +	COMP -		TEN +	COMP -
				(Kips)	(Kips)				Kips	Kips
U ₀ U ₁	H 15	T	$(12)(-1.5) + 3\left[\frac{11}{25}(-1.5)\right] = -19.98K$							
U ₁ U ₂		T	$(12)(-1.5) + 3\left[\frac{11}{25}(-1.5) - 1.0\right] = -21.66K$							
		U	$(.24)(25)(+3.0) + 9.75(+1.0) = +27.75K$	+27.75		1.182		2.437	79.93	
		U	$(.24)(25)(-3.0) + 9.75(-1.5) = -32.625K$		-32.625		1.222	2.437		97.158
		T	$(12)(1.0) + 3\left[\frac{11}{25}(1.5) + .5\right] = +14.16K$							
		T	$(12)(1.0) + 3\left[\frac{11}{25}(1.5) + .75\right] = +14.58K$							
	H 15	T	$(12)(-1.5) + 3\left[\frac{11}{25}(-1.5)\right] + 12\left[\frac{11}{25}(-1.5) - 1.0\right] = -34.62K$		-34.62		1.222	2.437		103.10
		T	$(12)(+1.0) + 3\left[\frac{11}{25}(1.5) + .5\right] + 12\left[\frac{11}{25}(1.5) + .75\right] = +24.48K$	+27.75		1.182		2.437	79.93	
		U	+27.75							
		U	-32.625							
	TR 2	T	$10(-1.5) + 5.75\left[\frac{11}{25}(-1.5) - 1.0\right] = -22.36$	+15.118	-22.36	1.182	1.222	2.437	43.55	66.59
		T	$10(+1.0) + 5.75\left[\frac{11}{25}(1.5) + .75\right] = +15.118$					2.437		
	TR 3	T	$9.5(-1.5) + 5.9375\left[\frac{11}{25}(-1.5)\right] + 9.5\left[\frac{11}{25}(-1.5) - 1.0\right] = -32.728$		-32.728	1.182	1.222	2.437	66.98	97.46
		T	$9.5(+1.0) + 5.9375\left[\frac{11}{25}(1.5) + .75\right] + 9.5\left[\frac{11}{25}(1.5) + .75\right] = +123.251$	+23.251				2.437		
	TR 4	T	$10(-1.5) + 4.6\left[\frac{16}{25}(-1.5)\right] + 9.5\left[\frac{21}{25}(-1.5) - 1.0\right] + 9.5\left[\frac{17}{25}(-1.5) - 1.0\right] = -45.636$		-45.636	1.182	1.222	2.437	91.12	135.90
		T	$10(+1.0) + 4.6\left[\frac{16}{25}(1.5) + .5\right] + 9.5\left[\frac{21}{25}(1.5) + .75\right] + 9.5\left[\frac{17}{25}(1.5) + .75\right] = +31.632$	+31.632				2.437		
		T	$9.5(1.0) + 4.6\left[\frac{16}{25}(1.5) + .5\right] + 10\left[\frac{21}{25}(1.5) + .5\right] + 9.5\left[\frac{17}{25}(1.5) + .75\right] = +31.224$							
		T	$9.5(-1.5) + 4.6\left[\frac{16}{25}(-1.5)\right] + 10\left[\frac{21}{25}(-1.5)\right] + 9.5\left[\frac{17}{25}(-1.5) - 1.0\right] = -43.652$							
	TR 5	T	$9.5(-1.5) + 2.75\left[\frac{16}{25}(-1.5)\right] + 9.5\left[\frac{21}{25}(-1.5)\right] + 7.5\left[\frac{16}{25}(1.5) + .75\right] + 7.5\left[\frac{12}{25}(1.5) + .75\right] = -47.070$	+33.845	-47.070	1.182	1.222	2.437	97.49	140.18
		T	$9.5(+1.0) + 2.75\left[\frac{16}{25}(1.5) + .5\right] + 9.5\left[\frac{21}{25}(1.5) + .5\right] + 7.5\left[\frac{16}{25}(1.5) + .75\right] + 7.5\left[\frac{12}{25}(1.5) + .75\right] = +33.845$					2.437		
U ₂ U ₃	H 15	T	$12(-1.042) + 3\left[\frac{11}{25}(-1.042) - .694\right] = -15.045$							
U ₃ U ₄		T	$12(-1.042) + 3\left[\frac{11}{25}(-1.042)\right] = -13.879$							
		T	$12(+2.087) + 3\left[\frac{11}{25}(+1.525) + 1.562\right] = +30.423$	+57.809		1.182		2.437	166.52	
		U	$2.24(+6.75) + 9.75(2.083) = +57.809K$		-22.658		1.222	2.437		67.47
		U	$2.24(-2.083) + 9.75(-1.042) = -22.658$		-24.045		1.222	2.437		-71.61
	H 15	T	$12(-1.042) + 3\left[\frac{11}{25}(-1.042)\right] + 12\left[\frac{11}{25}(-1.042) - .694\right] = -24.045$							
		T	$12(+2.087) + 3\left[\frac{11}{25}(+1.525) + 1.562\right] + 12\left[\frac{11}{25}(+1.525) + 1.562\right] = +51.065$	+57.809		1.182		2.437	166.52	
		U	+57.809							
		U	-22.658							
	TR 2	T	$10(-1.042) + 5.75\left[\frac{11}{25}(-1.042)\right] = -13.836$	+31.540	-13.836	1.182	1.222	2.437	90.86	21.02
		T	$10(+2.087) + 5.75\left[\frac{11}{25}(+1.525) + 1.562\right] = +31.540$		+31.540			2.437		

Br. #22 GASTON
LIVE LOAD BAR FORCES

BAR	VEHICLE	TRUCK (T) or UNIF. (U)	BAR FORCE (KIPS)	CONTROL		IMPACT		DIST. FACTOR	TOTAL LIVE LOAD BAR FORCE	
				TEN +	COMP -	TEN +	COMP -		TEN. +	COMP. -
									(KIPS)	(KIPS)
U243 U344	TR 3	T	$9.5(-1.042) + 5.9375 \left[\frac{14}{25}(-1.042) \right] + 9.5 \left[\frac{21}{25}(-.348) - .694 \right] = -22.849$		-22.849		1.222	2.437		66.04
		T	$9.5(-1.042) + 5.9375 \left[\frac{14}{25}(-1.042) \right] + 5.9375 \left[\frac{21}{25}(-.348) - .694 \right] = -21.371$							
		T	$9.5(+2.087) + 5.9375 \left[\frac{14}{25}(1.042) + 1.042 \right] + 9.5 \left[\frac{21}{25}(+.525) + 1.562 \right] = +48.517$	+48.517		1.182		2.437	139.75	
	TR 4	T	$10(-1.042) + 4.6 \left[\frac{14}{25}(-1.042) + 9.5 \left[\frac{21}{25}(-.348) + (-.694) \right] + 9.5 \left[\frac{17}{25}(-.348) - .694 \right] = -31.699$		-31.699		1.222	2.437		94.40
		T	$10(+2.087) + 4.6 \left[\frac{14}{25}(+1.042) + 1.042 \right] + 9.5 \left[\frac{21}{25}(+.525) + 1.562 \right] + 9.5 \left[\frac{17}{25}(+.525) + 1.562 \right] = +65.999$	+65.999		1.182		2.437	190.11	
	TR 5	T	$9.5(-1.042) + 2.75 \left[\frac{14}{25}(-1.042) \right] + 9.5 \left[\frac{21}{25}(-1.042) \right] + 7.5 \left[\frac{16}{25}(-.348) - .694 \right] + 7.5 \left[\frac{12}{25}(-.348) - .694 \right] = -30.61$		-30.61		1.222	2.437		91.16
		T	$9.5(+2.087) + 2.75 \left[\frac{14}{25}(1.042) + 1.042 \right] + 9.5 \left[\frac{21}{25}(1.042) + 1.042 \right] + 7.5 \left[\frac{16}{25}(+.525) + 1.562 \right] + 7.5 \left[\frac{12}{25}(+.525) + 1.562 \right] = +42.08$	+42.08		1.182		2.437	121.21	
U445 U546	H 15	T	$12(+1.389) + 3 \left[\frac{11}{25}(1.347) + 1.042 \right] = 20.835$							
		U	$12A(25)(3.473) + 9.75(+1.389) = 34.381$	+34.381		1.20	-	2.437	100.54	-
	HS 15	T	$12(+1.389) + 2.75 \left[\frac{14}{25}(1.347) \right] + 12 \left[\frac{11}{25}(1.347) + 1.042 \right] = +32.888$							
		U	+34.381	+34.381		1.20		2.437	100.54	-
	TR 2	T	$10(+1.389) + 5.75 \left[\frac{14}{25}(1.347) + 1.042 \right] = +20.999$	+20.999		1.2		2.437	61.41	-
	TR 3	T	$9.5(+1.389) + 5.9375 \left[\frac{14}{25}(1.347) \right] + 9.5 \left[\frac{21}{25}(1.347) + 1.042 \right] = +30.482$	+30.482		1.2		2.437	89.14	-
	TR 4	T	$10(+1.389) + 4.6 \left[\frac{14}{25}(1.347) \right] + 9.5 \left[\frac{21}{25}(1.347) + 1.042 \right] + 9.5 \left[\frac{17}{25}(1.347) + 1.042 \right] = +42.788$	+42.788		1.2		2.437	125.13	-
	TR 5	T	$9.5(+1.389) + 2.75 \left[\frac{14}{25}(1.347) \right] + 9.5 \left[\frac{21}{25}(1.347) \right] + 7.5 \left[\frac{16}{25}(1.347) + 1.042 \right] + 7.5 \left[\frac{12}{25}(1.347) + 1.042 \right] = +44.505$	+44.505		1.2		2.437	130.15	-
U647				0					0	0
U748	H 15	T	$12(-1.167) + 3 \left[\frac{14}{25}(-.334) + (-.833) \right] = -16.944$							
		U	$12A(25)(-3.333) + 9.75(-1.167) = -31.376$	0	-31.376		1.222	2.437	0	94.41
	HS 15	T	$12(-1.167) + 3 \left[\frac{11}{25}(-.334) + (-.833) \right] + 12 \left[\frac{11}{25}(-.334) + (-.833) \right] = -28.644$							
		U	-31.376		-31.376		1.222	2.437	-	94.44
	TR 2	T	$10(-1.167) + 5.75 \left[\frac{14}{25}(-.334) - .833 \right] = -17.769$		-17.769				-	52.92
	TR 3	T	$9.5(-1.167) + 5.9375 \left[\frac{14}{25}(-.334) - .833 \right] + 9.5 \left[\frac{21}{25}(-.334) - .833 \right] = -27.729$		-27.729				-	82.55
	TR 4	T	$10(-1.167) + 4.6 \left[\frac{14}{25}(-.334) - .833 \right] + 9.5 \left[\frac{21}{25}(-.334) - .833 \right] + 9.5 \left[\frac{17}{25}(-.334) - .833 \right] = -37.135$		-37.135				-	110.59
	TR 5	T	$9.5(-1.167) + 2.75 \left[\frac{14}{25}(-.334) - .833 \right] + 9.5 \left[\frac{21}{25}(-.334) - .833 \right] + 7.5 \left[\frac{16}{25}(-.334) - .833 \right] + 7.5 \left[\frac{12}{25}(-.334) - .833 \right] = -39.661$		-39.661		1.222	2.437	-	118.11
U841	H 15	T	$12(+1.677) + 3 \left[\frac{11}{25}(1.549) + 1.118 \right] = +24.203$							
		T	$12(-1.118) + 3 \left[\frac{11}{25}(-.289) - .833 \right] = -18.288$							
		U	$12A(25)(+3.354) + 9.75(+1.677) = +36.377$	+36.377		1.222		2.437	108.33	
		U	$12A(25)(-3.347) + 9.75(-1.118) = -30.983$		-30.983		1.182	2.437		89.25
	HS 15	T	$12(+1.677) + 3 \left[\frac{11}{25}(1.677) \right] + 12 \left[\frac{11}{25}(1.549) + 1.118 \right] = +38.519$	+38.519		1.222		2.437	114.71	
		T	$12(-1.118) + 3 \left[\frac{11}{25}(-.559) - .833 \right] + 12 \left[\frac{11}{25}(-.289) - .833 \right] = -27.318$							
		U	+36.377							
		U	-30.983		-30.983		1.182	2.437		89.25

Br. #22 GASTON
LIVE LOAD BAR FORCES

BAR	VEHICLE	TRUCK (T) or UNIT (U)	BAR FORCE (KIPS)	CONTROL		IMPACT		DIST. FACTOR	TOTAL LIVE LOAD BAR FORCE	
				TEN +	COMP -	TEN +	COMP -		TEN. + (KIPS)	COMP. - (KIPS)
UOL1	TR 2	T	$10(+1.677) + 5.75 \left[\frac{14}{25} (.549) + 1.118 \right] = +24.966$	24.966		1.222		2.437	73.35	
		U	$10(-1.118) + 5.75 \left[\frac{14}{25} (-1.267) - .831 \right] = -16.882$		16.882		1.182			48.63
	TR 3	T	$9.5(+1.677) + 5.9375 \left[\frac{14}{25} (1.667) + 9.5 \left[\frac{21}{25} (.549) + 1.118 \right] \right] = +36.476$	36.476		1.222			106.63	
		U	$9.5(-1.118) + 5.9375 \left[\frac{14}{25} (-1.559) - .559 \right] + 9.5 \left[\frac{21}{25} (-1.267) - .831 \right] = -25.983$		25.983		1.182			74.84
	TR 4	T	$10(+1.677) + 4.6 \left[\frac{16}{25} (1.667) \right] + 9.5 \left[\frac{21}{25} (.549) + 1.118 \right] + 9.5 \left[\frac{17}{25} (.549) + 1.118 \right] = +50.877$	50.877		1.222			151.51	
		U	$10(-1.118) + 4.6 \left[\frac{16}{25} (-1.559) - .559 \right] + 9.5 \left[\frac{21}{25} (-1.267) - .831 \right] + 9.5 \left[\frac{17}{25} (-1.267) - .831 \right] = -35.330$		35.330		1.182			101.77
	TR 5	T	$9.5(+1.677) + 2.75 \left[\frac{10}{25} (1.677) \right] + 9.5 \left[\frac{21}{25} (1.677) + 7.5 \left[\frac{14}{25} (.549) + 1.118 \right] + 1.5 \left[\frac{12}{25} (.549) + 1.118 \right] \right] = +52.540$	52.540		1.222			156.46	
		U	$9.5(-1.118) + 2.75 \left[\frac{10}{25} (-1.559) - .559 \right] + 9.5 \left[\frac{21}{25} (-1.559) - .559 \right] + 7.5 \left[\frac{14}{25} (-1.267) - .831 \right] + 1.5 \left[\frac{12}{25} (-1.267) - .831 \right] = -37.420$		37.420		1.182	2.437		107.79
L1L2	H15	T	$12(+1.675) + 3 \left[\frac{11}{25} (.838) + .837 \right] = +23.717$			1.222		2.437	108.47	
		U	$12(-1.675) + 3 \left[\frac{11}{25} (-1.419) - 1.259 \right] = -24.466$							
		T	$12(+1.675) + 3 \left[\frac{11}{25} (.838) + .837 \right] + 12 \left[\frac{11}{25} (.838) + .837 \right] = +36.425$	36.425						
		U	$12(-1.675) + 3 \left[\frac{11}{25} (-1.419) - 1.259 \right] + 12 \left[\frac{11}{25} (-1.419) - 1.259 \right] = -46.559$		46.559		1.182	2.437		134.11
	H515	T	$12(+1.675) + 3 \left[\frac{11}{25} (.838) + .837 \right] + 12 \left[\frac{11}{25} (.838) + .837 \right] = +36.186$	36.186		1.222		2.437	113.72	
		U	$12(-1.675) + 3 \left[\frac{11}{25} (-1.419) - 1.259 \right] + 12 \left[\frac{11}{25} (-1.419) - 1.259 \right] = -41.077$							
		T	$12(+1.675) + 3 \left[\frac{11}{25} (.838) + .837 \right] + 12 \left[\frac{11}{25} (.838) + .837 \right] = +36.425$							
		U	$12(-1.675) + 3 \left[\frac{11}{25} (-1.419) - 1.259 \right] + 12 \left[\frac{11}{25} (-1.419) - 1.259 \right] = -46.559$		46.559		1.182	2.437		134.11
	TR 2	T	$10(+1.675) + 5.75 \left[\frac{14}{25} (.838) + .837 \right] = +24.261$	24.261		1.222			72.25	
		U	$10(-1.675) + 5.75 \left[\frac{14}{25} (-1.419) - 1.259 \right] = -25.368$		25.368		1.182			73.07
	TR 3	T	$9.5(+1.675) + 5.9375 \left[\frac{14}{25} (.838) + .837 \right] = +27.221$	27.221		1.222			81.06	
		U	$9.5(-1.675) + 5.9375 \left[\frac{14}{25} (-1.419) - 1.259 \right] + 9.5 \left[\frac{21}{25} (-1.419) - 1.259 \right] = -39.011$		39.011		1.182			112.37
	TR 4	T	$9.5(+1.675) + 4.6 \left[\frac{16}{25} (.838) + .837 \right] + 9.5 \left[\frac{21}{25} (.838) + .837 \right] + 9.5 \left[\frac{17}{25} (.838) + .837 \right] = +51.071$	51.071		1.222			152.09	
		U	$9.5(-1.675) + 4.6 \left[\frac{16}{25} (-1.419) - 1.259 \right] + 9.5 \left[\frac{21}{25} (-1.419) - 1.259 \right] + 9.5 \left[\frac{17}{25} (-1.419) - 1.259 \right] = -53.077$		53.077		1.182			152.89
	TR 5	T	$9.5(+1.675) + 2.75 \left[\frac{10}{25} (.838) + .837 \right] + 9.5 \left[\frac{21}{25} (.838) + .837 \right] + 7.5 \left[\frac{14}{25} (.838) + .837 \right] + 1.5 \left[\frac{12}{25} (.838) + .837 \right] = +53.369$	53.369		1.222			158.93	
		U	$9.5(-1.675) + 2.75 \left[\frac{10}{25} (-1.419) - 1.259 \right] + 9.5 \left[\frac{21}{25} (-1.419) - 1.259 \right] + 7.5 \left[\frac{14}{25} (-1.419) - 1.259 \right] + 1.5 \left[\frac{12}{25} (-1.419) - 1.259 \right] = -57.185$		57.185		1.182	2.437		164.72
L2L3	H15	T	$12(+1.679) + 3 \left[\frac{11}{25} (.84) + .839 \right] = +23.774$			1.222		2.437	108.73	
		U	$12(-1.679) + 3 \left[\frac{11}{25} (-1.419) - 1.259 \right] = -24.478$							
		T	$12(+1.679) + 3 \left[\frac{11}{25} (.84) + .839 \right] + 12 \left[\frac{11}{25} (.84) + .839 \right] = +36.512$	36.512						
		U	$12(-1.679) + 3 \left[\frac{11}{25} (-1.419) - 1.259 \right] + 12 \left[\frac{11}{25} (-1.419) - 1.259 \right] = -46.592$		46.592		1.182	2.437		134.21
	H515	T	$12(+1.679) + 3 \left[\frac{11}{25} (.84) + .839 \right] + 12 \left[\frac{11}{25} (.84) + .839 \right] = +49.555$	49.555		1.222		2.437	147.58	
		U	$12(-1.679) + 3 \left[\frac{11}{25} (-1.419) - 1.259 \right] + 12 \left[\frac{11}{25} (-1.419) - 1.259 \right] = -41.094$							
		T	$12(+1.679) + 3 \left[\frac{11}{25} (.84) + .839 \right] + 12 \left[\frac{11}{25} (.84) + .839 \right] = +49.555$							
		U	$12(-1.679) + 3 \left[\frac{11}{25} (-1.419) - 1.259 \right] + 12 \left[\frac{11}{25} (-1.419) - 1.259 \right] = -46.592$		46.592		1.182	2.437		134.21

Br. #22 GASTON
LIVE LOAD BAR FORCES

LIVE LOAD BAR FORCES										
BAR	VEHICLE	TRUCK (T) OR UNIF. (U)	BAR FORCE (KIPS)	CONTROL		IMPACT		DIST. FACTOR	TOTAL LIVE LOAD BAR FORCE	
				TEN +	COMP -	TEN +	COMP -		TEN. +	COMP. -
									(KIPS)	(KIPS)
L2L3	TR 2	T	$10(+1.679) + 5.75 \left[\frac{14}{25} (.84) + .839 \right] = +24.319$	24.319		1.222		2.437	72.42	
		T	$10(-1.679) + 5.75 \left[\frac{14}{25} (-.419) + 1.239 \right] = -25.378$		25.378		1.182			73.10
	TR 3	T	$9.5(+1.679) + 5.9375 \left[\frac{14}{25} (.84) + .839 \right] + 9.5 \left[\frac{24}{25} (.84) + .839 \right] = +38.399$	38.399		1.222			114.35	
		T	$9.5(-1.679) + 5.9375 \left[\frac{14}{25} (-.84) - .839 \right] + 9.5 \left[\frac{24}{25} (-.419) - 1.239 \right] = -39.029$		39.029		1.182			112.42
	TR 4	T	$10(+1.679) + 4.6 \left[\frac{16}{25} (.84) + .839 \right] + 9.5 \left[\frac{24}{25} (.84) + .839 \right] + 9.5 \left[\frac{12}{25} (.84) + .839 \right] = +51.193$	51.193		1.222			152.45	
		T	$10(-1.679) + 4.6 \left[\frac{16}{25} (-.84) - .839 \right] + 9.5 \left[\frac{24}{25} (-.419) - 1.239 \right] + 9.5 \left[\frac{12}{25} (-.419) - 1.239 \right] = -53.094$		53.094		1.182			152.94
	TR 5	T	$9.5(+1.679) + 2.75 \left[\frac{16}{25} (.84) + .839 \right] + 9.5 \left[\frac{24}{25} (.84) + .839 \right] + 7.5 \left[\frac{16}{25} (.84) + .839 \right] + 7.5 \left[\frac{12}{25} (.84) + .839 \right] = +53.496$	53.496		1.222			159.31	
		T	$9.5(-1.679) + 2.75 \left[\frac{16}{25} (-.84) - .839 \right] + 9.5 \left[\frac{24}{25} (-.419) - .839 \right] + 7.5 \left[\frac{16}{25} (-.419) - 1.239 \right] + 7.5 \left[\frac{12}{25} (-.419) - 1.239 \right] = -56.760$		56.76		1.182	2.437		162.06
L3L4 L4L5	H16	T	$12(-1.923) + 3 \left[\frac{11}{25} (-.481) - 1.442 \right] = -28.037$							
		U	$12(25)(-5.770) + 9.75(-1.923) = -53.369$		53.369		1.182	2.437		153.73
	H515	T	$12(-1.923) + 3 \left[\frac{11}{25} (-.961) - .962 \right] + 12 \left[\frac{11}{25} (-.481) - 1.442 \right] = -47.074$							
		U	$= -53.369$		53.369		1.182	2.437		153.73
	TR 2	T	$10(-1.923) + 5.75 \left[\frac{14}{25} (-.481) - 1.442 \right] = -29.070$		29.070					83.74
	TR 3	T	$9.5(-1.923) + 5.9375 \left[\frac{14}{25} (-.961) - .962 \right] + 9.5 \left[\frac{24}{25} (-.481) - 1.442 \right] = -44.713$		44.713					128.80
	TR 4	T	$10(-1.923) + 4.6 \left[\frac{16}{25} (-.961) - .962 \right] + 9.5 \left[\frac{24}{25} (-.481) - 1.442 \right] + 9.5 \left[\frac{12}{25} (-.481) - 1.442 \right] = -60.828$		60.828					175.22
	TR 5	T	$9.5(-1.923) + 2.75 \left[\frac{16}{25} (-.961) - .962 \right] + 9.5 \left[\frac{24}{25} (-.481) - .962 \right] + 7.5 \left[\frac{16}{25} (-.481) - 1.442 \right] + 7.5 \left[\frac{12}{25} (-.481) - 1.442 \right] = -64.449$		64.449		1.182	2.437		185.65
L5L6								0	0	
L6L7 L7L8	H15	T	$12(+1.25) + 3 \left[\frac{11}{25} (+.417) + .833 \right] = +18.049$							
		U	$12(25)(+2.5) + 9.75(+1.25) = +27.188$	27.188		1.222		2.437	80.97	
	H515	T	$12(+1.25) + 3 \left[\frac{11}{25} (+.417) + .833 \right] + 12 \left[\frac{11}{25} (+.417) + .833 \right] = +28.848$	28.848		1.222		2.437	85.91	
		U	$= +27.188$							
	TR 2	T	$10(+1.25) + 5.75 \left[\frac{14}{25} (.417) + .833 \right] = +18.632$	18.632		1.222		2.437	55.49	
	TR 3	T	$9.5(+1.25) + 5.9375 \left[\frac{14}{25} (.417) + .833 \right] + 9.5 \left[\frac{24}{25} (.417) + .833 \right] = +27.272$	27.272					81.22	
	TR 4	T	$10(+1.25) + 4.6 \left[\frac{16}{25} (.417) + .833 \right] + 9.5 \left[\frac{24}{25} (.417) + .833 \right] + 9.5 \left[\frac{12}{25} (.417) + .833 \right] = +38.028$	38.028					113.25	
	TR 5	T	$9.5(+1.25) + 2.75 \left[\frac{16}{25} (.417) + .833 \right] + 9.5 \left[\frac{24}{25} (.417) + .833 \right] + 7.5 \left[\frac{16}{25} (.417) + .833 \right] + 7.5 \left[\frac{12}{25} (.417) + .833 \right] = +39.223$	39.223		1.222		2.437	116.81	
L1U2	H15	T	$12(+.745) + 3 \left[\frac{11}{25} (.186) + .559 \right] = +10.862$							
		U	$12(25)(+.745) + 9.75(.745) = +25.150$	25.150		1.235		2.437	75.69	
		T	$12(-.745) + 3 \left[\frac{11}{25} (-.372) + .373 \right] = -10.560$							
		U	$12(25)(-.745) + 9.75(-.745) = -13.972$		13.972		1.174	2.437		39.97
	H515	T	$12(+.745) + 3 \left[\frac{11}{25} (.372) + .373 \right] + 12 \left[\frac{11}{25} (.186) + .559 \right] = +18.240$							
		U	$+25.150$	25.150		1.235		2.437	75.69	
		T	$12(-.745) + 12 \left[\frac{36}{25} (-.745) \right] + 3 \left[\frac{22}{25} (-.745) \right] = -16.360$		16.36		1.174	2.437		46.81

Br. H22 GASTON
LIVE LOAD BAR FORCES

BAR	VEHICLE	TRUCK (T) or UNIF. (U)	BAR FORCE (KIPS)	CONTROL		IMPACT		DIST. FACTOR	TOTAL LIVE LOAD BAR FORCE	
				TEN +	COMP -	TEN +	COMP -		TEN. +	COMP. -
									(KIPS)	(KIPS)
L1U2	TRA2	T	$10(+.745) + 5.9375 \left[\frac{11}{25}(.186) + .559 \right] = + 11.135$	11.135		1.235		2.437	33.51	
		T	$10(-.745) + 5.9375 \left[\frac{11}{25}(-.372) - .373 \right] = - 10.536$		10.536		1.174			30.14
	TRA3	T	$9.5(+.745) + 5.9375 \left[\frac{14}{25}(.1372) + .373 \right] + 9.5 \left[\frac{24}{25}(.186) + .559 \right] = + 17.324$	17.324		1.235			52.14	
		T	$9.5(-.745) + 5.9375 \left[\frac{14}{25}(-.745) \right] + 9.5 \left[\frac{24}{25}(-.745) \right] = - 14.510$		14.510		1.174			41.51
	TRA4	T	$10(.745) + 4.6 \left[\frac{41}{50}(.745) \right] + 9.5 \left[\frac{96}{100}(.745) \right] + 9.5 \left[\frac{92}{100}(.745) \right] = + 23.566$	23.566		1.235			70.93	
		T	$10(-.745) + 4.6 \left[\frac{41}{50}(-.745) \right] + 9.5 \left[\frac{96}{100}(-.745) \right] + 9.5 \left[\frac{92}{100}(-.745) \right] = - 20.866$		20.866		1.174			59.70
	TRA5	T	$9.5(.745) + 2.75 \left[\frac{35}{50}(.745) \right] + 7.5 \left[\frac{46}{100}(.745) \right] + 7.5 \left[\frac{91}{100}(.745) \right] + 7.5 \left[\frac{97}{100}(.745) \right] = + 24.969$	24.969		1.235			75.15	
		T	$9.5(-.745) + 2.75 \left[\frac{35}{50}(-.745) \right] + 7.5 \left[\frac{46}{100}(-.745) \right] + 7.5 \left[\frac{91}{100}(-.745) \right] + 7.5 \left[\frac{97}{100}(-.745) \right] = - 23.617$		23.617		1.174	2.437		67.57
	H15	T	$12(+.257) + 3 \left[\frac{11}{25}(.257) \right] = + 3.423$							
		U	$12(25)(+.257) + 9.25(.257) = + 4.047$	4.047		1.3		2.437	12.98	
		T	$12(-.1198) + 3 \left[\frac{36}{50}(-.1198) \right] = - 16.964$							
		U	$12(25)(-.337) + 9.25(-.1198) = - 31.703$		31.703		1.145	2.437		88.46
	HS15	T	$12(.257) + 12 \left[\frac{14}{25}(.257) \right] = + 4.441$	4.441		1.3		2.437	14.07	
		U	$+ 4.047$							
		T	$12(-.1198) + 12 \left[\frac{36}{50}(-.1198) \right] + 3 \left[\frac{22}{50}(-.1198) \right] = - 26.308$							
		U	$= - 31.703$		31.703		1.145	2.437		88.46
	TRA2	T	$10(.257) + 5.75 \left[\frac{14}{25}(.257) \right] = + 3.398$	3.398		1.3			10.77	
		T	$10(-.1198) + 5.75 \left[\frac{39}{50}(-.1198) \right] = - 17.353$		17.353		1.145			48.42
	TRA3	T	$9.5(.257) + 9.5 \left[\frac{21}{25}(.257) \right] + 5.9375 \left[\frac{12}{25}(.257) \right] = + 5.103$	5.103		1.3			16.17	
		T	$9.5(-.1198) + 9.5 \left[\frac{46}{50}(-.1198) \right] + 5.9375 \left[\frac{35}{50}(-.1198) \right] = - 26.831$		26.831		1.145			74.87
	TRA4	T	$9.5(.257) + 9.5 \left[\frac{21}{25}(.257) \right] + 10 \left[\frac{17}{25}(.257) \right] + 4.6 \left[\frac{46}{50}(.257) \right] = + 6.618$	6.618		1.3			20.97	
		T	$9.5(-.1198) + 9.5 \left[\frac{46}{50}(-.1198) \right] + 10 \left[\frac{42}{50}(-.1198) \right] + 4.6 \left[\frac{33}{50}(-.1198) \right] = - 35.552$		35.552		1.145			99.20
L3U4	H15	T	$9.5(.257) + 9.5 \left[\frac{21}{25}(.257) \right] + 7.5 \left[\frac{12}{25}(.257) \right] + 7.5 \left[\frac{86}{100}(.257) \right] = + 6.034$	6.034		1.3			19.12	
		T	$7.5(-.1198) + 7.5 \left[\frac{46}{50}(-.1198) \right] + 9.5 \left[\frac{37}{50}(-.1198) \right] + 9.5 \left[\frac{33}{50}(-.1198) \right] + 2.75 \left[\frac{22}{50}(-.1198) \right] = - 34.634$		34.634		1.145	2.437		96.64
		T	$12(+.1284) + 3 \left[\frac{61}{50}(.1284) \right] = + 18.541$	27.927		1.222		2.437	83.17	
		U	$12(25)(+.2568) + 9.25(.1284) = + 27.927$							
	H15	T	$12(-.367) + 3 \left[\frac{86}{100}(-.367) \right] = - 5.351$							
		U	$12(25)(-1.1) + 9.25(-.367) = - 10.178$		10.178		1.182	2.437		29.32
		T	$12(.1284) + 12 \left[\frac{61}{50}(.1284) \right] + 3 \left[\frac{17}{25}(.1284) \right] = + 30.354$	30.354		1.222		2.437	90.39	
		U	$+ 27.927$							
	HS15	T	$12(-.367) + 12 \left[\frac{86}{100}(-.367) \right] + 3 \left[\frac{72}{100}(-.367) \right] = - 8.984$							
		U	$= - 10.178$		10.178		1.182	2.437		29.32

Br. H22 GASTON
LIVE LOAD BAR FORCES

BAR	VEHICLE	TRUCK (T) or UNIF. (U)	BAR FORCE (KIPS)	CONTROL		IMPACT		DIST. FACTOR	TOTAL LIVE LOAD BAR FORCE	
				TEN +	COMP -	TEN +	COMP -		TEN. +	COMP. -
									(KIPS)	(KIPS)
L344	TR 2	T	$10(1.284) + 5.75 \left[\frac{64}{93} (1.284) \right] = +19.140$	19.14		1.222		2.437	57.0	
		T	$10(-.367) + 5.75 \left[\frac{89}{100} (-.367) \right] = -5.548$		5.548		1.182			15.98
	TR 3	T	$9.5(1.284) + 9.5 \left[\frac{71}{75} (1.284) \right] + 5.9375 \left[\frac{63}{93} (1.284) \right] = +29.844$	29.844		1.222			88.88	
		T	$9.5(-.367) + 9.5 \left[\frac{90}{100} (-.367) \right] + 5.9375 \left[\frac{85}{100} (-.367) \right] = -8.686$		8.686		1.182			25.02
	TR 4	T	$9.5(1.284) + 9.5 \left[\frac{71}{75} (1.284) \right] + 10 \left[\frac{63}{93} (1.284) \right] + 4.6 \left[\frac{55}{93} (1.284) \right] = +39.783$	39.783		1.222			118.47	
		T	$9.5(-.367) + 9.5 \left[\frac{90}{100} (-.367) \right] + 10 \left[\frac{92}{100} (-.367) \right] + 4.6 \left[\frac{83}{100} (-.367) \right] = -11.611$		11.611		1.182			33.45
	TR 5	T	$7.5(1.284) + 7.5 \left[\frac{71}{75} (1.284) \right] + 9.5 \left[\frac{63}{93} (1.284) \right] + 9.5 \left[\frac{55}{93} (1.284) \right] + 2.75 \left[\frac{47}{93} (1.284) \right] = +40.476$	40.476		1.222			120.54	
		T	$7.5(-.367) + 7.5 \left[\frac{90}{100} (-.367) \right] + 9.5 \left[\frac{87}{100} (-.367) \right] + 9.5 \left[\frac{80}{100} (-.367) \right] + 2.75 \left[\frac{72}{100} (-.367) \right] = -12.049$		12.049		1.182	2.437		34.71
U4LS	H15	T	$12(+1.0) + 3 \left[\frac{11}{125} (1.0) \right] = +14.664$							
		U	$12(25)(+3.0) + 9.75(+1.0) = +27.75$	27.75		1.182		2.437	79.93	
	HS15	T	$12(+1.0) + 12 \left[\frac{11}{125} (1.0) \right] + 3 \left[\frac{97}{125} (1.0) \right] = +24.984$							
		U	+27.75	27.75		1.182			77.93	
	TR 2	T	$10(1.0) + \left[\frac{14}{125} (1.0) \right] 5.75 = +15.244$	15.244					43.91	
	TR 3	T	$9.5(1.0) + \left[\frac{11}{125} (1.0) \right] 9.5 + 5.9375 \left[\frac{120}{125} (1.0) \right] = +23.921$	23.921					68.91	
	TR 4	T	$9.5(1.0) + 9.5 \left[\frac{11}{125} (1.0) \right] + 10 \left[\frac{12}{125} (1.0) \right] + 4.6 \left[\frac{108}{125} (1.0) \right] = +32.030$	32.030					92.26	
	TR 5	T	$9.5(1.0) + 2.75 \left[\frac{13}{125} (1.0) \right] + 9.5 \left[\frac{12}{125} (1.0) \right] + 7.5 \left[\frac{112}{125} (1.0) \right] + 7.5 \left[\frac{108}{125} (1.0) \right] = +33.288$	33.286		1.182		2.437	95.80	
L5U6	H15	T	$12(-1.283) + 3 \left[\frac{86}{100} (-1.283) \right] = -18.706$							
		U	$.24(25)(-4.278) + 9.75(-1.283) = -38.177$		38.177		1.2	2.437		111.64
	HS15	T	$12(-1.283) + 12 \left[\frac{86}{100} (-1.283) \right] + 3 \left[\frac{72}{100} (-1.283) \right] = -31.408$							
		U	-38.177		38.177		1.2	2.437		111.64
	TR 2	T	$10(-1.283) + 5.75 \left[\frac{87}{100} (-1.283) \right] = -19.396$		19.396					56.72
	TR 3	T	$9.5(-1.283) + 9.5 \left[\frac{90}{100} (-1.283) \right] + 5.9375 \left[\frac{83}{100} (-1.283) \right] = -30.213$		30.213					88.35
	TR 4	T	$9.5(-1.283) + 9.5 \left[\frac{90}{100} (-1.283) \right] + 10 \left[\frac{92}{100} (-1.283) \right] + 4.6 \left[\frac{83}{100} (-1.283) \right] = -40.592$		40.592					118.71
	TR 5	T	$9.5(-1.283) + 2.75 \left[\frac{14}{125} (-1.283) \right] + 9.5 \left[\frac{90}{100} (-1.283) \right] + 7.5 \left[\frac{87}{100} (-1.283) \right] + 7.5 \left[\frac{80}{100} (-1.283) \right] = -42.224$		42.224		1.2	2.437		123.48
L6U7	H15	T	$12(-1.458) + 3 \left[\frac{61}{93} (-1.458) \right] = -21.054$							
		U	$.24(25)(-2.916) + 9.75(-1.458) = -31.712$		31.712		1.222	2.437		94.44
	HS15	T	$12(-1.458) + 12 \left[\frac{61}{93} (-1.458) \right] + 3 \left[\frac{47}{93} (-1.458) \right] = -34.467$		34.467		1.222	2.437		102.64
		U	-31.712							
	TR 2	T	$10(-1.458) + 5.75 \left[\frac{64}{93} (-1.458) \right] = -21.734$		21.734		1.222	2.437		64.72
	TR 3	T	$9.5(-1.458) + 9.5 \left[\frac{71}{75} (-1.458) \right] + 5.9375 \left[\frac{60}{93} (-1.458) \right] = -33.889$		33.889					100.92
	TR 4	T	$9.5(-1.458) + 9.5 \left[\frac{71}{75} (-1.458) \right] + 10 \left[\frac{63}{93} (-1.458) \right] + 4.6 \left[\frac{55}{93} (-1.458) \right] = -45.175$		45.175					134.53
	TR 5	T	$9.5(-1.458) + 2.75 \left[\frac{13}{125} (-1.458) \right] + 9.5 \left[\frac{71}{75} (-1.458) \right] + 7.5 \left[\frac{62}{93} (-1.458) \right] + 7.5 \left[\frac{55}{93} (-1.458) \right] = -46.705$		46.705		1.222	2.437		139.09

Br. #22 GASTON
LIVE LOAD BAR FORCES

BAR	VEHICLE	TRUCK (T) or UNIF. (U)	BAR FORCE (KIPS)	CONTROL		IMPACT		DIST. FACTOR	TOTAL LIVE LOAD BAR FORCE	
				TEN +	COMP -	TEN +	COMP -		TEN. +	COMP. -
									(KIPS)	(KIPS)
U7L8	H15	T	$12(.972) + 3 \left[\frac{36}{30} (.972) \right] = + 13.764$							
		U	$124(25)(+1.452) + 9.75(.972) = + 18.225$	18.225		1.222		2.437	54.274	
		T	$12(-.486) + 3 \left[\frac{14}{30} (-.486) \right] = - 6.648$							
		U	$124(25)(-.486) + 9.75(-.486) = - 7.655$		7.655		1.222	2.437		22.80
	HS15	T	$12(.972) + 12 \left[\frac{36}{30} (.972) \right] + 3 \left[\frac{22}{30} (.972) \right] = + 21.345$	21.345		1.222		2.437	63.57	
		U	$+ 18.225$							
		T	$12(-.486) + 12 \left[\frac{14}{30} (-.486) \right] = - 9.098$		9.098		1.222	2.437		27.09
		U	$- 7.655$							
	TR2	T	$10(.972) + 5.75 \left[\frac{36}{30} (.972) \right] = + 13.744$	13.744		1.222			40.93	
		T	$10(-.486) + 5.75 \left[\frac{14}{30} (-.486) \right] = - 6.425$		6.425		1.222			19.13
	TRB	T	$9.5(.972) + 9.5 \left[\frac{46}{30} (.972) \right] + 5.9375 \left[\frac{32}{30} (.972) \right] = + 21.769$	21.769		1.222			64.83	
		T	$9.5(-.486) + 9.5 \left[\frac{21}{30} (-.486) \right] + 5.9375 \left[\frac{15}{30} (-.486) \right] = - 9.65$		9.65		1.222			28.74
	TRA	T	$9.5(.972) + 9.5 \left[\frac{46}{30} (.972) \right] + 10 \left[\frac{42}{30} (.972) \right] + 4.6 \left[\frac{32}{30} (.972) \right] = + 28.845$	28.845		1.222			85.90	
		T	$9.5(-.486) + 9.5 \left[\frac{21}{30} (-.486) \right] + 10 \left[\frac{16}{30} (-.486) \right] + 4.6 \left[\frac{8}{30} (-.486) \right] = - 12.515$		12.515		1.222			37.27
	TRAS	T	$9.5(.972) + 2.75 \left[\frac{567}{16.67} (.972) \right] + 9.5 \left[\frac{46}{30} (.972) \right] + 7.5 \left[\frac{37}{30} (.972) \right] + 7.5 \left[\frac{32}{30} (.972) \right] = + 28.844$	28.844		1.222			85.90	
		T	$9.5(-.486) + 9.5 \left[\frac{21}{30} (-.486) \right] + 7.5 \left[\frac{12}{30} (-.486) \right] + 7.5 \left[\frac{8}{30} (-.486) \right] = - 11.411$		11.411		1.222	2.437		33.98
U121	H15	T	$12(-1.0) + 3 \left[\frac{11}{25} (-1.0) \right] = - 13.32$							
		U	$124(25)(-1.0) + 9.75(-1.0) = - 15.75$		15.75		1.286	2.437		49.36
	HS15	T	$12(-1.0) + 3 \left[\frac{11}{25} (-1.0) \right] + 12 \left[\frac{11}{25} (-1.0) \right] = - 18.60$		18.60		1.286	2.437		58.29
		U	$= - 15.75$							
	TR2	T	$10(-1.0) + 5.75 \left[\frac{14}{25} (-1.0) \right] = - 13.22$		13.22		1.286	2.437		41.43
	TR3	U	$9.5(-1.0) + 9.5 \left[\frac{21}{25} (-1.0) \right] + 5.9375 \left[\frac{14}{25} (-1.0) \right] = - 20.805$		20.805					65.20
	TRA	T	$10(-1.0) + 4.6 \left[\frac{16}{25} (-1.0) \right] + 9.5 \left[\frac{21}{25} (-1.0) \right] + 9.5 \left[\frac{17}{25} (-1.0) \right] = - 27.384$		27.384					85.82
	TRAS	U	$9.5(-1.0) + 9.5 \left[\frac{21}{25} (-1.0) \right] + 2.75 \left[\frac{10}{25} (-1.0) \right] + 1.5 \left[\frac{16}{25} (-1.0) \right] + 7.5 \left[\frac{12}{25} (-1.0) \right] = - 26.98$		26.98		1.286	2.437		84.55
U222	H15	T	$12(.033) + 3 \left[\frac{36}{30} (.033) \right] = + .467$							
		U	$124(25)(+.067) + 9.75(.033) = + .724$	.724		1.222		2.437	2.16	
		T	$12.0(-.033) + 3.0 \left[\frac{86}{100} (-.033) \right] = - .461$							
		U	$124(25)(-.1) + 9.75(-.033) = - .922$		.922		1.182	2.437		2.66
	HS15	T	$12(.033) + 3 \left[\frac{36}{30} (.033) \right] + 12 \left[\frac{36}{30} (.033) \right] = + .752$	.752		1.222		2.437	2.24	
		U	$= + .724$							
		T	$12(-.033) + 12 \left[\frac{36}{100} (-.033) \right] + 3 \left[\frac{22}{100} (-.033) \right] = - .808$							
		U	$- .922$		.922		1.182	2.437		2.66

Br. #22 GASTON
LIVE LOAD BAR FORCES

BAR	VEHICLE	TRUCK (T) or UNIF. (U)	BAR FORCE (KIPS)	CONTROL		IMPACT		DIST. FACTOR	TOTAL LIVE LOAD BAR FORCE	
				TEN +	COMP -	TEN +	COMP -		TEN. +	COMP. -
									(KIPS)	(KIPS)
U2L2	TR 2	T	$10(1.033) + 5.75 \left[\frac{76}{30}(1.033) \right] = + .467$	.467		1.222		2.437	1.39	
		T	$10(-1.033) + 5.75 \left[\frac{76}{30}(-1.033) \right] = - .499$		.499		1.182	↑		1.44
	TR 3	T	$9.5(1.033) + 5.9375 \left[\frac{39}{30}(1.033) \right] + 9.5 \left[\frac{46}{30}(1.033) \right] = + .755$	.755		1.222		↑	2.25	
		T	$9.5(-1.033) + 5.9375 \left[\frac{39}{30}(-1.033) \right] + 9.5 \left[\frac{46}{30}(-1.033) \right] = - .781$		.781		1.182	↑		2.25
	TR 4	T	$10(1.033) + 4.16 \left[\frac{41}{30}(1.033) \right] + 9.5 \left[\frac{46}{30}(1.033) \right] + 9.5 \left[\frac{42}{30}(1.033) \right] = + 1.006$	1.006		1.222		↑	3.00	
		T	$9.5(-1.033) + 9.5 \left[\frac{46}{30}(-1.033) \right] + 10 \left[\frac{42}{30}(-1.033) \right] + 4.16 \left[\frac{43}{30}(-1.033) \right] = - 1.044$		1.044		1.182	↑		3.01
	TR 5	T	$9.5(1.033) + 9.5 \left[\frac{46}{30}(1.033) \right] + 7.75 \left[\frac{35}{30}(1.033) \right] + 7.5 \left[\frac{46}{30}(1.033) \right] + 7.5 \left[\frac{35}{30}(1.033) \right] = + 1.052$	1.052		1.222		↓	3.13	
		T	$9.5(-1.033) + 2.75 \left[\frac{35}{30}(-1.033) \right] + 9.5 \left[\frac{46}{30}(-1.033) \right] + 7.5 \left[\frac{43}{30}(-1.033) \right] + 7.5 \left[\frac{43}{30}(-1.033) \right] = - 1.106$		1.106		1.182	↓		3.19
U3L3	H15	T	$12(-1.0) + 3 \left[\frac{11}{25}(-1.0) \right] = - 13.32$							
		U	$12(25)(-1) + 9.75(-1) = - 15.75$		15.75		1.286	2.437		49.36
	H515	T	$12(-1.0) + 3 \left[\frac{4}{25}(-1) \right] + 12 \left[\frac{4}{25}(-1) \right] = - 18.60$		18.60		1.286	2.437		58.29
		U	$= - 15.75$							
	TR 2	T	$10(-1) + 5.75 \left[\frac{10}{25}(-1) \right] = - 13.22$		13.22		1.286	2.437		41.43
	TR 3	U	$9.5(-1) + 9.5 \left[\frac{2}{25}(-1) \right] + 5.9375 \left[\frac{4}{25}(-1) \right] = - 20.805$		20.805		↑	↑		65.20
	TR 4	T	$10(-1) + 4.16 \left[\frac{16}{25}(-1) \right] + 9.5 \left[\frac{2}{25}(-1) \right] + 9.5 \left[\frac{17}{25}(-1) \right] = - 27.384$		27.384		↓	↓		85.82
	TR 5	U	$9.5(-1) + 9.5 \left[\frac{2}{25}(-1) \right] + 7.75 \left[\frac{10}{25}(-1) \right] + 7.5 \left[\frac{16}{25}(-1) \right] + 7.5 \left[\frac{12}{25}(-1) \right] = - 26.98$		26.98		1.286	2.437		84.55
U4L4	H15	T	$12(-1.0) + 3 \left[\frac{10}{25}(-1) \right] = - 14.58$							
		U	$12(25)(-3.214) + 9.75(-1.0) = - 29.034$		29.034		1.133	2.437		80.17
	H515	T	$12(-1) + 12 \left[\frac{10}{25}(-1) \right] + 3 \left[\frac{10}{25}(-1) \right] = - 16.74$							
		U	$= - 29.034$		29.034		1.133	2.437		80.17
	TR 2	T	$10(-1) + 5.75 \left[\frac{10}{25}(-1) \right] = - 15.118$		15.118		↑	↑		41.74
	TR 3	U	$9.5(-1) + 9.5 \left[\frac{10}{25}(-1) \right] + 5.9375 \left[\frac{10}{25}(-1) \right] = - 23.667$		23.667		↓	↓		65.35
	TR 4	T	$10(-1) + 4.16 \left[\frac{16}{25}(-1) \right] - .536 + 9.5 \left[\frac{10}{25}(-1) \right] + 9.5 \left[\frac{10}{25}(-1) \right] = - 31.692$		31.692		↓	↓		87.51
	TR 5	U	$9.5(-1) + 2.75 \left[\frac{10}{25}(-1) \right] - .536 + 9.5 \left[\frac{10}{25}(-1) \right] + 7.5 \left[\frac{10}{25}(-1) \right] + 7.5 \left[\frac{10}{25}(-1) \right] = - 33.559$		33.559		1.133	2.437		92.66
U5L5	H15	T								
		U			15.75		1.286	2.437		49.36
	H515	T			18.60		1.286	2.437		58.29
		U								
	TR 2	T			13.22		1.286	2.437		41.43
	TR 3	U			20.805		↓	↓		65.20
	TR 4	T			27.384		↓	↓		85.82
	TR 5	U			26.98		1.286	2.437		84.55

Same as U4L4
U5L4
U3

BAR FORCES							TRUCK	AVAILABLE LIVE LOAD CAPACITY																	
DEAD LOAD			LIVE LOAD + IMPACT		Max. BAR FORCE			BAR CAPACITY						INVENTORY						OPERATING					
TEN +	COMP -		TEN +	COMP -	TEN +	COMP -		TEN. +			COMP -			TEN +			COMP -								
(KIPS)	(KIPS)		(KIPS)	(KIPS)	(KIPS)	(KIPS)		@ 100%	@ 98%	@ 93%	@ 100%	@ 98%	@ 93%	@ 100%	@ 98%	@ 93%	@ 100%	@ 98%	@ 93%						
U0U1	+ .80	0	+ 79.93	- 97.16	+ 80.73	- 96.36	H	241.20	236.38	224.32	184.75	181.06	171.82	328.30	321.73	305.32	230.44	225.83	214.31						
U1U2			+ 79.93	- 103.10	+ 80.73	- 102.30	H5																		
			+ 43.55	- 66.59	+ 44.35	- 65.79	TR2																		
			+ 66.98	- 97.46	+ 67.78	- 96.66	TR3																		
			+ 91.12	- 135.90	+ 91.92	- 135.10	TR4																		
			+ 97.49	- 140.18	+ 98.29	- 139.38	TR5																		
U2U3	+ 212.64	0	+ 166.52	- 67.47	+ 379.16	+ 145.17	H	428.76	420.18	398.75	356.09	348.97	331.16	583.59	571.92	542.74	444.05	435.17	412.97						
U3U4			+ 166.52	- 71.61	+ 379.16	+ 141.03	H5																		
			+ 89.82	- 38.88	+ 302.46	+ 173.76	TR2																		
			+ 139.75	- 68.04	+ 352.39	+ 144.6	TR3																		
			+ 190.11	- 94.40	+ 402.75	+ 118.24	TR4																		
			+ 121.21	- 91.16	+ 333.85	+ 121.48	TR5																		
U4U5	+ 177.62	0	+ 100.54	0	+ 278.16	0	H	302.58	296.53	281.40	—	—	—	411.85	403.61	383.02	—	—	—						
U5U6			+ 100.54	0	+ 278.16	0	H5																		
			+ 61.41	0	+ 239.03	0	TR2																		
			+ 89.14	0	+ 266.76	0	TR3																		
			+ 125.13	0	+ 302.75	0	TR4																		
			+ 130.15	0	+ 307.77	0	TR5																		
U6U7	0	0	0	0	0	0	A11	202.14			160.21			275.14			199.85								
U7U8	0	- 84.66	0	- 94.44	0	- 179.10	H	—	—	—	328.56	321.99	305.56	—	—	—	409.72	401.53	381.04						
			0	- 94.44	0	- 179.10	H5																		
			0	- 52.92	0	- 137.58	TR2																		
			0	- 82.56	0	- 167.22	TR3																		
			0	- 110.59	0	- 195.25	TR4																		
			0	- 118.11	0	- 202.77	TR5																		
U0L1	0	- 0.89	+ 108.33	- 89.25	+ 107.44	- 90.14	H	241.20	236.38	224.32	170.34	166.93	158.42	328.30	321.73	305.32	212.51	208.26	197.63						
			+ 114.71	- 89.25	+ 113.82	- 90.14	H5																		
			+ 73.35	- 48.63	+ 72.46	- 49.52	TR2																		
			+ 108.63	- 74.84	+ 107.74	- 75.73	TR3																		
			+ 151.51	- 106.77	+ 150.62	- 102.66	TR4																		
			+ 156.46	- 107.79	+ 155.57	- 108.68	TR5																		

[illegible]

BAR	BAR CAPACITY (BC) @ 100 %		TEN + COMP- CONTROL (±)	DEAD LOAD (DL) (KIPS)	LIVE LOAD BAR (L) FORCE (KIPS)	AVAILABLE LIVE LOAD CAPACITY (ALLC) _I (KIPS) (Inventory)	INVENTORY @ 100%						OPERATING @ 100 %							
	INV. (KIPS)	OPER (KIPS)					RATING (TONS) RATING = $\frac{(ALLC)_I}{LL} (W)$						AVAILABLE LIVE LOAD CAPACITY (ALLC) _O (KIPS)	RATING (TONS) RATING = $\frac{(ALLC)_O}{LL} (W)$						
							H 15	HS 15	TR 2 15.75	TR 3 24.9375	TR 4 33.6	TR 5 36.75		H 15	HS 15	TR 2 15.75	TR 3 24.9375	TR 4 33.6	TR 5 36.75	
U0U1	241.2	328.30	+	+ .80		+240.4	45.1	45.1	86.9	89.5	88.6	90.6	+327.5	61.4	61.4	118.4	121.9	120.8	123.5	
U1U2	184.75	230.44	-			-185.55	28.6	27.0	43.9	47.5	45.9	48.6	-231.24	35.7	33.6	54.7	59.2	57.2	60.6	
			CON				-28.6	-27.0	-43.9	-47.5	-45.9	-48.6		-35.7	-33.6	-54.7	-59.2	-57.2	-60.6	
U2U3	428.76	583.59	+	+212.64		+216.12	19.5	19.5	37.9	38.6	38.2	65.5								
U3U4	356.09	444.05	-				BAR DOES NOT GO INTO COMPRESSION													
			CON				+19.5	+19.5	+37.9	+38.6	+38.2	+65.5								
U4U5	302.58	411.85	+	+177.62		+124.96	18.6	18.6	32.0	35.0	33.6	35.3								
U5U6	—	—	-				NO COMPRESSION													
			CON				+18.6	+18.6	+32.0	+35.0	+33.6	+35.3								
U6U7			+																	
			-																	
			CON																	
U7U8	—	—	+				No Tension													
	328.56	409.72	-	-84.66		-243.90	38.7	38.7	37.2	37.7	38.0	38.9								
			CON				-38.7	-38.7	-37.2	-37.7	-38.0	-38.9								
U0L1	241.2	328.3	+			+242.09	33.5	31.7	52.0	55.6	53.7	56.9								
	170.34	212.51	-	-1.89		-169.45	28.5	28.5	54.9	56.5	55.9	57.8								
			CON				-28.5	-28.5	+52.0	+55.6	+53.7	+56.9								
L1L2	368.10	501.03	+			+453.36	62.7	59.8	78.6	139.5	100.2	104.8								
	304.09	379.21	-	-85.26		-218.83	24.5	24.5	47.2	48.6	48.1	48.8								
			CON				-24.5	-24.5	-47.2	-48.6	-48.1	-48.8								
L2L3	368.10	501.03	+			+453.52	62.6	46.1	98.6	98.9	100.0	104.6								
	303.11	378.93	-	-85.42		-217.69	24.3	24.3	46.9	48.3	47.8	49.4								
			CON				-24.3	-24.3	-46.9	-48.3	-47.8	-49.4								
L3L4	—	—	+				No Tension													
L4L5	505.29	630.14	-	-279.36		-225.93	22.0	22.0	42.5	43.7	43.3	44.7								
			CON				-22.0	-22.0	-42.5	-43.7	-43.3	-44.7								
L5L6			+				No stress													
			-																	
			CON																	
L6L7	241.20	328.30	+	+126.43		+114.77	21.3	20.0	32.6	35.2	34.1	36.1								
L7L8	—	—	-				No Compression													
			CON				+21.3	+20.0	+32.6	+35.2	+34.1	+36.1								

BAR	BAR CAPACITY (BC) @ %		TEN + COMP- CONTROL (±)	DEAD LOAD (DL) (KIPS)	LIVE LOAD BAR (L) FORCE (KIPS)	AVAILABLE LIVE LOAD CAPACITY (ALLC) _I (KIPS)	INVENTORY @ %						OPERATING @ %						
	INV. (KIPS)	OPER (KIPS)					RATING (TONS) RATING = $\frac{(ALLC)_I}{LL} (W)$						AVAILABLE LIVE LOAD CAPACITY (ALLC) _O (KIPS)	RATING (TONS) RATING = $\frac{(ALLC)_O}{LL} (W)$					
							H 15	HS 15	TR 2 15.75	TR 3 24.9375	TR 4 33.6	TR 5 36.75		H 15	HS 15	TR 2 15.75	TR 3 24.9375	TR 4 33.6	TR 5 36.75
L1 U2	229.5	312.38	+	+93.86		+135.64	26.9	26.9	63.8	64.9	64.3	66.3							
	117.74	147.03	-				No Compression												
			CON				+26.9	+26.9	+63.8	+64.9	+64.3	+66.3							
U2 L3	395.82	538.76	+				No Tension												
	297.24	370.75	-	-157.54		-139.70	23.7	23.7	45.4	46.5	47.3	53.1							
			CON				-23.7	-23.7	-45.4	-46.5	-47.3	-53.1							
L3 U4	176.94	240.84	+	+78.15		+98.79	17.8	16.4	27.3	27.7	28.0	30.1							
	77.79	97.00	-				No Compression												
			CON				+17.8	+16.4	+27.3	+27.7	+28.0	+30.1							
U4 L5	199.26	271.22	+	+121.31		+77.95	14.6	14.6	28.0	28.2	28.4	29.9							
			-				No Compression												
			CON				+14.6	+14.6	+28.0	+28.2	+28.4	+29.9							
L5 U6			+				No Tension												
	374.18	466.69	-	-218.90		-155.28	20.9	20.9	43.12	43.8	44.0	46.2							
			CON				-20.9	-20.9	-43.12	-43.8	-44.0	-46.2							
L6 U7			+				No Tension												
	284.17	354.41	-	-147.47		-136.70	21.7	20.0	33.3	37.8	34.1	36.1							
			CON				-21.7	-20.0	-33.3	-37.8	-34.1	-36.1							
U7 L8	116.46	158.52	+	+48.72			18.7	16.0	26.1	29.2	26.5	29.0							
	32.40	40.40	-				No Compression												
			CON				+18.7	+16.0	+26.1	+29.2	+26.5	+29.0							
U1 L1			+				No Tension												
	117.96	147.11	-	-45.20		-72.76	22.1	18.7	27.7	27.8	28.5	31.6							
			CON				-22.1	-18.7	-27.7	-27.8	-28.5	-31.6							
U2 L2	116.46	158.52	+	+2.35		+114.11	792.4	764.1	1293.0	1264.7	1278.0	1339.8							
	92.57	115.47	-			-94.92	535.3	535.3	No C	No C	1059.6	1093.5							
			CON				-535.3	-535.3	+1293.0	+1264.7	-1059.6	-1093.5							
U3 L3			+				No Tension												
	146.32	182.49	-	-46.05		-100.27	30.5	25.8	38.1	38.4	39.3	43.6							
			CON				-30.5	-25.8	-38.1	-38.4	-39.3	-43.6							
U4 L4			+				No Tension												
	290.20	361.93	-	-165.84		-124.36	23.3	23.3	46.9	47.5	47.7	49.3							
			CON				-23.3	-23.3	-46.9	-47.5	-47.7	-49.3							

[illegible]