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INVESTIGATION OF BOYLSTON STREET BRIDGE

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Pages of "Investigation of Boylston Street Bridge" are un-numbered.

The purpose of this investigation is to inquire into the causes that led to the condemnation of the original structure; paying particular attention to the manner and methods of loading, the calculation of the resulting stresses and their intensities. In this we have been guided by the specifications of the Massachusetts Railroad Commission (December, 1901) and throughout the calculations have adopted their rulings for live loads, impact and allowable fibre stress.

The bridge itself is a pin-connected parabolic structure of steel and iron spanning the Boston & Albany Railroad tracks on Boylston street near Massachusetts avenue. It is composed of two systems of parabolic trusses on each side of the roadway which support, in addition to the readway itself, two sidewalks and, until recently, the tracks of the Boston Elevated Railway as well. Owing to the acute angle at which Boylston street crosses the railroad tracks it requires a span of 216 feet to carry the roadway over but 60 feet of railroad property. The skew there is such as to permit of but four floor beams to be in common with both systems of trusses, while the remaining floor beams rest on the abutment at one side. The floor beams are so connected to the systems of trusses that they equally distribute the loads to each of the two trusses composing a sy s tem.

The material of which the bridge is composed is for the most part of Bessemer steel. The floor beams, angles and channel bars, however, being of wrought iron.

77284

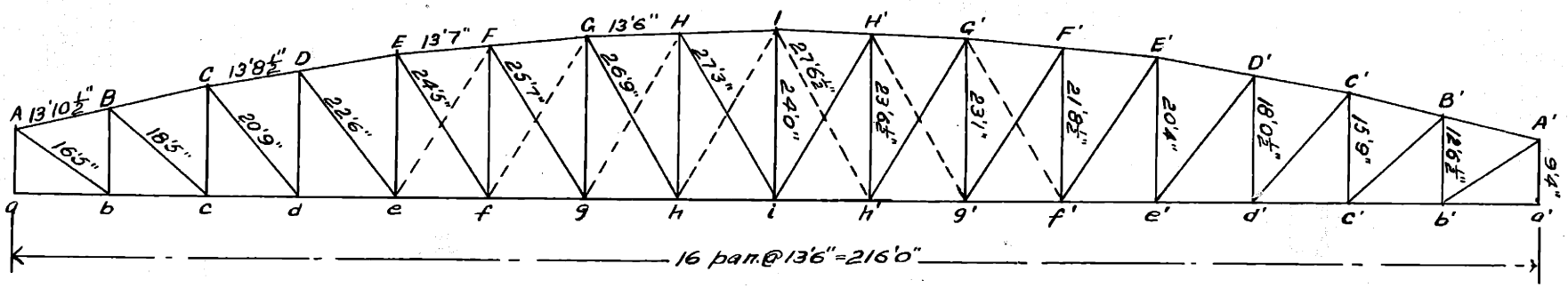
Since at each panel point the loads - both live and dead - differ, it was impossible to compute the stress for but one half of a truss and use the stress for the corresponding bars on the other half. The stress in each individual bar had to be considered alone; and to facilitate this calculation the method of using ordinates of influence lines was adopted. The ordinates for the influence line of each bar of one half of a truss were computed and since the truss is symmetrical about its centre the ordinates suffice for the other half as well. The ordinates at each of the panel points were then multiplied by the loading at that particular panel point to produce maximum stress in the bar under consideration. The computation of the ordinates for the influence lines of all the bars of one half the truss, though, laborious and somewhat tedious, will in similar cases be found in the end to be quite saving of time and labor; especially when investigating the actions of various bars under full and partial loadings.

For the dead loads to be used, it was decided that on account of the skew of the bridge no empirical formula or rule could be used with any reliance and accordingly the weights of the material used in the bridge were tabulated and figured. Moreover, this calculation of dead weight gave the actual stress in the truss to a much greater degree of accuracy. The only refinement that could then be added would be the disposition of the load between the upper and lower chord points.

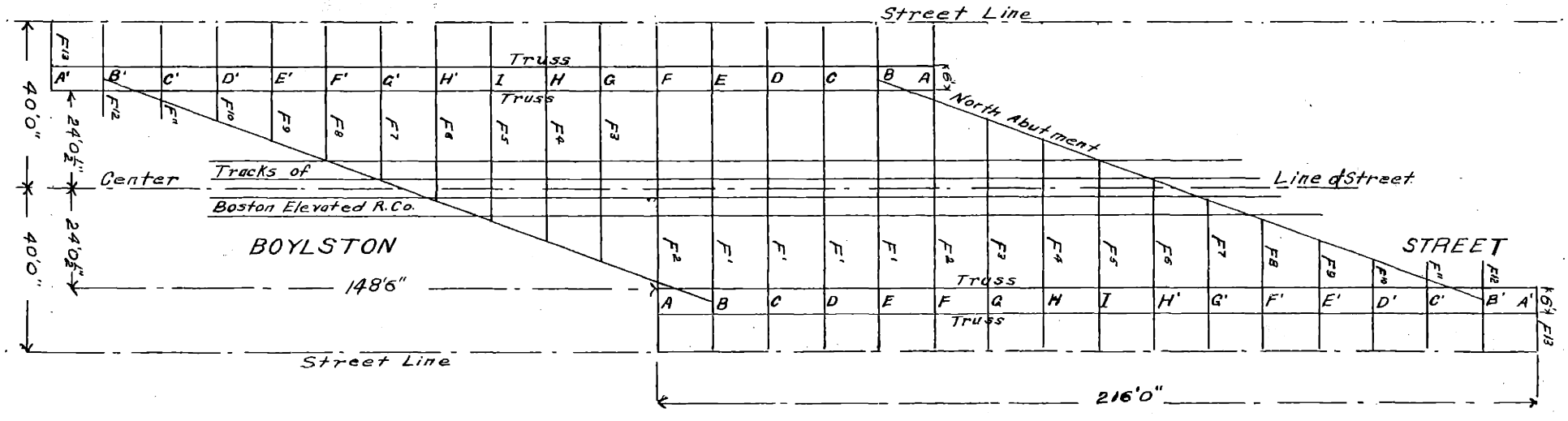
The live load was taken as 80 pounds per square foot covering entire floor surface up to two feet of rails, while

the moving load was that obtained from two lines of cars of type shown later. The actual loads were not used themselves but from two lines of cars an average load was found which with an excess enabled us to arrive at the same result.

DIAGRAM OF TRUSS



GENERAL PLAN



DEAD LOADS

MATERIALS. Steel-Upper chords;end posts;all eye bars 4" in width and over;chord pins and rollers.
Iron-All other parts of trusses and entire floor system.

Weight of Road-way.

Consider one full panel from curb to curb and from floor beam to floor beam-44' 7" X 13' 6".

4 rails at 115# per yd.=4 X 13.5/3 X 115	-2070#
Spruce planking at 2.5# per board ft. 44.6 X 13.5 X.17 X 30	-3060#
Hard pine planking at 4# per board ft. 44.6 X 13.5 X .25 X 48	-7230
Hard pine stringers - 8 - 5" X 12" 8 X 5 X 12/144 X 13.5 X 48	-2160
Hard pine stringers - 9 - 4" X 14" 9 X 4 X 14/144 X 13.5 X 48	-2270
Hard pine stringers - 4 - 10"X 14" 4 X 10 X 14/144 X 13.5 X 48	-2530
Total-	19330#

Weight per sq.ft. 19330/(44.6X13.5)=32.1#

Weight of wire ducts.

North side;
.48 sq.ft. incross section of concrete
.48 X 140 =67# concrete per linear ft.

Weight of wood -	16#	
" " concrete-	67	
" " 5 ducts & cable-	100	
	183#	per linear ft.
	2470 "	panel

South side;
.94 sq.ft. in cross section of concrete
.94 X 140 = 132# concrete per linear ft.

Weight of wood -	10#	
" " concrete-	132	
" " 4 ducts & cable-	80	
" " 3 Ts	28	
	250#	per linear ft.
	3380# "	panel.

North & South ducts- 5850#
Weight per sq.ft.=5850/(44.6 X 13.5)=9.7#
" of roadway - 32.1
Total per sq.ft. 41.8#

Weight of Side-Walk for one Bracket.
Area covered 17' 8 1/2" X 13' 6"

Hard pine planking 17.7 X 13.5 X .125 X 48-	1440#
" " stringers 8- 3" X 12"	
8 X 3 X 12/144 X 13.5 X 48-	1390
Hard pine riders- 2 - 4" X 6"	
2 X 4 X 6/144 X 17.7 X 48-	280
Hard pine stringer- 6"X 14"	
6 X 14/144 X 13.5 X48-	380
Facing planks at street line-2	
2.75 X 15/144 X 13.5 X 48-	190
Angle at curb-3 1/2" X 3 1/2" X 3/8"	
13.5 X 8.5 -	115
Bolts at curb-3/4"	
4.5 X 3 -	14
Fence-25# per ft.& 100# post in each panel	
13.5 X 25+100 =	438
Total-	4247#

Weight of roadway on floor beams.

Floor beam F^1 19330#
5850
25180#

F^2

Area supported=(44.6X6.75)+(39.67X6.75)+(4.92X6.75X.5)
=(6.75X84.27)+4.92X6.75X.5-
= 570+16.7 = 586.7 sq.ft.

Weight of roadway- 586.7X41.8 - 24500#

F^3

Area = 6.75(39.67 + 34.75) + 16.7
= 502 + 16.7 = 518.7 sq ft.

Weight of roadway- 21650#

F^4

Area = 6.75(34.75 + 29.83) + 16.7
= 430 + 16.7 = 446.7 sq.ft.

Weight of roadway- 18700#

F^5

18700
Constant difference 2900
15800 Weight of roadway- 15800#

F^6

Weight of roadway- 12900#

F^7

Weight of roadway- 10000#

F^8

Weight of roadway- 7100#

F^9

Weight of roadway- 4200#

F^{10}

Weight of roadway- 1300#

Weight of Floor Beams.

Mark	Pieces	Description	Wt. per ft.	Wt. piece	Total
F^1	2 Webs	43"X3/8"X37'1"	54.8	4065	
	4 Pls.	5"X7/16X37'1"	7.44	1100	
	2 "	5"X7/16"X27'4"	7.44	406	
	2 "	5"X7/16"X25'0"	7.44	372	
	4 Ls.	5"X31/2"X1/2"X37'1"	13.6	2023	
	2 "	5"X31/2"X1/2"X9'6"	13.6	261	
	4 Webs	$\frac{3'7"+2'1"}{2}$ X $\frac{3"X4'6"}{8}$	42.08	758	
	2(2 Webs	25"X3/8"X9'2"	31.88	584)+	
	2(2 "	$\frac{25"+9"}{2}$ X $\frac{5"X7'3"}{16}$	18.06	262)+	
	2(2 Ls.	5"X31/2"X1/2"X9'2"	13.6	249)+	
	2(4 "	31/2"X31/2"X7/16"X 7'3"	9.8	294)+	
	2(2 "	5"X312"X1/2"X13'8"	13.6	372)+	1761
					12505
	8 Pls.	71/2"X3/8"X2'91/2"	9.56	214	
	4 Ls.	3"X3/8"X3"X1'7"	7.2	46	
	4 "	31/2X31/2"X$\frac{3}{8}$"X1'7"	8.5	54	
	8 "	3"X3"X3/8"X2'3"	7.2	121	
	4 Pls.	12"X5/16"X1'11"	12.75	98	
	4 Ls.	41/2"X3"X1/2"X2'7"	11.9	123	
	2 Pls.	201/2"X3/8"X2'4"	26.14	122	
	2 "	201/2"X3/8"X1'11"	26.14	101	
	4 Ls.	41/2"X3"X1/2"X2'6"	11.9	119	
	8 Pls.	71/2"X$\frac{3}{8}$"X$\frac{1'3"+1'6"}{2}$	9.76	108	
	4 "	11"X3/8"X1'1"	14.03	61	
	4 "	61/2"X7/16"X2'1"	9.67	80	
	4 Ls.	3"X3"X7/16"X1'10"	8.3	61	
	2 Pls.	201/2"X3/8"X1'6"	26.14	78	
	2 Pls.	201/2"X3/8"X8'3"	26.14	216	
	70 Lat.Bar.	21/2"X3/8"X2'1"	3.19	464	2066

Total Weight of main section(i.e.of parts above dotted line) 12505#

Weight of rest of floor beam 2066 14571

Per cent of main section of additions- 16 5/10%

Mark	Pieces	Description	Wt.per ft.	Wt.piece	Total
F^1		Weight of iron work is taken from Cambria steel book and reduced 2% to give weight of iron.			
		Total			14571#
		2% reduction			291
				Total-	14280
F^2	2	Webs 43"X3/8"X34'10"	54.8	3820	
	4	" 1/2(43"+25")X3/8"X4'6"	42.08	758	
	2	" 25"X3/8"X2'6"	31.88	159	
	2	Ls. 5"X31/2"X1/2"X42'0"	13.6	1140	
	4	Pls. 5"X3/8"X34'7"	6.38	882	
	2	" 5"X3/8"X24'2 1/2"	6.38	308	
	2	" 5"X3/8"X23'7"	6.38	301	
	2	Ls. 5"X3 1/2"X1/2"X42'3"	13.6	1150	
	2	" 5"X3 1/2"X1/2"X4'9"	13.6	130	
	1	(Those parts of F marked thus)		1761	10409
		For this floor beam and the others the wt. of main section only is computed exactly; and increased 16 5/10% for the additions.			
		Additions 16 1/2%			1717
					12126
		2% reduction			242
				Total-	11884#
F^3	2	Webs 43"X3/8"X30'3"	54.8	5517	
	4	" 1/2X(43"+25")X3/8"X4'6"	42.08	758	
	2	" 25"X3/8"X1'7"	31.88	101	
	2	Pls. 5"X3/8"X24'1 1/2"	6.38	308	
	2	" " " " X25'9 1/2"	6.38	330	
	2	Ls. 5"X3"1/2"X1/2"X36'4"	13.6	988	
	2	" " " " X36'7"	13.6	995	
	2	" " " " X 4'9"	13.6	130	
	1	(Those parts of F' marked thus +)		1761	8690
		Additions 16 5/10%			1430
					10120
		Reduction 2%			202
				Total-	9918 #
F^4	2	Webs 35"X3/8"X25'4"	44.63	2260	
	2	" 1/2(35"+25")X3/8"X6'1"	38.25	465	
	2	" " " " " X4'6"	38.25	344	
	2	Pls. 5"X3/8"X20'6 3/4"	6.38	262	
	2	" " " X19'1 1/2"	6.38	244	
	2	Ls. 5"X3 1/2"X1/2"X31'8"	13.6	868	
	2	" " " " X36'6"	13.6	991	
	1	(Those parts of F' marked thus +)		1761	7181
		Additions 16 1/2%			1180
					8361
		Reduction 2%			167
				Total-	8194#

Mark	Pieces	Description	Wt.perft.	Wt. piece	Total
F^5	2 Webs	35"X3/8"X20'5"	44.63	1820	
	2 "	1/2(35"+25")X3/8"X6'1"	38.25	465	
	2 "	" " " " X4'6"	38.25	344	
	2 Ls.	5"X3 1/2"X1/2"X26'4"	13.6	716	
	2 "	" " " X31'2"	13.6	848	
	1(Those parts of F' marked thus +)			1761	5950
	Additions 16 1/2%				982
					6932
	Reduction 2%				139
				Total-	6793#
F^6	2 Webs	25"X3/8"X35'6 1/2"	31.88	2270	
	2 Pls.	3 1/2"X7/16X17'9"	5.21	185	
	2 "	" " X16'6"	5.21	172	
	2 Webs	1/2(25"+9")X3/8"X7'3"	18.06	262	
	4 Ls.	3 1/2"X3 1/2X7/16X42'9 1/2	9.8	1680	4569
	Additions 16 1/2%				754
					5323
	Reduction 2%				106
				Total	5217
F^7					
	2 Webs	25"X3/8"X30'7 1/2"	31.88	1960	
	2 "	1/2(25"+9")X3/8"X7'3"	18.06	262	
	4 Ls.	31/2X31/2X7/16X37'10 1/2"	9.8	1480	3702
	Additions 16 1/2%				611
					4313
	Reduction 2%				86
				Total-	4227
F^8	2 Webs	25"X3/8"X25'8 1/2"	31.88	1640	
	2 "	1/2(25"+9")X3/8"X7'3"	18.06	262	
	4 Ls.	31/2X31/2X7/16X32'11 1/2"	9.8	1290	3192
	Additions 16 1/2%				527
					3719
	Reduction 2%				74
				Total	3645
F^9	2 Webs	25"X3/8"X20'9 1/2"	31.88	1330	
	2 "	1/2(25"+9")X3/8"X7'3"	18.06	262	
	4 Ls.	31/2X31/2X7/16X28'0 1/2"	9.8	1100	2692
	Additions 16 1/2%				444
					3136
	Reduction 2%				63
				Total	3073

Mark	Pieces	Description	Wt. per ft.	Wt Piece	Total
F^{10}	2 Webs	25"X3/8"X15'10 1/2"	31.88	1020	
	2 "	1/2(25"+9")X3/8"X7'3"	18.06	262	
	4 Ls.	31/2X31/2X7/16X23'11/2"	9.8	906	2188
	Additions 16 1/2%				267
					2555
	Reduction 2%				51
				Total-	2504
F^{11}	2 Webs	25"X3/8"X14'7 1/2"	31.88	935	
	2 "	1/2(25"+9')X3/8"X7'3"	18.06	262	
F^{12}	4 Ls.	31/2X31/2X7/16X21'101/2"	9.8	858	2055
	Additions 16 1/2%				339
					2394
	Reduction 2%				48
				Total-	2346
F^{13}	1 Web	25"X3/8"X9'1"	31.88	290	
	1 Web	1/2(25"+9')X3/8"X7'3"	18.06	131	
	2 Ls.	5"X3 1/2"X1/2"X16'4"	13.6	444	865
	Addition 16 1/2%				142
					1007
	Reduction 2%				20
				Total-	987

Weight of Truss.

		Upper Chord			
AB	Pl.	22"X5/16"X13'101/2"	23.38	325	
	2 Ls.	31/2X31/2X7/16X13'101/2"	9.8	272	
A^1B^1	2 "	5"X31/2X1/2X13'10 1/2"	9.8	378	
	2 Pl.	17 1/2"X7/16"X13'10 1/2"	26.03	723	
	4 Ls.	5"X3"X1/2"X1'4"	12.8	68	
	1 Pl.	22"X3/8"X2' 1/2"	28.05	59	
	1 "	" " X1'3"	28.05	34	
	12 Lat.Bar.	2 1/2"X3'4"	2.66	104	1963
BC	1 Pl.	22"X5/16"X13'10 1/2"	23.38	325	
	2 Ls.	31/2X31/2X7/16X13'10 1/2"	9.8	272	
B^1C^1	2 "	5"X3 1/2"X1/2"X " "	13.6	378	
	2 Pl.	17 1/2"X7/16" X " "	26.03	723	
	4 Ls.	5"X3"X1/2"X1'4"	12.8	68	
	2 Pl.	22"X3/8"X1'3"	28.05	69	
	12 Lat Bar.			104	1939

Mark	Pieces	Description	Wt.per Ft.	Wt.Piece	Total
CD	1 Pl.	22"X5/16"x13'8 1/2"	23.38	320	
	2 Ls.	31/2x7/16x31/2x13'8 1/2"	9.8	268	
DE	2 "	5"x3 1/2"x1/2"x " "	13.6	372	
	2 "	17 1/2"x11/16"x " "	40.32	1130	
	4 "	--	68	68	
	2 Pl.	22"x3/8"x1'3"	28.05	69	
	12 Lat.	Bar.		104	2331
EF	1 Pl.	22"x5/16"x13'7"	23.38	318	
	2 Ls.	31/2x31/2x7/16x13'7"	9.8	266	
FG	2 Ls.	5"x3 1/2"x1/2"x "	13.6	370	
	2 Pl.	17 1/2"x3/4"x "	44.63	1210	
	4 Ls.	------		68	
	2 Pl.	-------		69	
	12 Lat.	Bar.		104	2405
GH	1 Pl.	22"x5/16"x13'6"	23.38	316	
HI	2 Ls.	3 1/2"x3 1/2"x7/16"x13'6"	9.8	264	
	2 Ls.	5"x3 1/2"x1/2" x "	13.6	368	
G^1H^1	2 Pl.	17 1/2"x3/4" x "	44.63	1202	
	4 Ls.	-------		68	
H^1I^1	2 Pl.	-------		69	
	12 Lat.	Bar		104	2391
E^1F^1	1 Pl.	22"x5/16"x13'7"	23.38	318	
	2 Ls.	3 1/2"x3 1/2"x7/18"x13'7"	9.8	266	
F^1G^1	2 "	5"x3 1/2"x1/2"x "	13.6	370	
	2 Pl.	17 1/2"x11/16"x "	40.32	1100	
	4 Ls.	-----		68	
	2 Pl.	------		69	
	12 Lat.	Bar		104	2295
C^1D^1	1 Pl.	22"x5/16"x13'8 1/2"	23.38	320	
	2 Ls.	3 1/2x3 1/2x7/16x13'8 1/2"	9.8	269	
D^1E^1	2 Ls.	5"x3 1/2"x1/2" x "	13.6	372	
	2 Pl.	17 1/2"x9/16"x "	33.47	919	
	4 Ls.	-----		68	
	2 Pl.	-----		69	
	12 Lat.	Bar		104	2120
		Lower Chord			
a b	2 E.B.	5"x 3/4"x3'	12.75	77	
	2 "	" " x2'3"	12.75	57	
	2 Pl.	5"x3/8"x1'11"	6.38	24	
	2-7"	[46.5#x11'9"	46.5	1068	
	2 Pl.	9"x5/16"x12"	9.56	19	
	24 Lat.	Bar. 2 1/4x1/4"x1'3"	1.91	56	1301

Mark	Pieces	Description	Wt.per Ft.	Wt.piece	Total
b c	2 E.B.	4"x1 1/8"x14'6"	15.3	444	
	2 "	4"x7/8"x14'6"	11.9	346	790
c d	4 E.B.	5"x1 3/16"x 14'6"	20.19		1170
d e	2 E. B.	5"x1 3/4"x14'6"	29.75	863	
	2 "	5"x1 1/8"x14'6"	19.13	555	1418
e f	4 E.B.	6"x1 1/8"x14'6"	22.95		1330
f g	2 E.B.	6"x1 5/8"x14'6"	33.15	960	
g h	2 E.B.	6"x1 1/8"x14'6"	22.95	665	1625
h i					
h^1 i					
g^1h^1	2 E.B.	6"x1 1/2"x14'6"	30.6	887	
f^1g^1	2 E.B.	6"x1 1/8"x14'6"	22.95	665	1552
e^1f^1	2 E B.	5"x1 5/8"x14'6"	27.63	801	
	2 E.B.	5"x1 1/8"x14'6"	19.13	555	1356
d^1e^1	2 E.B.	5"x1 3/8"x14'6"	23.38	678	
	2 E.B.	5"x1 1/8"x14'6"	19.13	555	1233
c^1d^1	2 E.B.	5"x1 1/8"x14'6"	19.13	555	
	2 E.B.	5"x1"x14'6"	17.0	493	1048
b^1c^1	4 E.B.	4"x7/8"x14'6"	11.9		692
a^1b^1	Same as a b			1301	
	2 Pl.	5"x3/8"x1'11"	6.38	24	1325
		Diagonals.			
A b	2 E. B.	6"x1 5/8"x16'5"	33.15		1090
B c	2 E. B.	5"x1 5/8"x18'5"	19.13		705
C d	2 E. B.	4"x1 1/16"x20'9"	14.45		600
D_1e_1	2 E. B.	4"x3/4"x22'6"	10.2		459
D^1e^1					
E_1f_1	2 E. B.	4"x3/4"x24'5"	10.2		498
E^1f^1					
F g	2 E. B.	4"x11/16"x25'7"	9.35		478
G_1h_1	2 E. B.	4"x3/4"x26'9"	10.2		545
G^1h^1					
H i					

Mark	Pieces	Description	Wt.per Ft.	Wt.Piece	Total
H i	2 E. B.	3"x5/8"x27'3"	6.38		348#
H^1i	2 E. B.	4"x3/4"x27'3"	10.2		556
F^1g	2 E. B.	4"x3/4"x25'7"	10.2		522
C^1d	2 E. B.	4"xl"x20'9"	13.6		565
B^1c	2 E. B.	5"xl"xl8'5"	17.0		627
A^1b	2 E. B.	6"xl 3/8"xl6'5"	28.05		920
		Counters.			
Fe	1 Rod	1 1/4"xl 1/4"x25'7"	5.31		135
G f	2 Rods	3"x5/8"x26'9"	6.38		335
H g	2 "	3"x5/8"x27'3"	6.38		341
I h	2 E. B.	4"x3/4"x27'6 1/2"	10.2		562
I h^1	2 Rods	3"x5/8"x27'6 1/2"	6.38		344
H^1g	1 Rod	1 1/4"xl 1/4"x27'3"	5.31		142
G^1f	1 "	" x " x26'9"	5.31		139
		Vertiesals.			
A a	1 Pl.	22"x5/16"x6'2"	23.38	144	
	2 "	17 1/2"x5/8"x10'2"	37.19	749	
A^1a^1	4 Ls.	4"x3 1/2"x7/16"x9'4"	10/6	396	
	2 "	3 1/2"x31/2"x7/16x3'7	19.8	71	
	1 Pl.	22"x7/16"x2'0"	2 32.73	65	
	6 Lat. Bar	21/2"x5/16"x2'2"	2.66	35	
	1 Pl.	14 1/4"x3/8"xl'10"	18.17	33	
	1 "	10 1/2"x3/8"xl'10"	13.39	24	1517
B b	2 10"[31.33#X	13'5 1/2"	31.33	844	
	2 Pl.	7 1/2"xll/16"xl'7"	17.53	55	
B^1b^1	2 "	9 1/4"x3/8"x9"	11.79	18	
	2 "	13"x3/8"x2'1"	16.58	69	
	2 Ls.	3"x3"x7/16"x2'1"	8.3	35	
	1 "	6"x3 1/2"xl/2"xl'6"	15.3	23	
	4 Pl.	7 1/2"x3/8"xl'4"	9.56	51	
	2 "	9 1/4"x5/16"xl'3"	9.83	25	
	Lat.18	2 1/4"x5/16"xl'1"	2.39	47	
				1167	

Mark	Pieces	Description	Wt.per Ft.	Wt.Piece	Total
B b	One half of the following)				
	Lat.	3"x5/16"x26'	3.19	83	
B^1b^1	4 Ls.	3"x3"x5/16"x5'	6.1	122	
	4 "	" x "x " x3'11"	6.1	96	
	2 "	6"x3 1/2"x1/2"x7"	15.3	18	
	1 Pl.	9 1/2"x5/16"x5'	10/09	50	
	1 "	7 1/2"x " x "	7.97	40	
	2 "	" x " x2'6"	7.97	40	
	4 "	4 1/2"x " x1'2"	4.78	22	
				2)471	
				236	
				1167	
				1403	
	Reduction 2%			28	1375#
C c	2 10" Cs	23#x16'8"	23.0	766	
	2 Pl.	7 1/2"x1/2"x1'7"	12.75	40	
C^1c^1	2 "	9 1/4"x3/8"x9"	11.79	18	
	2 "	13"x3/8"x2'1"	16.58	69	
	2 Ls.	3"x3"x7/16"x2'1"	8.3	35	
	1 "	6"x3 1/2"x1/2"x1'6"	15.3	23	
	2 Pl.	7 1/2"x1/2"x1'4"	12.75	34	
	2 "	9 1/4"x5/16"x1'3"	9.83	25	
	28 Lat.	2 1/4"x5/16"x1'1"	2.39	67	
				1077	
	(One half of following)				
	Lat.	3"x5/16"x52'	3.19	166	
	4 Ls .	3"x 3"x5/16"x5'	6.1	122	
	4 "	" x "x " x7'	6.1	171	
	2 "	6"x3 1/2"x1/2"x7"	15.3	18	
	1 Pl.	9 1/2"x5/16"x5'	10.09	50	
	1 "	7 1/2"x5/16"x5'	7.97	40	
	2 "	" x " x6'7"	7.97	105	
	4 "	4 1/2"x " x1'	4.78	19	
				2)691	
				346	
				1077	
				1423	
	Reduction 2%			28	1395
D d	2 10" Cs	21#x18'11 1/2"	21.0	796	
	2 Pl.	7 1/2"x7/16"x1'7"	11.16	35	
D^1d^1	Same as in C c			18	
	" " " "			69	
	" " " "			35	
	" " " "			23	
	" " " "			25	
	2 Pl.	7 1/2"x5/16"x 14"	7.97	21	
	34 Lat.	2 1/4"x5/16"x1'1"	2.39	81	
				1103	

Mark	Pierces	Description	Wt.per Ft.	Wt.Piece	Total
D d					
		(One half of the following)			
D^1d^1		Lat. 3"x5/16"x70'	3.19	223	
		4 Ls. 3"x3"x5/16"x5'	6.1	122	
		4 " " x " x " x9'5"	6.1	231	
		Same as in C c		18	
		" " " "		50	
		" " " "		40	
		2 Pl. 7 1/2"x5/16"x7'11"	7.97	127	
		4 " 4 1/2"x " x1'2"	4.78	22	
				2)833	
				417	
				1103	
				1520	
		Reduction 2%		30	1490
E e		2 10" Cs 21#x21'3"	21.0	893	
		2 Pl. 7 1/2"x5/16"x1'7"	7.97	25	
E^1e^1		Same as in C c		18	
		" " " "		69	
		" " " "		35	
		" " " "		23	
		" " " "		25	
		2 Pl. 7 1/2"x5/16"x1'4"	7.97	21	
		40 Lat.		96	
				1205	
		(One half of the following)			
		Lat. 3"x3/8"x94'	3.83	360	
		4 Ls. 3"x3"x5/16"x5'	3.19	122	
		2 " 6"x3 1/2"x1/2"x7"	15.3	18	
		2 Pl. 7 1/2"x5/16"x5'	7.97	40	
		4 " 4 1/2"x5/16"x1'2"	4.78	22	
		1 " 8"x5/16"x5'	8.50	43	
		4 Ls. 3"x3"x5/16"x11'7"	6.1	282	
		2 Pl. 7 1/2"x5/16"x10'3"	7.97	163	
				2)1050	
				525	
				1205	
				1730	
		Reduction 2%		35	1695
F f		2 10" Cs 21#x22'7 1/2"	21.0	952	
		Same as in E e except for Lat.		216	
F^1f^1		44 Lat.		105	
				1273	
		(One half the following)			
		Lat. 3"x3/8"x106'	3.83	406	
		Same as in E e		122	
		" " " "		18	
		" " " "		40	
		" " " "		22	
		" " " "		43	

Mark	Pieces	Description	Wt.per Ft.	Wt.Piece	Total
F f	4 Ls.	3"x3"x5/16"x13'	6.1	318	
F^1f^1	2 Pl.	7 1/2"x5/16"x11'9"	7.97	187	
				2)1056	
				528	
				1273	
				1801	
	Reduction 2%			36	1765
G g	2 10" [s	21#x24'	21.0	1008	
	Same as in E e except for Lat.			216	
G^1g^1	48 Lat.			115	
				1339	
	(One half the following)				
	Lat.	3"x3/8"x118'	3.83	452	
	Same as in E e			122	
	"	" " "		18	
	"	" " "		40	
	"	" " "		22	
	"	" " "		43	
	4 Ls.	3"x3"x5/16"x14'4"	6.1	350	
	2 Pl.	7 1/2"x5/16"x13'0"	7.97	207	
				2)1254	
				627	
				1339	
				1966	
	Reduction 2%			39	1927
H h	2 10" [s	21#x24'5 1/2"	21.0	1025	
	Same as in E e except for Lat.			216	
H^1h^1	50 Lat.			120	
				1361	
	(One half the following)				
	Lat.	3"x3/8"x118'	3.83	452	
	Same as in Ee			122	
	"	" " "		18	
	"	" " "		22	
	"	" " "		40	
	1 Pl.	9 1/2"x5/16"x5'	10.09	50	
	4 Ls.	3"x3"x " x14'10"	6.1	362	
	2 Pl.	7 1/2"x " x13'4"	7.97	213	
				2)1279	
				640	
				1361	
				2001	
	Reduction 2%			40	1961

Mark	Pieces	Description	Wt.per Ft.	Wt. Piece	Total
I i	2 10" ⊏ 21#x24'11"		21.0	1047	
	Same as in E e except for Lat.			216	
I^1i^1	50 Lat.			120	
				1383	
	(One half the following)				
	Lat.	3"x3/8"x124'	3.83	475	
	Same as in E e			122	
	" " " "			18	
	" " " "			22	
	" " " "			40	
	4 Ls/	3"x3"x5/16"x15'3 "	6.1	372	
	2 Pl.	7 1/2"x5/16"x13'11"	7.97	222	
	1 "	9"x5/16"x5'	9.56	48	
				2)1319	
				660	
				1383	
				2043	
	Reduction 2%			41	2002
Post Hanger Beam.					
	2 Webs	25"x3/8"x4'6 1/2"	31.88	289	
	4 Pl.	7"x7/16"x1'7"	10.41	66	
	2 "	11"x3/8"x "	14.03	44	
	2 "	9 3/4"x5/16"x1'3"	10.35	26	
	4 Ls.	3"x3"x7/16"x5'1"	8.3	168	
	4 "	"x " x5/16"x1'7"	6.1	39	
				632	
	Reduction 2%			13	619
End Strut, Upper Chord					
	4 Ls.	2 1/2"x2 1/2"x5/16"x4'81/4"	5.0	94	
	4 Pl.	12"x1/4"x1'4"	10.2	54	
	4 "	9"x5/16"x1'2"	9.56	45	
	8 Lat.	2 1/4"x1/4"x1'6"	1.91	27	
	12 "	" x " x1'6"	1.91	35	
				255	255
Intermediate Strut, Upper Chord					
	4 Ls.	2 1/2"x2 1/2"x1/4"x4'21/2"	4.1	69	
	2 Pl.	9"x1/4"x1'4"	7.65	20	
	4 "	9"x5/16"x1'	9.56	38	
	4 Lat.	2 1/4"x1/4"x1'9"	1.91	13	
				140	
	Reduction 2%			3	137
	Struts				
S (Between F^2 & F^3)					
	2 Ls.	5"x3 1/2"x1/2"x14'4 3/8"	13.6	390+	
	2 "	" " " x7 1/2"	13.6	17	
	2 Pl.	13"x1/2"x1'1 1/2"	22.1	50+	
	1 "	8 1/2"x3/4"x1'2"	21.68	25	
	10 Lat.	2 1/2"x5/16"x1'7"	2.66	42	
				524	
	Reduction 2%			10	514

Mark	Pieces	Description	Wt.perFt.	Wt.Piece	Total
S (Between F^3 & F^4: F^5 & F^6)					
	2 Ls.	5"x3 1/2"x1/2"x1'3"	13.6	34	
	2 "	3"x4 1/2"x1/2"x2'	11.9	48	
	1 Pl.	17"x3/4"x1'2"	43.35	50	
	1 "	13"x3/8"x2'	16.58	33	
	2 Ls.	Same as † in S preceeding		390	
	2 Pl.	" " † " " "		50	
	8 Lat.			34	
				639	
	Reduction 2%			13	626
S (Between F^4 & F^5)					
	1 Pl.	13"x1/2"x1'1 1/2"	22.1	25	
	1 "	17"x1/2"x2'	28.9	58	
	10 Lat.			42	
	2 Ls.	Same as before		390	
	2 Pl.	" " "		50	
	2 Ls.	5"x3 1/2"x1/2"x1'3"	13.6	34	
				599	
	Reduction 2%			12	587
S (Between F^6 & F^7; F^8 & F^9)					
	2 Ls.	Same as before		390	
	2 "	" " "		34	
	2 Pl.	" " "		50	
	1 "	17"x3/4"x1'2"	43.35	50	
	10 Lat.			42	
	Reduction 2%			566	
				11	555
S (Between F^7 & F^8)					
	Same as S between F^4 & F^5			599	
	1 Pl.	13"x3/8"x2'	16.58	33	
	2 Ls.	3"x4 1/2"x1/2"x2'	11.9	48	
				680	
	Reduction 2%			14	666
S (Between F^9 & F^{10})					
	2 Ls.	5"x3 1/2"x1/2"x14'	13.6	380	
	2 "	" " " x7 1/2"	13.6	17	
	1 "	" " " x3'3 1/2"	13.6	45	
	1 "	3"x4 1/2"x1/2"x2'	11.9	24	
	1 Pl.	13"x1/2"x1'1 1/2"	22.1	25	
	1 "	16 3/4"x1/2"x3'3 1/2"	28.48	94	
	8 Lat.			34	
				619	
	Reduction 2%			12	607
S (Between F^{10} & F^{11})					
	2 Ls.	5"x3 1/2"x1/2"x14'2"	13.6	385	
	1 "	" " " x1'11 1/2"	13.6	27	
	1 Pl.	13"x1/2"x1'1 1/2"	22.1	25	
	1 "	16 3/4"x1/2"x1'11 1/2"	28.48	56	
	9 Lat.			38	
				531	
	Reduction 2%			11	520

Mark	Pieces	Description	Wt.per Ft.	Wt.Piece	Total
S (Between F^{11} & F^{12})					
	2 Ls/	5"x3 1/2"x1/2"x14'4 3/8"	13.6	390	
	1 Pl.	13"x1/2"x1'1 1/2"	22.1	25	
	1 "	18"x1/2"x2'6"	30.60	77	
	9 Lat.			38	
				530	
	Reduction 2%			11	519#
S^1	2 Ls.	5"x3 1/2"x1/2"x11'9 1/2"	13.6	320	
	2 Pl.	20"x1/2"x1'9"	34.0	119	
	2 "	9 1/2"x1/2"x1'	16.15	32	
	8 Lat.	2 1/2"x5/16"x1'7"	2.66	34	
				505	
	Reduction 2%			10	495
S^2 (Between F^3 & F^4 near abutments)					
	2 Ls/	5"x3 1/2"x1/2"x12'4 1/2"	13.6	336	
	2 Pl.	8 3/4"x1/2"x9"	14.88	22 +	
	1 "	12"x1/2"x10"	32.3	27 +	
	1 "	9"x5/16"x1'1"	9.56	10 +	
				385	
	Reduction 2%			8	377
S^2 (All others)					
	2 Ls.	Same as above		336	
	2	(Those parts of S^2 marked thus +)		118	
				454	
	Reduction 2%			9	445
S^3					
		5"x3 1/2"x1/2"x11'9 1/4"	13.6	320	
	2 Pl.	8 3/4"x1/2"x9"	14.88	22	
	1 "	19"x1/2"x1'6"	32.3	48	
				390	
	Reduction 2%			8	382
S^4	2 Ls.	5"x3 1/2"x1/2"x12'7"	13.6	342	
	1 Pl.	20"x1/2"x1'7"	34.0	54	
	9 Lat.	2 1/2"x5/16"x1'7"	2.66	38	
				434	
	Reduction 2%			9	425
S^5	2 Ls.	5"x3 1/2"x1/2"x11'9 1/4"	13.6	320	
	1 Pl.	20"x1/2"x1'9"	34.0	60	
	1 "	9 1/2"x1/2"x1'	16.15	16	
	7 Lat.			28	
				424	
	Reduction 2%			8	416

Mark	Pieces	Description	Wt.per Ft.	Wt.Piece	Total
S^6	2 Ls.	5"x3 1/2"x1/2"x12'0 3/4"	13.6	328	
	1 Pl.	19"x1/2"x10"	32.3	27	
	4 "	8 3/4"x1/2"x9"	14.88	44	
	1 "	9"x 5/16"x1'11"	9.56	10	
	1 "	19"x1/2"x1'7"	32.3	51	
				460	
	Reduction 2%			9	451
S^7	2 Ls.	5"x3 1/2"x1/2"x11'9 1/4"	13.6	320	
	2 Pl.	19"x1/2"x1'6"	32.3	48	
	3 "	8 3/4"x1/2"x9"	14.88	33	
				401	
	Reduction 2%			8	393
	Upper Lateral Bracing				
	Per panel				
	4 Rods	7/8"x7/8"x8'	2.6	83	
	Reduction 2%			2	81
	Lower Lateral Bracing				
Post a^1	2 Ls.	5"x3"x1/2"x10 1/2"x	12.8	22	
	1 Pl.	3"x7/16"x10 1/2"	4.46	4	
	1 Rod	7/8"x7/8"x7'4 1/2"	2.6	19	
				45	
	Reduction 2%			1	44
Post b^1	2 Ls.	5"x3"x1/2"x8"	12.8	17	
	1 Pl.	3"x11/16"x8"	7.01	5	
	1 Rod	7/8"x7/8"x14'9"	2.6	38	
				60	
	Reduction 2%			1	59
Posts c^1,d^1,e^1					
	2 Ls.	5"x3"x1/2"x8"	12.8	17	
	1 Rod			38	
				55	54
Post f^1	2 Ls.	Same as above		17	
	1 Rod	7/8"x7/8"x7'4 1/2"	2.6	19	
				36	35
	Lateral Rods				
Side Rods		1"x1"x23'	3.4	78	76
Center Rods		1"x1"x19'6"	3.4	66	65

ASSEMBLAGE OF DEAD LOADS AT LOWER CHORD PANEL POINTS.

There are several approximations made in computing the dead loads at the panel points; but errors on one side arecounterbalanced by those on the other. The dead weight ofthe sidewalk is assumed to act at one-half the distance from the point of supportto the edge ; and account is taken of the cantilever action. Dead weight of the street and of entire floor beam are considered to act at one-half the distance between supports. Stnuts and lateral rods are taken in their actual positions. The dead weight of the truss itself at any panel point is considered as one-half the weight of the members in the panels on each side of the point.

Panel point b

Pin 4 3/4" dia. x 1'6"	90#	
" 4" " x 1'8"	71	
1/2 A b	545	
" a b	651	
" A B	982	
" B C	970	
B b	1375	
1/2 B c	353	
" b c	395	
" Post hanger beam	310	
1 Intermediate strut	137	
2 Lat. bracing rods	41	
2 Pls. 16 1/2"x7/16"x1'6"	74	
1/4 S^1	124	
" S^4	107	
1/2 S^2	223	
1/2(1 1/2 side lat. rods)	57	
" Center lat. rods	33	
1/4 F^1	3570	
1/4 Roadway on F^1	6295	
1/2 Sidewalk	2124	
Total	18525	18525#

Panel point c

Pin	100	
"	71	
1/2 b c	395	
" B c	353	
" B C	970	
" C D	1166	
" C d	300	
C c	1396	
1/2 c d	585	
" Post hanger beam	310+	
" S^1	248+	
1 Intermediate strut	137+	
2 Lat. bracing rods	41+	
1/2 S^2	223 /	
1 Side lat. rod	76 /	
1/2 Center lat.rod	33 /	

1/4 F^1	3570 /	
" Roadway on F^1	6295 /	
1/2 Sidewalk	2124 /	
2 Pls. 16 1/2"x1/2"x1'7"	87 °	
1 " 22"x5/16"x1'3"	28 °	
	18508	18500

Panel point d

Pins	171	
1/2 c d	585	
" C d	300	
" d e	709	
" C D	1166	
" D e	230	
" D E	1166	
1 D d	1490	
Parts at c marked thus +	736	
" " " " /	12321	
	18874	18900

Panel point e

Pins	171	
1/2 d e	709	
" D e	230	
" F e	68	
" e f	665	
" D E	1166	
" E f	249	
" E F	1203	
1 E e	1696	
Parts at c marked thus +	736	
" " " " " /	12321	
" " " " " °	115	
	19329	19300

Panel point f

Pins	171	
1/2 e f	665	
" E f	249	
" G f	168	
" f g	813	
" E F	1203	
" F e	68	
" F g	239	
" F G	1203	
1 F f	1766	
1/2 Lat. rod, side	38	
Lat. rod 3/5(38+33) + 3/10x33	53	
S^2 1/2x9/10xS^2	201	
1/4 F^2	2970	
" Roadway on F^2	6125	
Sidewalk 56/49.5 x 2124	2405	
Parts at c marked thus +	736	
	19073	19100

DEAD LOADS(continued)

Panel point g

Pins	171	
1/2 f g	813	
" F g	239	
" H g	172	
" g h	813	
" F G	1203	
" G f	168	
" G h	273	
" G H	1196	
1 G g	1928	
1/2 Side lat. rod	38	
Lat. rod 5/9(38+33) + 2/9x33	47	
S^2 : 1/2 x 7/9 xS^2	172	
1/4 F^3	2479	
" Roadway on F^3	5413	
Sidewalk 51/44.5 x 2124	2440	
Parts of C marked thus +	736	
" " " " " o	115	
	18416	18400

Panel point h

Pins	171	
1/2 g h	813	
" G h	273	
" I h	281	
" h i	813	
" G H	1196	
" H g	172	
" H i	171	
" H I	1196	
1 H h	1962	
1/2 Lat. rod	38	
Lat. rod 1/2x71 + 1/8x33	40	
S^2&S^3. 1/4S^2 + 1/16(S^2 + S^3)	159	
1/4 F^4	2049	
" Roadway on F^4	4675	
Sidewalk 46/39.5 x 2124	2480	
Parts at c marked thus +	736	
	17225	17200

Panel point i

Pins	171
1/2 h i	813
" H i	172
" H^1i	278
" i h^1	813
" H I	1196
" I h	281
" I h^1	172

Panel point i (cont.)

1/2 I H^1	1196	
1 i i	2002	
1/2 Lat. rod	38	
Lat. rod 3/7(38 + 16)	24	
S^2; 3/7 x 1/4 x S^2	96	
S^6; 3/7 x 1/4 x S^6	49	
1/4 F^5	1698	
" Roadway on F^5	3950	
Sidewalk 41/34.5 x 2124	2525	
Parts at c marked thus +	736	
" " " " " o	115	
	16325	16300

Panel point h^1

Pins	171	
1/2 i h^1	813	
" I h^1	172	
" G^1h^1	273	
" g^1h^1	776	
" I H^1	1196	
" H^1i	278	
" H^1g	71	
" H^1G^1	1196	
1 H^1h^1	1964	
1/2 Lat. rod	38	
Lat. rod 1/3 x 38	13	
S^6 & S^7; 1/2 x 1/3 x (S^6 & S^7)	141	
1/4 F^6	1304	
" Roadway on F^6	3225	
Sidewalk 36/29.5 x 2124	2600	
Parts at c marked thus +	736	
	14967	15000

Panel point g^1

Pins	171	
1/2 g^1h^1	776	
" H^1g^1	71	
" F^1g^1	261	
" f^1g^1	776	
" H^1G^1	1196	
" G^1h^1	273	
" G^1f^1	70	
" G^1F^1	1148	
1 G^1g^1	1928	
1/2 Lat. rod	38	
Lat. rod 1/5 x 38	8	
S^7 & S^3 1/2 x 1/5 x(S^7 + S^3)	78	
1/4 F^7	1057	
" Roadway on F^7	2500	
Sidewalk 31/24.5 x 2124	2695	
Patrs at c marked thus +	736	
" " " " " o	115	
	13897	13900

Panel point f^1

Pins	171	
1/2 g^1f^1	776	
" G^1f^1	70	
" E^1f^1	249	
" e^1f^1	678	
" G^1F^1	1148	
" F^1g^1	261	
" F^1E^1	1148	
1 F^1f^1	1274	
1/4 Lat. rod	19	
Lat. brac.	35	
1/4 F^8	911	
" Roadway on F^8	1775	
Sidewalk 26/19.5 x 2124	2837	
Parts at c marked thus +	736	
	12334	12300

Panel point e^1

Pins	171	
1/2 e^1f^1	678	
" D^1e^1	230	
" d^1e^1	617	
" F^1E^1	1148	
" E^1f^1	249	
" E^1D^1	1060	
1 E^1e^1	1696	
Lat. brac.	54	
1/4 F^9	768	
" Roadway on F^9	1050	
Sidewalk 21/14.5 x 2124	3080	
Parts at c marked thus +	736	
" " " " " °	115	
	11652	11700

Panel point d^1

Pins	171	
1/2 e^1d^1	617	
" C^1d^1	283	
" c^1d^1	524	
" E^1D^1	1060	
" D^1e^1	230	
" D^1C^1	1060	
1 D^1d^1	1490	
Lat. brac.	54	
1/4 F^{10}	626	
Roadway on F^{10}	325	
Sidewalk 16/9.5 x 2124	3580	
Parts at c marked thus +	736	
	10756	10800

Panel point c^1

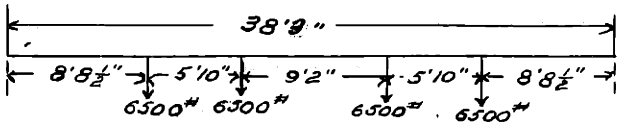
Pins	171	
1/2 c^1d^1	524	
" B^1c^1	314	
" b^1c^1	346	
" D^1c^1	1060	
" C^1d^1	283	
" C^1B^1	970	
1 C^1c^1	1396	
1/2 Post hanger beam	310	
1/4 S^1	124	
" S^5	104	
Lat. brac.	54	
1 Intermediate strut	137	
Lat. brac.	41	
1/4 F^{11}	587	
Sidewalk 16/9.5 x 2124	3580	
Parts at c marked thus °	115	
	10016	10000

Panel point b^1

Pins	171	
1/2 b^1c^1	346	
" A^1b^1	460	
" a^1b^1	663	
" B^1C^1	970	
" B^1c^1	314	
" B^1A^1	982	
1 B^1b^1	1376	
1/2 Post hanger beam	310	
1/4 S^5	104	
" S	130	
Lat. brac.	59	
1 Intermediate strut	137	
Lat. brac.	41	
1/4 F^{12}	587	
Sidewalk as at c^1	3580	
	10230	10200

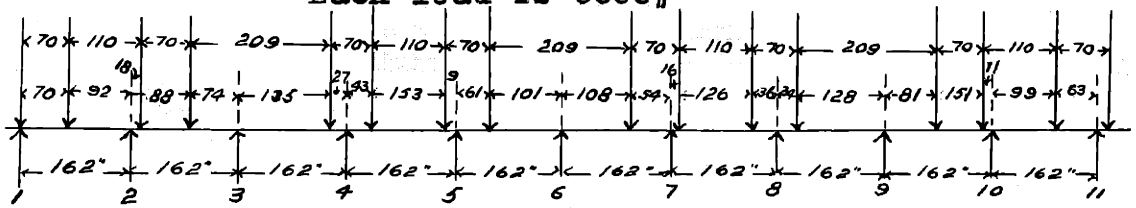
LIVE LOAD DUE TO CARS

The car used in computing this live load is shown below, and the loads given are wheel loads.



The following sketch shows the bridge covered with the wheel loads under maximum conditions.

Each load is 6500#



On account of the skew of the bridge and the comparativly large number of panel points, it seemed undesirable to compute the reactions at all points for the actual leads under maximum conditions for each bar of the truss. To avoid this amount of work and yet secure results which would be practically correct it was decided to find the uniform load, which placed at each panel point, would give the same results as the actual wheel loads. The computations follow.

$R_1 = \frac{6500}{162}$ (92 + 162) - 10100#

R_2 = " (74 + 70 + 144) - 11500

R_3 = " (18 + 88 + 27) - 5300

R_4 = " (135 + 119 + 9) - 10500

R_5 = " (43 + 153 + 101) - 11900

R_6 = " (61 + 54) - 4600

R_7 = " (108 + 36 + 146) - 11600

R_8 = " (16 + 126 + 128) - 10800

R_9 = " (34 + 81 + 11) - 5000

R_{10} = " (81 + 151 + 63) - 11800

10) 93100

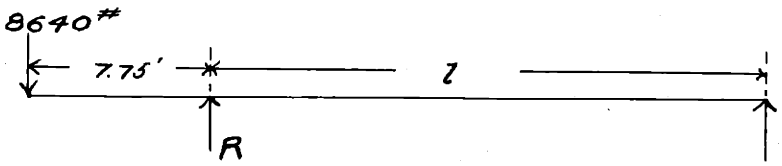
9300#

Uniform load at each panel point

Locomotive excess 1000#

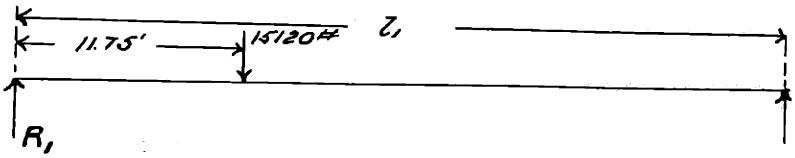
COMPUTATIONS OF UNIFORM LIVE LOADS ON ROADWAY AND SIDEWALK

Live load of 80# per square foot on the roadway each side of the car tracks to the curb; and on the sidewalk.



Load per panel on a sidewalk bracket
13.5 x 8 x80 = 8640#
R = reaction on double truss due to sidewalk load
l = distance between point of support at truss and at abutment
R x l = 8640 (l + 7.75)

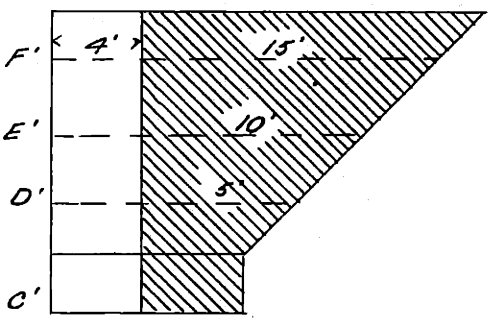
$$R = 8640 + \frac{8640 \times 7.75}{l} = 8640 + \frac{67000}{l}$$



Load per panel on one side of roadway before rail next to roadway goes onto the abutment
13.5 x 14 x 80 = 15120#
R_1 = reaction on double truss due to this load
l_1 = distance between point of support at truss and at abutment
$R_1 \times l_1 = 15120 (l_1 - 11.75)$

$$R_1 = 15120 - \frac{177800}{l_1}$$

Where the area covered with live load is changing the formula will not apply; and the reaction can best be computed for each case.



At E^1;

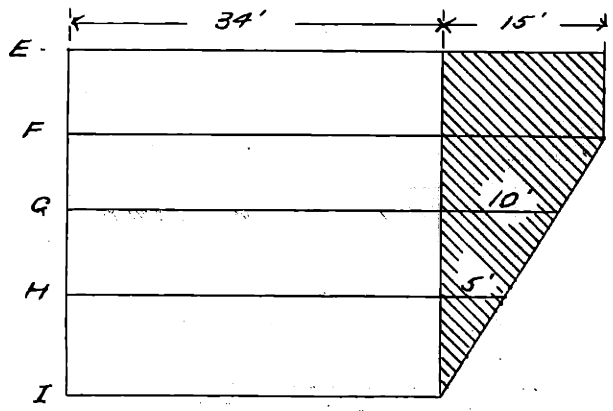
$$R_1 = \frac{10 \times 13.5 \times 80 \times 5}{14} = 3860\#$$

At D^1

$$R_1 = \frac{5 \times 13.5 \times 80 \times 2.5}{9} = 1500\#$$

At C^1 & B^1;

$$R_1 = \frac{5 \times 13.5 \times 80 \times 2.5}{9} = 1500\#$$



R_2 = reaction on double truss due to live load on further side of roadway when the area covered is changing.

At F;

$$R_2 = \frac{13.5 \times 13 \times 80 \times 8}{49} = 2290\#$$

At G

$$R_2 = \frac{13.5 \times 8 \times 80 \times 6}{44} = 1180\#$$

At H

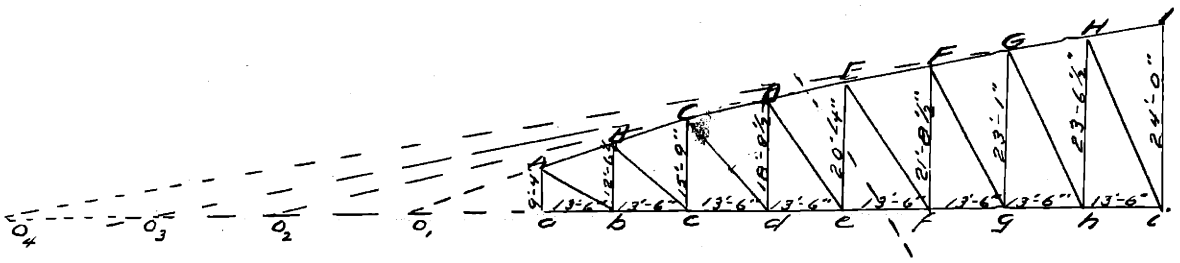
$$R_2 = \frac{13.5 \times 4 \times 80 \times 3}{39} = 330\#$$

UNIFORM LIVE LOAD (continued)

Panel point	R	R_1	R_2	Load on single truss
B	8640	15120	in R_1	11880#
C	8640	15120	"	11880
D	8640	15120	"	11880
E	8640	15120	"	11880
F	10010	11490	2290	11900
G	10160	11080	1180	10710
H	10360	10560	330	10630
I	10610	9900		10260
H^1	10950	8990		9970
G^1	11430	7720		9580
F^1	12160	5770		8970
E^1	13430	3860		8700
D^1	16090	1500		8800
C^1	16090	1500		8800
B^1	16090	1500		8800

SUMMARY OF LOADS.

Point	Uniform	Cor	Total live	Total dead
b'	8800		8800	10200
c'	8800		8800	10000
d'	8800		8800	10800
e	8700		8700	11700
f'	9000		9000	12300
g'	9600	800	10400	13900
h'	10000	2100	12100	15000
i	10300	3800	14100	16300
h	10600	5600	16200	17200
g	10700	7100	17800	18400
f	11900	8300	20200	19100
e	11900	9300	21200	19300
d	11900	9300	21200	18900
c	11900	9300	21200	18500
b	11900	9300	21200	18500



I5' -9" = 9' - 4" = 6' 5" = 77/I2

o

o_1a = 9' 4"x27 x I2/77 = II2/I2 x 27x I2/77 = 39.272

20' 4" - I5' 9" = 244/I2 - I89/I2 = 55/I2

o_2c = I89/I2 x 27 x I2/55 = 92.782: o_2a = 92.782 -27 = 65.782

23' I" - 20' 4" = 277/I2 -244/I2 = 33/I2

o_3e = 244/I2 x I2 x 27/I2 - I99.64: o_3a = I99.64 - 54 = I45.64

24' 0" - 23' I" = II/I2

o_4g = 277/I2 x I2/II = 679.9I: o_4a = 679.9I - 8I = 598.9I

CALCULATION OF BARS

VERTICALS-

Taking sections cutting three bars as shown above:

Bar Aa: S=reactions of left abutment=1/16=.06250 C when load is at B^1

When load is at b:S=15/16 =.9375 C.

Bar Bb:

Load at B^1:S=1/16x39.272x1/52.772=.04651 C.
Load at c :S=14/16x39.272/52.272=.6512 C.
Load at b :S=(15/16x39.272-1x52.272)1/52.272=3023 T.

Bar Cc:

Load at b^1:S=1/16x39.272/66.272=.03708 C
Load at d :S=13x.03708=.4820 C.
Load at b :S=(15/16x39.272-1x52.772)1/66.372=.2405 T
Load at c :S=2x.2405=.4809 T.

Bar Dd:

Load at b :S=1/16x65.782/106.282=.03870 C.
Load at e :S=12x.03870=.4643 C.
Load at b :S=(15/16x65.782-79.282)1/106.282=.1657 T.
Load at d :S=.1657x3=.4971 T.

Bar Ee:

Load at b^1: $S = \frac{1}{16} \times \frac{65.782}{119.782} = .03432$ C.

Load at f : S = .03432 x 11 = .3776 C.

Load at b : $S = \left(\frac{15}{16} \times 65.782 - 79.282 \right) \frac{1}{119.782} = .1476$ T.

Load at e : S = 4 x .1476 = .5881 T.

Bar Ff:

Load at b^1: $S = \frac{1}{16} \times 145.64 \times \frac{1}{213.14} = .04271$ C.

Load at g : S = 10 x .04271 C. = .4271

Load at b : $S = \left(\frac{15}{16} \times 145.64 - 159.14 \right) \times \frac{1}{213.14} = .1061$ T.

Load at f : S = 5 x .1061 T. = .5305 T.

Bar Gg:

Load at b^1: $S = \frac{1}{16} \times 145.64 \times \frac{1}{226.64} = .04016$ C.

Load at h : S = .04016 x 9 = .3614 C.

Load at b : $S = \left(\frac{15}{16} \times 145.64 - 159.14 \right) \frac{1}{226.64} = .09973$ T.

Load at g : S = .09973 x 6 = .5984 T.

Bar Hh:

Load at b^1: $S = \frac{1}{16} \times 598.91 \times \frac{1}{693.41} = .05398$ C.

Load at i : S = 8 x .05398 = .4318 C.

Load at b : $S = \left(\frac{15}{16} \times 598.91 - 1 \times 612.41 \right) \frac{1}{693.41} = .07346$ T.

Load at h : S = .07346 x 7 = .5142 T.

Bar Ii:

S is = to 0 when both diagonals are in action.

VERTICALS (Counters in action)

Bar Ff:

Load at b^1: $S = \frac{1}{16} \times 145.64 \times \frac{1}{213.14} = .04270$ T.

Load at f : S = .04270 x 11 = .4697 T.

Load at b : $S = \left(\frac{15}{16} \times 145.64 - 159.1 \right) \frac{1}{213.14} = .1061$ C.

Load at e : S = 4 x .1061 = .4244 C.

Bar Gg:

Load at b : $S = \frac{1}{16} \times 598.91 \times \frac{1}{679.91} = .05505$ T.

Load at g : S = .05505 x 10 = .5505 T.

Load at b : $S = \left(\frac{15}{16} \times 598.91 - 612.4 \right) \frac{1}{679.91} = .07486$ C.

Bar Gg:(Cont.)
Load at f : S = 5 x .07486 = .3743 C.

Bar Hh:
Load at b^1: $S = \frac{1}{16} \times 598.91 \times \frac{1}{693.41} = .05398$ T.

Load at h : S = .05398 x 9 = .4858 T.

Load at b : $S = \left(\frac{15}{16} \times 598.91 - 612.41 \right) \frac{1}{693.41} = .07341$ C.

Load at g : S = .07341 x 6 = .4405 C.

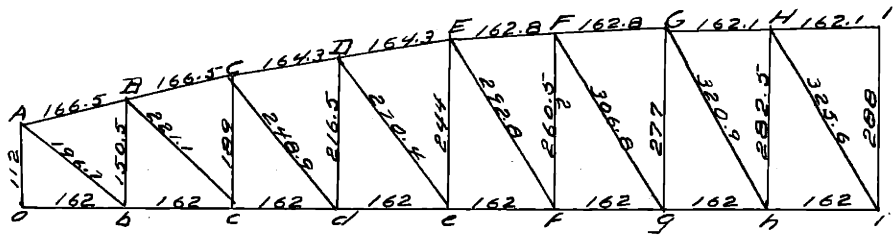
Bar Ii: (One diagonal and one counter in action)
Load at b': $S = \frac{1}{16} \times 598.91 \times \frac{1}{706.91} = .05295$ C.

Load at h': S = 7 x .05295 = .3707 C.

Load at b : $S = \left(\frac{15}{16} \times 598.91 - 612.41 \right) \frac{1}{706.91} = .07205$ T.

Load at i : S = .07205 x 8 = .5764 T.

DIAGONALS.



Dimensions in above figure given in inches in order to avoid unweildy fractions in calculations.

By method of joints in above case - taking joints b,c,d,etc., the verticle component of the stress in the diagonal is equal to the stress in the verticle and of an opposite character. More over the direct stress in the diagonal equals the vertical component multiplied by the secant of the angle made by the diagonal with the verticle.

Bar Ab:
Load at b': $S = .04651 \times \frac{196.72}{112} = .08169$ T.

Load at b : S = 15 X .08169 = 1.225 T.

Bar Bc:
Load at b': $S = .03708 \times \frac{221.1}{150.5} = .05447$ T.

Load at c : S = 14 x .05447 = .7626 T.

Bar Bc:(Cont.)
Load at b : $S = .2405 \times \frac{221.1}{150.5} = .3539$ C.

Bar Cd:
Load at b': $S = .03870 \times \frac{248.9}{189} = .05096$ T.

Load at d : $S = .05096 \times 13 = .66\ 25$ T.

Load at b : $S = .1657 \times \frac{248.9}{189} = .2182$ C.

Load at c : $S = .2182 \times 2 = .4364$ C.

Bar De:
Load at b': $S = .03432 \times \frac{270.4}{216.5} = .04287$ T.

Load at e : $S = .04287 \times 12 = .5146$ T.

Load at b : $S = .1470 \times \frac{270.4}{216.5} = .1836$ C.

Load at d : $S = .1836 \times 3 = .5508$ C.

Bar Ef:
Load at b': $S = .04271 \times \frac{292.8}{244} = .05126$ T.

Load at f : $S = .05126 \times 11 = .5639$ T.

Load at b : $S = .1061 \times \frac{292.8}{244} = .1275$ C.

Load at e : $S = .1275 \times 4 = .5100$ C.

Bar Fg:
Load at b': $S = .04016 \times \frac{306.8}{260.5} = .04730$ T.

Load at g : $S = .04730 \times 10 = .4730$ T.

Load at b : $S = .9973 \times \frac{306.8}{260.5} = .1173$ C.

Load at f : $S = .1173 \times 5 = .5864$ C.

Bar Gh:
Load at b': $S = .05398 \times \frac{320.9}{277} = .06253$ T.

Load at h : $S = .06253 \times 9 = .5628$ T.

Load at b : $S = .07346 \times \frac{320.9}{277} = .08340$ C.

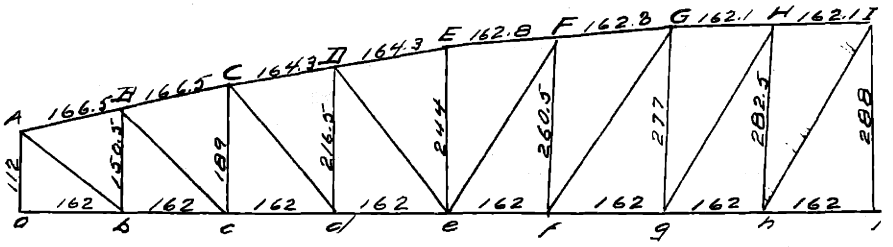
Load at g : $S = .08340 \times 6 = .5004$ C.

Bar Hi:
Load at b': $S = .05295 \times \frac{325.6}{282.5} = .06104$ T.

Load at i : $S = .06104 \times 8 = .4883$ T.

Load at d : $S = .07205 \times \frac{325.6}{282.5} = .08330$ C.

Load at h : $S = 7 \times .08330 = .5831$ C.



Bar eF:

Load at b': $S = \frac{306.8}{260.5} \times \frac{1}{16} \times \frac{145.64}{199.64} \times 1 = .0536$ C.

Load at f: S = .0536 x 11 = .5896 C.

Load at b: $S = \frac{306.8}{260.5} \times \frac{1}{199.64}(\frac{15}{16} \times 145.64 - 159.14) = .1335$ C.

Load at e: S = .1335 x 4 = .5340 T.

BarfG:

Load at b': $S = \frac{320.9}{277} \times .04270 = .04947$ C.

Load at g: S = .04947 x 10 = .4947 C.

Load at b: $S = .1061 \times \frac{320.9}{277} \times 1 = .1229$ T.

Load at f: S = .1229 x 5 = .6145 T.

Bar gH:

Load at b': $S = \frac{325.65}{282.5} \times .05505 = .06345$ C.

Load at h: S = .06345 x 9 = 5710 C.

Load at b: $S = .06345 \times \frac{325.65}{282.5} = .0864$ T.

Load at g: S = .0864 x 6 = 5184 T.

Bar hI:

Load at b': $S = \frac{330.4}{288} \times .05398 = .06194$ C.

Load at i: S = .06194 C. x 8 = .4955C.

Load at b: $S = \frac{330.4}{288} \times .07341 = .08423$ T.

Load at h: S = .08423 x7 = .5896 T.

B

LOWER CHORD:

Bar ab - 0

Bar bc:

Load at b: S - $\frac{1}{16}$ x $\frac{162}{150.5}$ - .06728 T.

Load atbb: S - .06728 x15 - 1.0078 T.

Bar cd:

Load at b': S - $\frac{1}{16}$ x $\frac{162}{189}$ x 2 - .10714 T.

Load at c: S -.10714 x 14 -1.503 T.

Load at b: S - $\frac{162}{189}$($\frac{15}{16}$ x 2 - 1) - .7500 T.

Load at c: S - .10714 x 14 - 1.503 T.

Bar de:

Load at b: S - $\frac{1}{16}$ x $\frac{162}{216.5}$ x 3 - .1403 T.

Load at d: S - .1403 x 13 - 1.8239 T.

Load at b: S - $\frac{162}{216.5}$($\frac{15}{16}$ x 3 - 2) - .6086 T.

Bar ef:

Load at b: S - $\frac{1}{16}$ x $\frac{162}{244}$ x 4 - .1660 T.

LOAD at e: S - 12 x .1660 - 1.992 T.

Load at b: S - $\frac{162}{244}$($\frac{15}{16}$ x 5 - 4) - .4980 T.

Bar gh:

Load at b': S - $\frac{1}{16}$ x $\frac{162}{277.5}$ x 6 - .2193 T.

Load at g: S - .2193 x10 - 2.193 T.

Load at b: S - $\frac{162}{277}$($\frac{15}{16}$ x 6 - 5) - .3655 T.

Barfg:

LOWER CHORD:

Bar ef

Load @ b' : $S = \frac{1}{16} \times \frac{162 \times 4}{244} = .1660$ T.

" " e : $S = 12 \times .1660 = 1.922$ T.

" " b : $S = (\frac{15}{16} \times 162 \times 4 - 162 \times 3) \frac{1}{244} = .4980$ T.

Bar fg

Load @ b' : $S = \frac{1}{16} \times \frac{162 \times 5}{260.5} = .1943$ T.

" " f : $S = .1943 \times 11 = 2.137$ T.

" " b : $S = (\frac{15}{16} \times 162 \times 5 - 162 \times 4) \frac{1}{260.5} = .4294$ T.

Bar gh

Load @ b' : $S = \frac{1}{16} \times \frac{162 \times 5}{277.5} = .2193$ T.

" " g : $S = .2193 \times 10 = 2.193$ T.

" " b : $S = (\frac{15}{16} \times 162 \times 6 - 162 \times 5) \frac{1}{277} = .3655$ T.

Bar hi

Load @ b' : $S = \frac{1}{16} \times \frac{162 \times 7}{282.5} = .2510$ T.

" " h : $S = .2510 \times 9 = 2.2259$ T.

" " b : $S = (\frac{15}{16} \times 162 \times 7 - 162 \times 6) \frac{1}{282.5} = .3227$ T.

UPPER CHORD(Taking same sections as for the Lower Chord the horizontal component of upper chord is equal to the stress in lower chord and of an opposite character. The direct stress in the upper chord, however, is equal to the horizontal component multiplied by the secant of the angle made by the upper chord with the horizontal.)

Bar AB

Load @ b' : $S = \frac{166.5}{162} \times .06728 = .06915$ C

" " b : $S = .06915 \times 15 = 1.037$ C.

Bar BC

Load @ b' : $S = \frac{166.5}{162} \times .10714 = .1101$ C.

" " c : $S = .1101 \times 14 = 1.542$ C

" " b : $S = \frac{166.5}{162} \times .7500 = .7709$ C.

Bar CD

Load @ b' : $S = \frac{164.3}{162} \times .1403 = .1422$ C.

" " d : $S = .1422 \times 13 = .1849$ C

" " b : $S = \frac{164.3}{162} \times .6080 = .61685$

UPPER CHORD (Contd.)

Bar DE

Load @ b' : $S = \frac{164.3}{162} \times .1660 = .1684$ C

" " c : $S = .1684 \times 12 = 2.020$ C.

" " b : $S = \frac{164.3}{162} \times .4980 = .5050$ C

Bar EF

Load @ b' : $S = \frac{162.8}{162} \times .1943 = .1953$ C

" " f : $S = .1953 \times 11 = 2.148$ C

" " b : $S = \frac{162.8}{162} \times .4294 = .4296$ C.

Bar FG

Load @ b' : $S = \frac{162.8}{162} \times .2193 = .2204$ C.

" " g : $S = 2204 \times 10 = 2.204$ C

" " b : $S = \frac{162.8}{162} \times .3655 = .3673$ C.

Bar GH

Load @ b' : $S = \frac{162.1}{162} \times .2510 = .2510$ C.

" " g : $S = 9 \times .2510 = 2.259$ C

" " b : $S = \frac{162.1}{162} \times .3227 = .3227$ C.

Bar HI

Load @ b' : $S = \frac{1}{16} \times \frac{162 \times 8}{288} = .2814$ C

" " i : $S = .2814 \times 8 = 2.251$ C.

" " b : $S = \frac{1}{16} \times \frac{162 \times 8}{288} = .2814$ C.

The ordinates having been calculated for the panel points nearest the abutments and at those points where the direction of the influence line changes, the intermediate values were then obtained by multiplying the values of the ordinates at b' and at b by 2, 3, 4, etc., respectively, up to the point where the change in direction occurred. The following tables, then give ordinates for each bar of the left half of span for a load of unity at any panel point. The ordinates for bars of the right half of span may be obtained by taking values opposite letters of reverse nomenclature

P A N E L AB

Point	Lower ab	Upper AB	Diag. Ab	Vert. Aa	Vert. Bb
b'	o	-.06915	+.08169	-.06250	-.04651
c'	o	-.1383	.1634	-.1250	-.09302
d'	O	-.2074	.2451	-.1870	-.1395
e'	o	-.2766	.3268	-.2500	-.18604
f'	o	-.3458	.4085	-.3125	-.2326
g'	o	-.4149	.4902	-.3750	-.2791
h'	O	-.4840	.5718	-.4375	-.3256
i	o	-.5532	.6535	-.5000	-.3721
h	o	-.6224	.7352	-.5625	-.4186
g	o	-.6915	.8169	-.6250	-.4651
f	o	-.7606	.8986	-.6875	-.5116
e	o	-.8298	.9803	-.7500	-.5581
d	o	-.8990	1.062	-.8125	-.6046
c	o	-.9681	1.144	-.8750	-.6512
b	o	-1.0373	1.225	-.9375	-.3023

P A N E L B.C.

Point	Lower	Upper	Diag.	Vert.
b'	.06728	-.1101	05447	-.03708
c'	.1346	-.2203	.1089	-.07415
d'	.2018	-.3304	.1634	-.11122
e'	.2691	-.4405	.2179	-.1483
f'	.3364	-.5506	.2724	-.1854
g'	.4037	-.6607	.3268	-.2224
h'	.4709	-.7709	.3808	-.2595
i	.5383	-.8810	.4358	-.2966
h	.6054	-.9911	.4902	-.3337
g	.6728	-1.1013	.5447	-.3708
f	.7400	-1.2114	.5992	-.4078
e	.8073	-1.3216	.6537	-.4449
d	.8746	-1.4317	.7081	-.4820
c	.9419	-1.5418	.7626	+.4809
b	1.0078	- .7709	-.3539	+.2405

P A N E L C.D.

Point	Lower cd	Upper CD	Diag. cd	Vert. Dd
b'	.10714	-.1422	05096	-.03870
c'	.2143	-.2844	.1019	-.07739
d'	.3214	-.4266	.1529	-.1161
e'	.4287	-.5688	-2039	-.1548
f'	.5357	-.7110	.2548	-.1935
g'	.6429	-.8533	.3058	-.2322
h'	.7500	-.9955	.3568	-.2709
i	.8571	-1.1377	.4077	-.3096
h	.9643	-1.2799	.4587	-.3483
g	1.0714	-1.4221	.5097	-.3870
f	1.1786	-1.5643	.5606	-.4256
e	1.2857	-1.7056	.6116	-.46434
d	1.3929	-1.8487	.6625	.4971
c	1.5030	-1.2337	-.4364	.3314
b	.7500	- .61685	-.2182	.1657

P A N E L D.E.

Point	Lower de	Upper DE	Diag. De	Vert. Ee
b'	.1403	-.1684	.04287	-.03432
c'	.2806	-.3367	.08574	-.06865
d'	.4209	-.5051	.1286	-.1030
e'	.5612	-.6724	.1715	-.1374
f'	.7015	-.8418	.2144	-.1716
g'	.8418	-1.0102	.2572	-.2060
h'	.9821	-1.1788	.3001	-.2403
i	1.1224	-1.3469	.3430	-.2746
h	1.2627	-1.5153	.3858	-.3089
g	1.4030	-1.6836	.4287	-.3432
f	1.5433	-1.852	.4716	-.3776
e	1.6836	-2.0202	.5146	.5881
d	1.8239	-1.515	-.5508	.4441
c	1.216	-1.010	-.3670	.2941
b	.6080	-.5050	- .1836	.1470

P A N E L EF

Point	Lower ef	Upper EF	Diag. Ef	Vert. FF
b'	.1660	-.1953	.05126	-.0437
c'	.3320	-.3907	.1025	-.08542
d'	.4979	-.5860	.1538	-.12813
e'	.6640	-.7814	.2050	-.1708
f'	.8301	-.9767	.2563	-.2136
g'	.9960	-1.1720	.3076	-.2563
h'	1.1619	-1.3674	.3588	-.2990
i	1.328	-1.5627	.4101	-.3417
h	1.494	-1.758	.4613	-.3844
g	1.660	-1.953	.5126	-.4271
f	1.826	-2.148	.5639	.5305
e	1.992	-1.718	-.5103	.4244
d	1.4940	-1.289	.3827	.3183
c	.9960	-.8592	-.2550	.2122
b	.4980	-.4296	-.1275	.1062

PANNEL F.G.

Point	Lower Fg	Upper FG	Diag. Fg	Vert. Gg
b'	.1943	-.2204	.04730	-.04016
c'	.3886	-.4408	.09460	-.08032
d'	.5829	-.6612	.1419	-.1205
e'	.7772	-.8816	.1899	-.1606
f'	.9715	-1.102	.2365	-.2008
g'	1.166	-1.322	.2838	-.2410
h'	1.360	-1.543	.3311	-.2811
i	1.554	-1.763	.3792	-.3212
h	1.748	-1.984	.4257	-.3614
g	1.943	-2.204	.4740	.5984
f	2.137	-1.837	-.5864	.4987
e	1.718	-1.469	-.4691	.3989
d	1.2882	-1.102	-.3519	.2992
c	.8588	- .7346	-.2346	.19946
b	.4294	-.3673	-.1173	.09973

P A N E L GH

Point	Lower gh	Upper GH	Diag. Gh	Vert. Hh
b'	.2193	-.2510	.06253	-.05398
c'	.4386	-.5021	.1251	-.1080
d'	.6579	-.7531	.1876	-.1619
e'	.8772	-1.004	.2501	-.2159
f'	1.097	-1.255	.3127	-.2699
g'	1.316	-1.506	.3752	-.3239
h'	1.535	-1.757	.4377	-.3779
i	1.755	-2.008	.5003	-.4318
h	1.974	-2.259	.5628	.5142
g	2.193	-1.936	-.5004	.4408
f	1.828	-1.613	-.4170	.5673
e	1.462	-1.291	-.3336	.2938
d	1.097	-.9681	-. 2502	.2204
c	.7310	-.6454	-.1668	.1469
b	.3655	-.3227	-.0834	.07346

P A N E L Hi

	hi	Hi	Hi	Ii
b'	.2510	-.2804	.06104	-.05295
c'	.5019	-.5628	.1221	-.1059
d'	.7529	-.8442	.1831	-.1589
e'	1.004	-1.126	.2442	-.2118
f'	1.255	-1.407	.3052	-.2648
g'	1.506	-1.688	.3663	-.3177
h'	1.757	-1.970	.4273	-.3707
i	2.008	-2.251	.2883	.5764
h	2.259	-1.970	-.5831	3044
g	1.936	-1.688	-.4998	.4323
f	1.613	-1.408	-.4165	.3602
e	1.291	-1.126	-.3332	.2882
d	.9681	-.8443	-.2499	.2161

VERTICAL aA

Point	Factor	Loads dead	Loads live	Stress dead	Stress live
b'	-.06250	10200	8800	-600	-600
c'	-.1250	10000	8800	-1300	-1100
d'	-.1870	10800	8800	2000	-1700
e'	-.2500	11700	8700	-2900	-2200
f'	-.3125	12300	9000	-3800	-2800
g'	-.3750	13900	10400	-5200	-3900
h'	-.4350	15000	12100	-6500	-5300
i	-.5000	16300	14100	-8200	-7000
h	-.5625	17200	16200	-9700	-9100
g	-.6250	18400	17800	-11500	-11100
f	-.6875	19100	20200	-13200	-13800
e	-.7500	19300	21200	-14500	-15900
d	-.8125	18900	21200	-15400	-17200
c	-.8750	18500	21200	-16200	-18600
b	-.9375	18500	24200	-17300	23700
				-128300	-133000

VERTICAL Bb

b'	-.0465	10200	8800	- 500	- 400
c'	-.0930	10000	8800	- 900	- 800
d'	-.1395	10800	8800	-1500	-2200
e'	-.1860	11700	8700	-2200	-1600
f'	-.2326	12300	9000	-2900	-2100
g'	-.2791	13900	10400	-3900	-2900
h'	-.3256	15000	12100	-4900	-3900
i	-.3721	16300	14100	-6100	-4000
h	-.4186	17200	16200	-7200	-6800
g	-.4651	18400	17800	-8500	-8400
f	-.5116	19100	20200	-9800	-10300
e	-.5581	19300	21200	-10800	-11800
d	-.6046	18900	21200	-11500	-12800
c	-.6512	18500	22200	-12000	-14500
				-82700	-81500
b	+.3023	18500		+ 5600	
				-77100	

-VERTICAL Cc -

	Point	Factor	Loads dead	Loads live	Stress dead	Stress live
	b'	-.0371	10200	8800	-400	-300
	c'	-.0742	10000	8800	-700	-700
	d'	-.1112	10800	8800	-1200	-1000
	e'	-.1483	11700	8700	-1700	-1300
	f'	-.1854	12300	9000	-2300	-1700
	g'	-.2224	13900	10400	-3100	-2300
	h'	-.2595	15000	12100	-3900	-3100
	i	-.2966	16300	14100	-4800	-4200
	h	-.3337	17200	16200	-5700	-5400
	g	-.3708	18400	17800	-6800	-6700
	f	-.4078	19100	20200	-7800	-8300
	e	-.4449	19300	21200	-8600	-9600
1000	d	-.4820	18900	22200	-9100	-10700
					-56100	-55000
	c	+.4809	18500		+ 8700	
	b	+.2405	18500		+ 4400	
					+13100	
					(-43,000)	

VERTICAL Dd

	b'	-.0387	10200	8800	-400	-300
	c'	-.0774	10000	8800	-800	-700
	d'	-.1161	10800	8800	-1300	- 1000
	e'	-.1548	11700	8700	-1800	-1400
	f'	-.1935	12300	9000	-2300	-1700
	g'	-.2322	13900	10400	-3200	-2500
	h'	-.2709	15000	12100	-4100	-3100
	i	-.3096	16300	14100	-5000	-4400
	h	-.3483	17200	16200	-6000	-5600
	g	-.3870	18400	17800	-7100	-6900
	f	-.4256	19100	20200	-8100	-8600
	e	-.4643	19100	22200	-9000	-10300
					-49200	-46500
	d	+.4971	18900		9400	
	c	+.3314	18500		6100	
	b	+.1607	18500		3100	
					18600	
					(-30,600)	

VERTICAL Ee

Point	Factor	Loads dead	Loads live	Stress dead	Stress live
b'	-.0343	10200	8800	-300	-400
c'	-.0687	10000	8800	-700	-600
d'	-.1030	10800	8800	-1100	-900
e'	-.1374	11700	8700	-1600	-1200
f'	-.1716	12300	9000	-2100	-1500
g'	-.2060	13900	10400	-2900	-2100
h'	-.2403	15000	12100	-3600	-2900
i	-.2746	16300	14100	-4500	-3900
h	-.3089	17200	16200	-5300	-5000
g	-.3432	18400	17800	-6300	-6100
f	-.3776	19100	21200	-7200	-8000
				-41900	-26400
e	+.5881	19300		11400	
d	+.4441	18900		8400	
c	+.2941	18500		5500	
b	+.1476	18500		2700	
				28000	

VERTICAL Ff

b'	-.04271	10200	8800	-400	-400
c'	-.08542	10000	8800	-900	-700
d'	-.1281	10800	8800	-1400	-1100
e'	-.1708	11700	8700	-2000	-1500
f'	-.2136	12300	9000	-2600	-2000
g'	-.2563	13900	10400	-3600	-2600
h'	-.2990	15000	12100	-4500	-3600
i	-.3417	16300	14100	-5600	-4800
h	-.3844	17200	16200	-6600	-6200
g	-.4271	18400	18600	-7800	-8000
				-35400	-38200
f	+.5305	19100		10100	
e	+.4244	19300		8200	
d	+.3183	18900		6000	
c	+.2122	18500		3900	
b	+.1061	18500		2000	
				30200	

(5,200)

VERTICAL Gg

Point	Factor	Loads dead	Loads live	Stress dead	Stress live
b'	-.04016	10200	8800	-400	-800
c'	-.08032	10000	8800	-800	-1500
d'	-.1205	10200	8800	-1300	-2400
e'	-.1606	11700	8700	-1900	-3300
f'	-.2008	12300	9000	-2500	-4300
g'	-.2410	13900	10400	-3400	-5900
h'	-.2811	15000	12100	-4200	-7600
i	-.3212	16300	14100	-5200	-9800
h	-.3614	17200	16800	-6200	-12300
				-25900	-22000
g	+.5984	18400		11000	
f	+.4987	19100		9500	
e	+.3989	19300		7700	
d	+.2992	18900		5700	
c	+.1995	18500		3700	
b	+.09973	18500		1800	
				39400	
				(+13,500)	

VERTICAL Hh

b'	-.05398	10200	8800	-500	-500
c'	-.1080	10000	8800	-1100	-900
d'	-.1619	10800	8800	-1800	-1400
e'	-.2159	11700	8700	-2500	-1900
f'	-.2699	12300	9000	-3300	-2500
g'	-.3239	13900	10400	-3100	-4800
h'	-.3779	15000	12100	-5700	-4600
i	-.4318	16300	14500	-7000	-6300
				-25000	-22900
h	+.5142	17200		8800	
g	+.4408	18400		8100	
f	+.3673	19100		7000	
e	+.2939	19300		5700	
d	+.2204	18900		4200	
c	+.1469	18500		2700	
b	+.07346	18500		1400	
				37900	
				(12,900)	

VERTICAL Ii

Point	Factor	Loads dead	Loads live	Stress dead	Stress live
b'	-.05295	10200	8800	-500	-500
c'	-.1059	10000	8800	-1100	-900
d'	-.1589	10800	8800	-1700	-1400
e'	-.2118	11700	8700	-2500	-2000
f'	-.2648	12300	9000	-3300	-2400
g'	-.3177	13900	10400	-4400	-3300
h	-.3707	15000	12300	-5600	-4500
				-19100	-15000
i	+.5764	16300		9400	
h	+.5044	17200		8700	
g	+.4323	18400		8000	
f	+.3602	19100		6900	
e	+.2882	19300		5600	
d	+.2161	18900		4100	
c	+.1441	18500		2700	
b	+.07205	18500		1300	
				46700	

(+27,600)

VERTICAL Ii

Point	Factor	Loads dead	Loads live	Stress dead	Stress live
b'	+.07205	10200		700	
c'	.1441	10000		1400	
d'	.2161	10800		1300	
e'	.2882	11700		3400	
f'	.3602	12300		4400	
g'	.4323	13900		6000	
h'	.5044	15000		7600	
i'	.5764	16300		9400	
				+34200	
h	-.3707	17200	16200	-6400	-6000
g	-.3177	18400	17800	-5800	-5700
f	-.2648	19100	21200	-5100	-5600
e	-.2118	19300	21200	-4100	-4500
d	-.1589	18900	21200	-3000	-3400
c	-.1059	18500	21200	-2000	-2200
b	-.05295	18500	21200	-1000	-1100
				- 27400	-28500
				+ 6800	

VERTICAL H'h'

b'	+.07346	10200		800	
c'	.1469	10000		1500	
d'	.2204	10800		2400	
e'	.2939	11700		3400	
f'	.3673	12300		4500	
g'	.4408	13900		6100	
h'	.5142	15000		7700	
				26400	
i	-.4318	16300	14100	-7000	-6100
h	-.3779	17200	16200	-6500	-6100
g	-.3239	18400	17800	-6000	-5800
f	-.2699	19100	21200	-5200	-5700
e	-.2159	19300	21200	-4200	-4600
d	-.1619	18900	21200	-3100	-3400
c	-.1080	18500	21200	-2000	-2300
b	-.05398	18500	21200	-1000	-1100
				-35000	-35100
				- 8600	

VERTICAL G'g'

Point	Factor	Loads dead	Loads live	Stress dead	Stress live
b'	+.09973	10200		1000	
c'	.1885	10000		2000	
d'	.2992	10800		3200	
e'	.3989	11700		4700	
f'	.4987	12300		6100	
g'	.5984	13900		8300	
				25300	
h'	-.3614	15000	12100	-5400	-4400
i	-.3212	16300	14100	-5200	-4500
h	-.2811	17200	16200	-4800	-4600
g	-.2410	18400	17800	-4400	-4300
f	-.2008	19100	21200	-3800	-4300
e	-.1606	19300	21200	-3100	-3400
d	-.1205	18900	21200	-2300	-2600
c	-.08032	18500	21200	-1500	-1700
b	-.04016	18500	21200	- 800	- 900
				-31300	-30700
				- 6000	

VERTICAL F'f'

Point	Factor	Loads dead	Loads live	Stress dead	Stress live
b'	.1061	10200		1100	
c'	.2122	10000		2100	
d'	.3183	10800		3400	
e'	.4244	11700		5000	
f'	.5305	12300		6500	
				18100	
g'	-.4271	13900	10400	-5900	-4400
h'	-.3844	15000	12100	-5700	-4700
i	-.3417	16300	14100	-5600	-4800
h	-.29900	17200	16200	-5100	-4800
g	-.2563	18400	17800	-4700	-4600
f	-.2136	19100	21200	-4100	-4500
e	-.1708	19300	21200	-3300	-3600
d	-.1281	18900	21200	-2400	-2700
c	-.08542	18500	21200	-1500	-1800
b	-.04271	18500	21200	- 800	- 900
				-39100	- 36800
				-21000	

VERTICAL E'e'

Point	Factor	Loads dead	Loads live	Stress dead	Stress live
b'	+.1476	10200		1500	
c'	+.2941	10000		2900	
d'	+.4441	10800		4800	
e'	+.5881	11700		6800	
				16000	
f'	-.3776	12300	9000	-4600	-3400
g'	-.3432	13900	10400	-4800	-3600
h'	-.3089	15000	12100	-4600	-3700
i	-.2746	16300	14100	-4500	-3900
h	-.2403	17200	16200	-4100	-3900
g	-.2060	18400	17800	-3800	-3700
f	-.1716	19100	21200	-3300	-3600
e	-.1374	19300	21200	-2700	-2900
d	-.1030	18900	21200	-2000	-2200
c	-.0687	18500	21200	-1300	-1500
b	-.0343	18500	21200	- 700	- 700
				-36400	-32900
				-20400	

Vertical D'd'

b'	+.1657	10200		1700	
c'	+.3314	10000		3300	
d'	+.4971	10800		5400	
				10400	
e'	-.4643	11700	8700	-5400	-4000
f'	-.4256	12300	9000	-5200	-3800
g'	-.3870	13900	10400	-5400	-4000
h'	-.3483	15000	12100	-5200	-4200
i	-.3096	16300	14100	-5000	-4400
h	-.2709	17200	16200	-4700	-4400
g	-.2322	18400	17800	-4300	-4100
f	-.1935	19100	21200	-3700	-4100
e	-.1548	19300	21200	-3000	-3300
d	-.1161	18900	21200	-2200	-2500
c	-.0774	18500	21200	-1400	-1600
b	-.0387	18500	21200	- 700	- 800
				-46200	-41200
				-35800	

VERTICAL C'c'

Point	Factor	Loads dead	Loads live	Stress dead	Stress live
b'	+.2405	10200		2500	
c'	+.4809	10000		4800	
				7300	
d'	-.4820	10800	8800	-5200	-4200
e	-.4449	11700	8700	-5200	-3900
f'	-.4078	12300	9000	-5000	-3700
g'	-.3708	13900	10400	-5200	-3900
h'	-.3337	15000	12100	-5000	-4000
i	-.2966	16300	14100	-4800	-4200
h	-.2595	17200	16200	-4400	-4200
g	-.2224	18400	17800	-4100	-4000
f	-.1854	19100	21200	-3500	-3900
e	-.1483	19300	21200	-2900	-3100
d	-.1112	18900	21200	-2100	-2400
c	-.0742	18500	21200	-1400	-1600
b	-.03171	18500	21200	- 700	- 800
				-49500	-44800
				-42200	

VERTICAL B'b'

Point	Factor	Loads dead	Loads live	Stress dead	Stress live
b'	+.3023	10200		3100	
				3100	
c'	-.6512	10000	8800	-6500	-5700
d'	-.6046	10800	8800	-6500	-5300
e'	-.5581	11700	8700	-6500	-4900
f'	-.5116	12300	9000	-6300	-4600
g'	-.4651	13900	10400	-6500	-4800
h'	-.4186	15000	12100	-6300	-5100
i	-.3721	16300	14100	-6100	-5200
h	-.3256	17200	16200	-5600	-5300
g	-.2791	18400	17800	-5100	-5000
f	-.2326	19100	21200	-4400	-4900
e	-.1860	19300	21200	-3600	-3900
d	-.1395	18900	21200	-2600	-3000
c	-.0930	18500	21200	-1700	-2000
b	-.0465	18500	21200	- 900	-1000
				-68600	-60700
				-65500	

VERTICAL Gg
(Counter in action)

Point	Factor	Loads dead	Loads live		Stress live	Stress dead
b'	.05505	10800				600
c'	.1101	10000				1100
d'	.1652	10800				1800
e'	.2202	11700				2600
f'	.2753	12300				3400
g'	.3303	13900				4600
h'	.3853	15000				5800
i	.4955	16300				8100
h	.5505	17200				9500
g	.6056	18400				11100
						48600
f	-.3743	19100	21200	-7900		-7200
e	-.2994	19300	21200	-6300		-5800
d	-.2246	18900	21200	-4800		-4200
c	-.1497	18500	21200	-3200		-2800
b	-.07486	18500	21200	-1600		-1400
						-21400
						+ 27200

VERTICAL Hh
(Counter in action)

b'	+.05341	10200				600
c'	+.1080	10000				1100
d'	+.1619	10800				1700
e'	+.2159	11700				2500
f'	+.2699	12300				3300
g'	+.3239	13900				4500
h'	+.3779	15000				5700
i	+.4318	16300				7100
h	+.4858	17200				8400
						34900
g	-.4405	18400	17800	-7900		-8100
f	-.3671	19100	21200	-7800		-7000
e	-.2936	19300	21200	-6200		-5700
d	-.2202	18900	21200	-4700		-4200
c	-.1468	18500	21200	-3100		-2700
b	-.07341	18500	21200	-1600		-1400
				-37300		-29100+
						+ 5800

VERTICAL H'h'

Point	Factor	Loads live	Loads dead	Stress live	Stress dead
b'	-.07341	8800	10200	-700	-800
c'	-.1468	8800	10000	-1300	-1500
d'	-.2202	8800	10800	-1900	-2400
e'	-.2936	8700	11700	-2600	-3400
f'	-.3671	9000	12300	- 3300	-4500
g'	-.4405	10400	13900	-4600	-6100
h				-14400	-18000
h'	-.4858		15000		7300
i	.4318		16300		7100
h	.3779		17200		6500
g	.3239		18400		6000
f	.2699		19100		5200
e	.2159		19300		4200
d	.1619		18900		3100
c	.1080		18500		2000
b	.05341		18500		1000
					+42400
					+23700

~~SOUTHERLY TRUSS~~

DIAGONAL Ab

Point	Factor	Loads		Stress	
		dead	live	dead	live
b'	.08169	10200	8800	800	800
c'	.1634	10000	8800	1600	1500
d'	.2451	10800	8800	2600	2200
e'	.3268	11700	8700	3800	2900
f'	.4085	12300	9000	5000	3700
g'	.4902	13900	10400	6800	5100
h'	.5718	15000	12100	8600	6900
i	.6535	16300	14100	10700	9200
h	.7352	17200	16200	12500	12100
g	.8169	18400	17800	15000	14600
f	.8986	19100	20200	17200	18100
e	.9803	19300	21200	18900	10800
d	1.062	18900	21200	20100	22500
c	1.144	18500	21200	21200	24200
b	1.225	18500	24200	22700	29600
				167500	174200

DIAGONAL Bc

b'	.05447	10200	8800	600	500
c'	.1089	10000	8800	1100	900
d'	.1634	10800	8800	1800	1400
e'	.2179	11700	8700	2700	1700
f'	.2724	12300	9000	3400	2400
g'	.3268	13900	10400	4600	3300
h'	.3808	15000	12100	5700	4600
i	.4358	16300	14100	7100	6100
h	.4902	17200	16200	8400	7500
g	.5447	18400	17800	10000	9700
f	.5992	19100	20200	11500	11100
e	.6537	19300	21200	12600	13800
d	.7080	18900	21200	13400	15000
c	.7626	18500	22200	14100	16900
				97000	95800
b	-.3539	-18500		- 6500	
				90500	

DIAGONAL Cd

	Point	Factor	Loads dead	Loads live	Stress dead	Stress live
	b'	.05096	10200	8800	500	400
	c'	.1019	10000	8800	1000	900
	d'	.1529	10800	8800	1700	1300
	e'	.2039	11700	8700	2400	1800
	f'	.2548	12300	9000	3100	2100
	g'	.3058	13900	10400	4200	3200
	h'	.3568	15000	12100	5400	4300
	i	.4077	16300	14100	6700	5700
	h	.4587	17200	16200	7900	7400
	g	.5097	18400	17800	9400	9100
	f	.5606	19100	20200	10700	11300
	e	.6116	19300	21200	11800	12100
1000	d	.6625	18900	22200	12500	14700
					77300	140600
	c	-.4364	-18500		- 8100	
	b	-.2182	-18500		- 4000	
					-12100	
					(65,200)	

DIAGONAL De

	b'	.04287	10200	8800	400	400
	c'	08574	10000	8800	900	700
	d'	0.1286	10800	8800	1400	1100
	e'	.1715	11700	8700	2000	1500
	f'	.2144	12300	9000	2600	2000
	g'	.2572	13900	10400	3600	2600
	h'	.3001	15000	12100	4500	3600
	i	.3430	16300	14100	5400	5000
	h	.3858	17200	16200	6700	6200
	g	.4287	18400	17800	7900	7600
	f	.4716	19100	20200	9000	9500
	e	.5146	19300	22200	9900	11400
					54300	52000
	d	-.5507	-18900		-10400	
	c	-.3670	-18500		- 6800	
	d	-.1836	-18500		- 3400	
					-20600	
					(33,700)	

DIAGONAL Ef.

	Point	Factor	Loads dead	Loads live	Stress dead	Stress live
	b'	.05126	10200	8800	500	500
	c'	.1025	10000	8800	1000	900
	d'	.1538	10800	8800	1700	1300
	e'	.2050	11700	8700	2400	1800
	f'	.2563	12300	9000	3200	2300
	g'	.3076	13900	10400	4300	3200
	h'	.3588	15000	12100	5400	4300
	i	.4101	16300	14100	6700	5800
	h	.4613	17200	16200	7900	7500
	g	.5126	18400	17800	9400	9200
1000	f	. 5639	19100	21200	10800	11900
					53300	48800
	e	-.5103	-19300		-9900	
	d	-.3827	-18900		-7200	
	c	-.2550	-18500		-4700	
	b	-.1275	-18500		-2400	
					-24200	
					(29,100)	

DIAGONAL Fg

	b'	.0473	10200	8800	500	400
	c'	.0946	10000	8800	900	900
	d'	.1419	10800	8800	1500	1300
	e'	.1899	11700	8700	2200	1700
	f'	.2365	12300	9000	2900	2100
	g'	.2838	13900	10400	3900	3000
	h'	.3311	15000	12100	5000	4000
	i	.3792	16300	14100	6200	5300
	h	.4257	17200	16200	7300	6900
	g	.4740	18400	17800	8700	8800
					39100	34400
	f	-.5864	-19100		-11200	
	e	-.4691	-19300		- 9100	
	d	-.3519	-18900		- 6700	
	c	-.2346	-18500		- 4300	
	b	-.1173	-18500		- 2200	
					-33500	
					(5,600)	

DIAGONAL Gh

	Point	Factor	Loads dead	Loads live	Stress dead	Stress live
	b'	.06253	10200	8800	600	600
	c'	.1251	10000	8800	1300	1100
	d'	.1876	10800	8800	2000	1700
	e'	.2501	11700	8700	2900	2200
	f'	.3127	12300	9000	3800	2900
	g'	.3752	13900	10400	5200	3900
	h'	.4377	15000	12100	6600	5300
	i	.5003	16300	14100	8200	7000
600	h	.5628	17200	16800	9700	9400
					40300	34100
	g	-.5004	-18400		-9200	
	f	-.4170	-19100		-8000	
	e	-.3336	-19300		-6400	
	d	-.2502	-18900		-4700	
	c	-.1668	-18500		-3160	
	b	-.0834	-18500		-1500	
					-32900	
					(7,400)	

DIAGONAL Hi

	b'	+.0610	10200	8800	600	600
	c'	.1221	10000	8800	1200	1100
	d'	.1831	10800	8800	2000	1600
	e'	.2442	11700	8700	2900	2100
	f'	.3052	12300	9000	3800	2700
	g'	.3663	13900	10400	5100	3800
	h'	.4273	15000	12100	6400	5200
	i	.4883	16300	14500	8000	7100
					30000	24200
	h	-.5831	-17200		-10000	
	g	-.4998	-18400		- 9200	
	f	-.4165	-19100		- 8000	
	e	-.3332	-19300		- 6400	
	d	-.2499	-18900		- 4700	
	c	-.1666	-18500		- 3000	
	b	-.0833	-18500		- 1500	
					-42800	
					(-12,800)	

DIAGONAL H'i

Point	Factor	Loads dead	Loads live	Stress dead	Stress live
b'	-.0833	10200	8800	900	
c'	-.1666	10000		-1700	
d'	-.2499	10800		-2700	
e'	-.3332	11700		-3900	
f	-.4165	12300		-5100	
g'	-.4998	13900		-7000	
h'	-.5831	15000		-8700	
				-30000	
i	+.4883	16300	14100	8000	+6900
h	.4273	17200	16200	7400	+6900
g	.3663	18400	17800	6700	+6500
f	.3052	19100	21200	5700	+6500
e	.2442	19300	21200	4700	+5200
d	.1831	18900	21200	3500	+3900
c	.1221	18500	21200	2200	+2600
b	.0610	18500	21200	1100	+1300
				39300	39800
				9300	

DIAGONAL G'h'

b'	-.0834	10200		-800	
c'	-.1668	10000		-1700	
d'	-.2502	10800		-2700	
e'	-.3336	11700		-3900	
f'	-.4170	12300		-5100	
g'	-.5004	13900		-7000	
				-21200	
h'	+.5628	15000	12100	8400	+6800
i	.5003	16300	14100	8200	+7100
h	.4377	17200	16200	7500	+7100
g	.3752	18400	17800	6900	+6800
f	.3127	19100	21200	6000	+6600
e	.2501	19300	21200	4800	+5300
d	.1876	18900	21200	3500	+4000
c	.1251	18500	21200	2300	+2700
b	.06253	18500	21200	1200	+1300
				48800	47700
				27600	

DIAGONAL F'g'

Point	Factor	Loads dead	Loads live	Stress dead	Stress live
b'	-.1173	10200		-1200	
c'	-.2346	10000		-2400	
d'	-.3519	10800		-3800	
e'	-.4691	11700		-5500	
f'	-.5864	12300		-7200	
				-20100	
g'	+.4740	13900	10400	6600	+4900
h	.4257	15000	12100	6400	+5100
i	.3792	16300	14100	6200	+5300
h	.3311	17200	16200	5700	+5400
g	.2838	18400	17800	5200	+5000
f	.2365	19100	21200	4500	+5000
e	.1899	19300	21200	3700	+4000
d	.1419	18900	21200	2700	+3000
c	.0946	18500	21200	1800	+2000
b	.0473	18500	21200	900	+1000
				43700	40700
				23600	

DIAGONAL D'f'

b'	-.1275	10200		-1300	
c'	-.2550	10000		-2600	
d'	-.3827	10800		-4100	
e'	-.5103	11700		-6000	
				-14000	
f'	+.5639	12300	9000	6900	+5100
g'	.5126	13900	10400	7100	+5300
h'	.4613	15000	12100	6900	+5500
i'	.4102	16300	14100	6700	+5800
h	.3588	17200	16200	6200	+5800
g	.3076	18400	17800	5700	+5500
f	.2563	19100	21200	4900	+5400
e	.2050	19300	21200	4000	+4400
d	.1538	18900	21200	2900	+3300
c	.1025	18500	21200	1900	+2200
b	.05126	18500	21200	1000	+1100
				54200	49400
				40200	

DIAGONAL D'e'

Point	Factor	Loads dead	Loads live	Stress dead	Stress live
b'	-.1836	-10200		-1900	
c'	-.3670	-10000		-3700	
d'	-.5507	-10800		-6000	
				-11600	
e'	+.5146	11700	8700	6000	+4500
f'	.4716	12300	9000	5800	+4200
g'	.4287	13900	10400	6000	+4500
h'	.3858	15000	12100	5800	+4700
i	.3430	16300	14100	5100	+4800
h	.3001	17200	16200	5200	+4900
g	.2572	18400	17800	4700	+4600
f	.2144	19100	21200	4100	+4600
e	.1715	19300	21200	3300	+3600
d	1.1286	18900	21200	2400	+2700
c	.08574	18500	21200	1600	+1800
b	.04281	18500	21200	800	+ 900
				50800	45800
				39200	

DIAGONAL C'd'

b'	-.2182	10200		-2200	
c'	-.4364	10000		-4400	
				-6600	
d'	+.6625	10800	8800	7200	+5800
c'	.6116	11700	8700	7200	+5300
f'	.5606	12300	9000	6900	+5000
g'	.5097	13900	10400	7100	+5300
h'	.4587	15000	12100	6900	+5500
i	.4077	16300	14100	6500	+5700
h	.3568	17200	16200	6100	+5800
g	.3058	18400	17800	5600	+5400
f	.2548	19100	21200	4900	+5400
e	.2039	19300	21200	3900	+4300
d	1529	18900	21200	2900	+3200
c	.1019	18500	21200	1900	+2100
b	.05096	18500	21200	1000	+1100
				66200	59900
				59600	

DIAGONAL B'c'

Point	Factor	Loads dead	Loads live	Stress dead	Stress live
b'	-.3539	10200		-3600	
				-3600	
c'	+.7626	10000	8800	7600	+6700
d'	.7081	10800	8800	7700	+6200
e'	.6537	11700	8700	7700	+5700
f'	.5992	12300	9000	7400	+5400
g'	.5447	13900	10400	7600	+5700
h'	.4902	1500 0	12100	7400	+5900
i	.4358	16300	12100	7100	+6200
h	.3808	17200	16200	6500	+6200
g	.3268	18400	17800	6000	+5800
f	.2724	19100	21200	5200	+5800
e	.2179	19300	21200	4200	+4600
d	.1634	18900	21200	3100	+3500
c	.1089	18500	21200	2000	+2300
b	.05447	18500	21200	1000	+1200
				80500	71200
				76900	

DIAGONAL A'b'

b'	+1.255	10200	8800	12800	+11000
c'	1.144	10000	8800	11400	+10100
d'	1.062	10800	8800	11500	+ 9400
e'	.9803	11700	8700	11500	+ 8500
f'	.8986	12300	9000	11100	+ 8100
g'	.8169	13900	10400	11400	+ 8500
h'	.7352	15000	12100	11100	+ 8900
i	.6535	16300	14100	10700	+ 9200
h	.5718	17200	16200	9800	+ 9300
g	.4902	18400	17800	9100	+8700
f	.4085	19100	21200	7800	+ 8700
e	.3268	19300	21200	6300	+ 7000
d	.2451	18900	21200	4600	+ 5200
c	.1634	18500	21200	3000	+ 3500
b	.08169	18500	21200	1500	+ 1700
				133500	117800

COUNTER eF

Point	Factor	Loads dead	Loads live	Stress dead	Stress live
b'	-.0536	10200		-600	
c'	-.1072	10000		-1100	
d'	-.1608	10800		-1700	
e'	-.2144	11700		-2500	
f'	-.2680	12300		-3300	
g'	-.3226	13900		-4500	
h'	-.3762	15000		-5600	
i	-.4288	16300		-7000	
h	-.4824	17200		-8400	
g	-.5360	18400		-9900	
f	-.5896	19100		-11300	
				-55900	
e	+.5340	19300	22200	10300	+11900
d	+.4005	18900	21200	7600	8500
c	+.2670	18500	21200	5000	5600
b	+.1335	18500	21200	2500	2800
				25400	28800
				(-30,500)	

COUNTER fG

b'	-.04947	10200		-500	
c'	-0.9894	10000		-1000	
d'	-0.14841	10800		-1600	
e'	-0.1979	11700		-2300	
f'	-.2475	12300		-3100	
g'	-.2965	13900		-4100	
h'	-.3465	15000		-5200	
i	-.3958	16300		-5600	
h	-.4453	17200		-7700	
g	-. 4947	18400		-9100	
				-41100	
f	+.6145	19100	21200	11700	+13100
e	+.4915	19300	21200	9500	10400
d	+.3678	18900	21200	7000	7800
c	+ .2458	18500	21200	4600	5200
b	+.1229	18500	21200	2300	2600
				35100	39100
				(-6,000)	

COUNTER gH

Point	Factor	Loads dead	Loads live	Stress dead	Stress live
b'	-.06345	10200	8800	-600	-600
c'	-.1269	10000	8800	-1300	-1100
d'	-.1904	10800	8800	-2100	-1700
e'	-.2538	11700	8700	-3000	-3100
f'	-.3172	12300	9000	-.3900	-2900
g'	-.3805	13900	10400	-5300	-4000
h'	-.4400	15000	12100	-6700	-5400
i	-.5075	16300	14100	-8300	-7200
h	-.5710	17200	16200	-9800	-9300
				-41000	-33300
g	.5184	18400	17800	9400	9200
f	.4320	19100	21200	8300	9100
e	.3600	19300	21200	7000	7600
d	.2593	18900	21200	4900	5500
c	.1728	18500	21200	3200	3700
b	.0864	18500	21200	1600	1800
				34400	36900
				- 6.600	+ 3600

Counter HI

b'	-.06194	10200	8800	-600	-500
c'	-.1239	10000	8800	-1200	-1100
d'	-.1858	10800	8800	-2000	-1600
e'	-.2477	11700	8700	-2900	-2200
f'	-.3096	12300	9000	-3800	-2800
g'	-.3715	13900	10400	-5200	-3900
h'	-.4334	15000	12100	-6500	-5300
i	-.4955	16300	14100	-8100	-7000
				-30300	-24400
h	.5876	17200	16200	10100	9600
g	.5052	18400	17800	9300	9000
f	.4211	19100	21200	8100	9300
e	.3366	19300	21200	6500	7100
d	.2524	18900	21200	4800	5300
c	.1685	18500	21200	3300	3500
b	.08423	18500	21200	1600	1800
				43700	45600
				+13400	+21200

COUNTER G'f'

Point	Factor	Loads dead	Loads live	Stress dead	Stress live
b'	+.1229	10200	8800	1300	1100
c'	.2458	10000	8800	2500	2200
d'	.3687	10800	8800	4000	3200
e'	.4915	11700	8700	5700	4300
f'	.6145	12300	9000	7600	5500
				21100	16300
g'	-.4947	13900		- 6900	
h'	-.4453	15000		- 6700	
i	-.3958	16300		- 6500	
h	-.3465	17200		- 6000	
g	-.2965	18400		- 5600	
f	-.2475	19100		- 4700	
e	-.1979	19300		- 3800	
d	-.1484	18900		- 2800	
c	-.0984	18500		- 1800	
b	-.04947	18500		- 900	
				-45700	
				+21100	
				-24600	

COUNTER H'g'

b'	+.0864	10200	8800	900	800
c'	.1728	10000	8800	1700	1500
d'	.2593	10800	8800	2800	2300
e'	.3600	11700	8700	4200	3100
f'	.4320	12300	9000	5300	3900
g'	.5184	13900	10400	7200	5300
				22100	16900
h'	-.5100	15000		-8600	
i	-.5075	16300		-8300	
h	-.4440	17200		-7600	
g	-.3805	18400		-7000	
f	-.3172	19100		-6100	
e	-.2538	19300		-5000	
d	-.1904	18900		-3600	
c	-.1269	18500		-2200	
b	-.06345	18500		-1100	
				-49500	
				-27400	

COUNTER Ih'

Point	Factor	Loads dead	Loads live	Stress dead	Stress live
b'	+.08423	10200	8800	900	700
c'	.1685	10000	8800	1700	1500
d'	.2524	10800	8800	2700	2200
e'	.3366	11700	8700	4000	2900
f'	.4211	12300	9000	5200	3800
g'	.5052	13900	10400	7000	5200
h'	.5896	15000	12100	8900	7100
				30400	23400
i	-.4955	16300		-8100	
h	-.4334	17200		-7500	
g	-.3715	18400		-6700	
f	-.3096	19100		-5700	
e	-.2477	19300		-4800	
d	-.1858	18900		-3500	
c	-.1239	18500		-2300	
b	-.06194	18500		-1200	
				-39800	
				- 9,400	

LOWER CHORD bc

Point	Factor	Loads dead	Loads live	Stress dead	Stress live
b'	+.06728	10200	8800	700	600
c'	+.1346	10000	8800	1300	1200
d'	+.2018	10800	8800	2200	1800
e'	+.2691	11700	8700	3100	2400
f'	+.3364	12300	9000	4100	3100
g'	+.4037	13900	10400	5600	4200
h'	+.4709	15000	12100	7200	5600
i	+. 5383	16300	14100	8800	7600
h	+.6054	17200	16200	10400	9800
g	+.6728	18400	17800	12400	12000
f	+.7400	19100	20200	14200	14900
e	+.8073	19300	21200	15600	16100
d	+.8746	18900	21200	16500	18600
c	+.9419	18500	21200	17400	20000
b	+1.008	18500	23200	18500	14600
				133000	143500

LOWER CHORD cd.

b'	.1071	10200	8800	1100	900
c'	.2143	10000	8800	2100	1900
d'	.3214	10800	8800	3500	2800
e'	.4287	11700	8700	5000	3800
f'	.5357	12300	9000	6600	4800
g'	.6429	13900	10400	8900	6700
h'	.7500	15000	12100	11200	9200
i	.8571	16300	14100	14000	12100
h	.9643	17200	16200	16600	15600
g	1.071	18400	17800	19700	19100
f	1.179	19100	20200	22500	23900
e	1.286	19300	21200	24800	27300
d	1.393	18900	21200	26400	29500
c	1.503	18500	22200	27800	33400
b	.7500	18500	21200	13900	15900
				204100	207700

LOWER CHORD de

Point	Factor	Loads dead	Loads live	Stress dead	Stress live
b'	.1403	10200	8800	1400	1300
c'	.2806	10000	8800	2800	2500
d'	.4209	10800	8800	4500	3800
e'	.5612	11700	8700	6600	4900
f'	.7015	12300	9000	8600	6300
g'	.8418	13900	10400	11600	8900
h'	.9821	15000	12100	14700	11900
i	1.122	16300	14100	18300	15800
h	1.263	17200	16200	21700	20500
g	1.403	18400	17800	25800	25000
f	1.543	19100	20200	29500	31200
e	1.684	19300	21200	32600	35500
d	1.824	18900	22200	34400	40600
c	1.216	18500	21200	22500	25800
b	.6080	18500	21200	12300	12900
				247300	245900

LOWER CHORD ef.

b'	.1660	10200	8800	1700	1500
c'	.3320	10000	8800	3300	3000
d'	.4979	10800	8800	5400	4400
e'	.6640	11700	8700	7800	5800
f'	.8301	12300	9000	10200	7500
g'	.9960	13900	10400	13900	10300
h'	1.162	15000	12100	17400	14100
i	1.328	16300	14100	21700	18700
h	1.494	17200	16200	25700	24200
g	1.660	18400	17800	30600	29500
f	1.826	19100	20200	34700	37100
e	1.992	19300	22200	38400	44300
d	1.494	18900	21200	28300	31600
c	.9960	18500	21200	18500	21100
b	.4980	18500	21200	9300	10300
				266900	223800

LOWER CHORD fg

Point	Factor	Loads dead	Loads live	Stress dead	Stress live
b'	.1943	10200	8800	2000	1700
c'	.3886	10000	8800	3900	3400
d'	.5829	10800	8800	6300	5200
e'	.7772	11700	8700	9100	6800
f'	.9715	12300	9000	12000	8700
g'	1.166	13900	10400	16200	12100
h	1.360	1500	12100	20400	16500
i	1.554	16300	14100	25300	22000
h	1.748	17200	16200	30100	28400
g	1.943	18400	17800	35800	34600
f	2.137	19100	21200	40900	45200
e	1.718	19300	21200	33200	36300
d	1.288	1890o	21200	24400	27200
c	.8588	18500	21200	15900	18200
b	.4294	18500	21200	8000	9100
				283500	275300

LOWER CHORD gh.

b'	.2193	10200	8800	2200	200
c'	.4386	10000	8800	4400	3900
d	.6579	10800	8800	7100	5800
e'	.8772	11700	8700	10300	7600
f'	1.097	12300	9000	13500	9900
g'	1.316	13900	10400	18300	13700
h'	1.535	15000	12100	23000	18600
i	1.755	16300	14100	28600	24800
h	1.974	17200	16200	33900	32100
g	2.193	18400	17800	40400	38900
f	1.828	19100	21200	34700	38900
e	1.462	19300	21200	28200	31000
d	1.097	18900	21200	19800	20600
c	.7310	18500	21200	13500	15500
b	.3655	18500	21200	6800	7700
				284700	271000

LOWER CHORD hi (counter in action)

Point	Factor	Loads		Stress	
		dead	live	dead	live
b'	.2813	10200	8800	2900	2300
c'	.5625	10000	8800	5600	5000
d'	.8438	10800	8800	9100	7400
e'	1.1250	11700	8700	13200	9800
f'	1.406	12300	9000	17300	12700
g'	1.687	13900	10400	23500	17600
h'	1.978	15000	12100	29600	23900
i	2.260	16300	14100	36800	31900
h	1.978	17200	16200	34000	32000
g	1.687	18400	17800	31000	30000
f	1.406	19100	21200	26900	29800
e	1.125	19300	21200	21700	23800
d	.8438	18900	21200	16000	+17900
c	.5625	18500	21200	10400	+11900
b	.2813	18500	21200	5200	+ 6000
				265900	262000

LOWER CHORD H'i

Point	Factor	Loads dead	Loads live	Stress dead	Stress live
b'	.3227	10200	8800	+3300	+2800
c'	.6454	10000	8800	+6500	+5700
d'	.9681	10800	8800	+10500	+8500
e'	1.291	11700	8700	+15100	+11200
f'	1.613	12300	9000	+19800	+14500
g'	1.936	13900	10400	+26900	+20100
h'	2.259	15000	12100	+33900	+27400
i	2.008	16300	14100	+32700	+28300
h	1.757	17200	16200	+30300	+28500
g	1.506	18400	17800	+27700	+26800
f	1.255	19100	21200	+24000	+26600
e	1.004	19300	21200	+19300	+21300
d	.7529	18900	21200	+14300	+16000
c	.5019	18500	21200	+ 9300	+10600
b	.2510	18500	21200	+ 4700	+ 5300
				278300	253600

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LOWER CHORD g'h'

b'	.3655	10200	8800	+3700	+3200
c'	.7310	10000	8800	+7300	+6400
d'	1.097	10800	8800	+11900	+9700
e'	1.462	11700	8700	+17100	+12700
f'	1.828	12300	9000	+22500	+16500
g	2.193	13900	10400	+30500	+22800
h'	1.974	15000	12100	+29100	+23800
i	1.755	16300	14100	+28600	+24800
h	1.535	17200	16200	+26400	+24900
g	1.316	18400	17800	+24200	+23400
f	1.097	19100	21200	+21000	+23200
e	.8772	19300	21200	+17000	+18600
d	.6579	18900	21200	+12500	+14000
c	.4386	18500	21200	+8100	+9300
b	.2193	18500	21200	+4100	+ 4700
				264000	238000

LOWER CHORD f'g'

Point	Factor	Loads dead	Loads live	Stress dead	Stress live
b'	.4294	10200	8800	+4300	+3800
c'	.8588	10000	8800	+8000	+7600
d'	1.288	10800	8800	+13900	+11300
e'	1.718	11700	8700	+20100	+14900
f'	2.137	12300	9000	+26300	+19200
g'	1.943	13900	10400	+27000	+20100
h'	1.748	15000	12100	+26200	+21200
i	1.554	16300	14100	+25300	+21900
h	1.360	17200	16200	+23400	+22000
g	1.166	18400	17800	+21400	+20700
f	.9715	19100	21200	+18600	+20600
e	.7772	19300	21200	+15000	+16500
d	.5829	18900	21200	+11000	+12400
c	.3886	18500	21200	+ 7200	+ 8200
b	.1943	18500	21200	+ 3600	+ 4100
				251300	224500

LOWER CHORD g'f'

b'	.4980	10200	8800	+5100	+4400
c'	.9960	10000	8800	+10000	+8800
d'	1.494	10800	8800	+16100	+13100
e'	1.992	11700	8700	+23300	+17300
f'	1.826	12300	9000	+22500	+16400
g'	1.6600	13900	10400	+23100	+17300
h'	1.494	15000	12100	+22400	+18000
i	1.328	16300	14100	+21600	+18800
h	1.162	17200	16200	+20000	+18800
g	.9960	18400	17800	+18300	+17800
f	.8301	19100	21200	+15800	+17600
e	.6640	19300	21200	+12800	+14100
d	.4979	18900	21200	+ 9400	+10600
c	.3320	18500	21200	+ 6100	+ 7000
b	.1660	18500	21200	+ 3100	+ 3500
				229600	203900

LOWER CHORD d'e'

Point	Factor	Loads dead	Loads live	Stress dead	Stress live
b'	.6080	10200	8800	+6200	+5400
c'	1.216	10000	8800	+22200	+10700
d'	1.824	10800	8800	+19700	+16000
e'	1.684	11700	8700	+19800	+14600
f'	1.543	12300	9000	+19000	+13900
g'	1.403	13900	10400	+19500	+14600
h'	1.263	15000	12100	+18900	+15300
i	1.122	16300	14100	+18300	+15800
h	.9821	17200	16200	+16900	+15900
g	.8408	18400	17800	+15500	+15000
f	.7015	19100	21200	+13400	+14900
e	.5612	19300	21200	+10800	+11900
d	.4209	18900	21200	+ 8000	+ 8900
c	.2806	18500	21200	+ 5200	+ 6000
b	.1403	18500	21200	+ 2600	+ 3000
				206000	181900

LOWER CHORD c'd'

b'	.7500	10200	8800	+1700	+6600
c'	1.503	10000	8800	+15000	+13200
d'	1.393	10800	8800	+15000	+12400
e'	1.286	11700	8700	+15000	+11200
f'	1.179	12300	9000	+14500	+10600
g'	1.071	13900	10400	+14900	+ 11100
h'	.9643	15000	21200	+14400	+ 11700
i'	.8571	16300	14100	+14000	+ 21200
h	.7500	17200	16200	+12900	+ 12200
g	.6429	18400	17800	+11800	+ 11400
f	.5357	19100	21200	+10200	+ 11400
e	.4287	19300	21200	+ 8300	+ 9100
d	.3214	18900	21200	+ 6100	+ 6800
c	.2143	18500	21200	+ 4000	+ 4600
b	.1071	18500	21200	+ 2000	+ 2300
				165600	146700

LOWER CHORD b'c'

Point	Factor	Loads		Stress	
		dead	live	dead	live
b'	1.008	10200	8800	10000	+8900
c'	.9419	10000	8800	+ 9400	+8300
d'	.8746	10800	8800	+ 9500	+7700
e'	.8073	11700	8700	+ 9500	+7000
f'	.7400	12300	9000	+ 9100	+6700
g'	.6728	13900	10400	+ 9400	+7000
h'	.6054	15000	12100	+ 9100	+7300
i	.5383	16300	14100	+ 8800	+7600
h	.4709	17200	16200	+ 8100	+7600
g	.4037	18400	17800	+ 7400	+7200
f	.3364	19100	21200	+ 6400	+7100
e	.2691	19300	21200	+ 5000	+5700
d	.2018	18900	21200	+ 3800	+4300
c	.1346	18500	21200	+2500	+2900
b	.06728	18500	21200	+ 1300	+1400
				109300	96700

~~NORTHERLY TRUSS~~

UPPER CHORD AB

	Point	Factor	Loads dead	Loads live	Stress dead	Stress live
	b'	-.06925	10200	8800	-700	-600
	c'	-.1383	10000	8800	-1400	-1200
	d'	-.2074	10000	8800	-2100	-2000
	e'	-.2766	11700	8700	-3200	-2500
	f'	-.3458	12300	9000	-4300	-3100
	g'	-.4149	13900	10400	-5800	-4300
	h'	-.4840	15000	12100	-7300	-5800
	i	-.5532	16300	14100	-9000	-7800
	h	-.6224	17200	16200	-10700	-10100
	g	-.6915	18400	17800	-12700	-12400
	f	-.7606	19100	20200	-14500	-15400
	e	-.8298	19300	21200	-16000	-17600
	d	-.8990	18900	21200	-17000	-19000
	c	-.9681	18500	21200	-17900	-20500
3000	b	-1.037	18500	24200	-19200	-25100
					-141800	-147400

UPPER CHORD BC

	b'	-.1101	10200	8800	-1100	-1000
	c'	-.2203	10000	8800	-2200	-1900
	d'	-.3304	10800	8800	-3600	-2900
	e'	-.4405	11700	8700	-5200	-3800
	f'	-.5506	12300	9000	-6800	-4900
	g'	-.6607	13900	10400	-9200	-6900
	h'	-.7709	15000	12100	-11600	-9300
	i	-.8810	16300	14100	-14400	-12400
	h	-.9911	17200	16200	-17100	-16000
	g	-1.101	18400	17800	-20200	-19700
	f	-1.211	19100	20200	-23200	-24400
	e	-1.322	19300	21200	-25500	-28000
	d	-1.432	18900	21200	-27100	-30300
1000	c	-1.542	18500	22200	-28600	-34200
	b	-.7709	18500	21200	-14300	-16300
					-210100	-209300

UPPER CHORD CD.

Point	Factor	Loads dead	Loads live	Stress dead	Stress live
b'	-.1422	10200	8800	-1500	-1200
c'	-.2844	10000	8800	-2800	-2600
d'	-.4266	10800	8800	-4600	-3800
e'	-.5688	11700	8700	-6500	-5100
f'	-.1110	12300	9000	-8700	-6400
g'	-.8533	13900	10400	-11800	-8900
h'	-.9955	15000	12100	-14900	-12100
i	-1.138	16300	14100	-18600	-16000
h	-1.280	17200	16200	-22000	-20600
g	-1.422	18400	17800	-26200	-25300
f	-1.564	19100	20200	-29900	-31600
e	-1.706	19300	21200	-32900	-36200
d	-1.849	18900	22200	-34900	-41100
c	-1.234	18500	21200	-22900	-26100
b	-.6168	18500	21200	-11500	-13000
				-249500	-250400

UPPER CHORD DE.

b'	-.1684	10200	8800	-1700	-1500
c'	-.3367	10000	8800	-3400	-2900
d'	-.5051	10800	8800	-5400	-4500
e'	-.6724	11700	8700	-7900	-6000
f'	-.8418	12300	9000	-10300	-7600
g'	-1.010	13900	10400	-14000	-10500
h'	-1.179	15000	12100	-17700	-14300
i	-1.347	16300	14100	-22000	-18900
h	-1.515	17200	16200	-28800	-21800
g	-1.684	18400	17800	-31000	-30000
f	-1.852	19100	20200	-35400	-37400
e	-2.020	19300	22200	-39000	-44800
d	-1.515	18900	21200	-28700	-32100
c	-1.010	18500	21200	-18700	-21400
b	-.5050	18500	21200	- 9400	-10600
				-273400	-264300

UPPER CHORD EF

Point	Factor	Loads		Stress	
		dead	live	dead	live
b'	-.1953	10200	8800	-2000	-1700
c'	-.3907	10000	8800	-3900	-3500
d'	-.5860	10800	8800	-6300	-5200
e'	-.7814	11700	8700	-9100	-6900
f'	-.9767	12300	9000	-12000	-8800
g'	-1.1720	13900	10400	-16300	-12600
h'	-1.367	15000	12100	-20500	-16500
i	-1.563	16300	14100	-25500	-22000
h	-1.758	17200	16200	-30200	-28500
g	-1.953	18400	17800	-35900	-34800
f	-2.148	19100	21200	-41000	-45800
e	-1.718	19300	21200	-33200	-36300
d	-1.289	18900	21200	-24200	-27400
c	-.8592	18500	21200	-15900	-18200
b	-.4296	18500	21200	- 8000	- 9100
				-284000	-277300

UPPER CHORD FG

b'	-.2204	10200	8800	-2300	-1900
c'	-.4408	10000	8800	-4400	-3900
d'	-.6612	10800	8800	-7100	-5900
e'	-.8816	11700	8700	-10300	-7700
f'	-1.102	12300	9000	-13600	-9900
g'	-1.322	13900	10400	-18400	-13700
h'	-1.543	15000	12100	-23200	-18600
i	-1.763	16300	14100	-28700	-24900
h	-1.984	17200	16200	-34100	-32100
g	-2.204	18400	17800	-40500	-39400
f	-1.837	19100	21200	-35100	-39000
3	-1.469	19300	21200	-28400	-31100
d	-1.102	18900	21200	-20800	-23400
c	-.7346	18500	21200	-13600	-15600
b	-.3673	18500	21200	- 6800	- 7800
				-287300	-275000

UPPER CHORD GH

Point	Factor	Loads dead	Loads live	Stress dead	Stress live
b'	-.2510	10200	8800	-2600	-2200
c'	-.5021	10000	8800	-5000	-4500
d'	-.7531	10800	8800	-8100	-6700
e'	-1.004	11700	8700	-11800	-8700
f'	-1.255	12300	9000	-15500	-11200
g	-1.506	13900	10400	-20900	-15700
h'	-1.757	1500	12100	-26400	-21200
i	-2.008	16300	14100	-32700	-28600
h	-2.259	17200	16200	-38800	-36600
g	-1.936	18400	17800	-35600	-35600
f	-1.613	19100	21200	-30800	-34200
e	-1.291	19300	21200	-25000	-27300
d	-.9681	18900	21200	-18300	-20500
c	-.6454	18500	21200	-12000	-13600
b	-3227	18500	21200	- 6000	- 6800
				-289500	-282400

UPPER CHORD HI

The stress in this chord is the same as in GH since for full loading the diagonal Gh and counter Ih are in action.

UPPER CHORD H'I

Point	Factor	Loads dead	Loads live	Stress dead	Stress live
B'	-.2815	10200	8800	-2900	-2500
c'	-.5630	10000	8800	-5600	-4900
d'	-.8445	10800	8800	-9100	-7500
e'	-1.126	11700	8700	-13200	-9800
f'	-1.408	12300	9000	-17300	-12700
g'	-1.689	13900	10400	-23500	-17600
h'	-1.970	15000	12100	-29600	-23800
i	-2.251	16200	14100	-36700	-31800
h	-1.970	17200	16200	-33900	-31900
g	-1.688	18400	17800	-31000	-30000
f	-1.407	19100	21200	-26900	-29800
e	-1.126	19300	21200	-21700	-23800
d	-.8442	18900	21200	-16000	-17900
c	-.5628	18500	21200	-10200	-11900
b	-.2814	18500	21200	- 5700	-6000
				-283300	-261900

UPPER CHORD G'H'

b'	-.3227	10200	8800	-3300	-2800
c'	-.6454	10000	8800	-6500	-5700
d'	-.9680	10800	8800	-10500	-8500
e	-1.291	11700	8700	-15100	-11200
f'	-1.613	12300	9000	-19800	-14500
g'	-1.936	13900	10400	-26900	-19600
h'	-2.259	15000	12100	-34000	-27300
i	-2.008	16200	14100	-32700	-28300
h	-1,757	17200	10200	-30200	-28400
g	-1.506	18400	17800	-27700	-26800
f	-1.255	19100	21200	-24000	-26600
e	-1.004	19300	21200	-19300	-21200
d	-.7531	18900	21200	-14200	-16000
c	-.5021	18500	21200	- 9300	-10700
b	-.2510	18500	21200	- 4700	- 5300
				-288200	252900

UPPER CHORD F'G'

Point	Factor	Loads		Stress	
		dead	live	dead	live
b'	-.3673	10200	8800	-3800	-3200
c'	-.7346	10000	8800	-7300	-6500
d'	-1.102	10800	8800	-11900	-9700
e'	-1.469	11700	8700	-17200	-12600
f'	-1.837	12300	9000	-22600	-16500
g'	-2.204	13900	10400	-30700	-23000
h'	-1.984	15000	12100	-29800	-24000
i	-1.763	16300	14100	-28700	-24800
h	-1.543	17200	16200	-26500	-25000
g	-1.322	18400	17800	-24300	-23600
f	-1.102	19100	21200	-21100	-23400
e	- .8816	19300	21200	-17000	-18700
d	- .6612	18900	21200	-12500	-14000
c	- .4408	18500	21200	- 8200	- 9400
b	- .2204	18500	21200	- 4100	- 4700
				-265700	239100

UPPER CHORD E'F'

b'	-.4296	10200	8800	-4400	-3800
c'	-.8592	10000	8800	-8600	-7600
d'	-1.289	10800	8800	-13900	-11400
e'	-1.716	11700	8700	-20100	-15000
f'	-2.148	12300	9000	-20400	-19300
g'	-1.953	13900	10400	-27200	-20200
h'	-1.758	15000	12100	-26400	-21200
i	-1.563	16300	14100	-25500	-22000
h	-1.367	17200	16200	-23500	-22100
g	-1.172	18400	17800	-21600	-20900
f	- .9767	19100	21200	-18700	-20700
e	- .7814	19300	21200	-15100	-16600
d	- .5860	18900	21200	-11100	-12400
c	- .3901	18500	21200	- 6300	- 8300
b	- .1953	18500	21200	- 3200	- 4100
				-246000	225600

UPPER CHORD D'E'

Point	Factor	Loads dead	Loads live	Stress dead	Stress live
b'	-.5050	10200	8800	-5200	4400
c'	-1.010	10000	8800	-10100	-8900
d'	-1.515	10800	8800	-16400	-13300
e'	-2.020	11700	8700	-23600	-17600
f'	-1.852	12300	9000	-22800	-16700
g'	-1.684	13900	10400	-23400	-17500
h'	-1.515	15000	12100	-22700	- 18300
i'	-1.347	16300	14100	-22000	-19000
h	-1.179	17200	16200	-20300	-19100
g	-1.010	18400	17800	-18600	-18000
f	- .8418	19100	21200	-16100	-17800
e	- .6724	19300	21200	-13000	-14300
d	-.5051	18900	21200	- 9500	-11700
c	-.3367	18500	21200	- 6200	- 7100
b	-.1684	18500	21200	- 3100	- 3600
				-233000	207300

UPPER CHORD C'D'

b'	-.6168	10200	8800	6300	-5400
c'	-1.234	10000	8800	12000	-10900
d'	-1.849	10800	8800	20000	-16300
e'	-1.706	11700	8700	20000	-14800
f'	-1.564	12300	9000	19200	-14100
g'	-1.422	13900	10400	19800	-14800
h'	-1.280	15000	12100	19200	-15500
i	-1.138	16300	14100	18600	-16100
h	-.9955	17200	16200	17200	-16100
g	-.8533	18400	17800	15700	-15200
f	-.7110	19100	21200	13600	-15100
e	-.5688	19300	21200	11000	-12100
d	-.4266	18900	21200	8100	- 9100
c	-.2844	18500	21200	5300	- 6000
b	-.1422	18500	21200	2700	- 3000
				208700	187500

UPPER CHORD B'C'

Point	Factor	Loads dead	Loads live	Stress dead	Stress live
b'	-.7709	10200	8800	7900	-6800
c'	-1.542	10000	8800	15400	-13600
d'	-1.432	10800	8800	15500	-12600
e'	-1.322	11700	8700	15500	-11500
f'	-1.211	12300	9000	14900	-10900
g'	-1.101	13900	10400	15300	-11400
h'	-.9911	15000	12100	14900	-12000
i	-.8810	16300	14100	14400	-12400
h	-.7709	17200	16200	13300	-12500
g	-.6607	18400	17800	12200	-11800
f	-.5506	19100	21200	10500	-11700
e	-.4405	19300	21200	8500	- 9300
d	-.3304	18900	21200	6300	- 7000
c	-.2203	18500	21200	4100	- 4700
b	-.1101	18500	21200	2100	- 2300
				170800	150500

UPPER CHORD A'B'

b'	-.96	10200	8800	-10600	-9100
c'	-.8681	10000	8800	- 9700	-8500
d'	-.8990	10800	8800	- 9700	-7900
c'	-.8298	11700	8700	- 9700	-7200
f'	-.7606	12300	9000	- 9400	-6906
g'	-.6915	13900	10400	- 9600	-7200
h'	-.6224	15000	12100	- 9400	-7500
i	-.5532	16300	14100	- 9000	-7800
h	-.4840	17200	16200	- 8300	-7900
g	-.4149	18400	17800	- 7600	-7400
f	-.3458	19100		-6600	-7300
e	-.2766	19300	21200	- 5300	-5900
d	-.2074	18900	21200	- 3900	-4400
c	-.1383	18500	21200	- 2600	-2900
b	-.06915	18500	21200	- 1300	-1500
					99400

TOTAL STRESS.

Diagonals.

Bar	Dead	Live	Impact	Total
AB	+167500	+174200	+17400	+359100
Bc	+ 90500	+ 95800	+ 9600	+195900
Cd	+ 65200	+ 75400	+ 8200	+148800
De	+ 33700	+ 52000	+ 6200	+ 91900
Ef	+29100	+ 48800	+ 6400	+84300
Fg	+ 5600	+ 34400	+ 4800	+ 44800
Gh	+ 7400	+ 34100	+ 5100	+ 46600
Hi	- 12800	+ 24200	+ 3900	+ 15300
H'i	+ 9300	+ 39800	+ 7200	+56300
G'h'	+27600	+ 47700	+ 9100	+ 84400
F'g'	+ 23600	+ 40700	+ 8100	+ 72400
E'f'	+ 40200	+ 49400	+ 10400	+100000
D'e'	+ 39200	+ 45800	+10100	+ 95100
C'd'	+ 39600	+ 59900	+ 13700	+133200
B'c'	+ 76900	+ 71200	+17800	+165900
A'b'	+133500	+117800	+24000	+275300

Counters.

eF	-30500	+28800	+11500	+9800
fG	- 6000	+39100	+15600	+48700
gH	- 6600	+36900	+14800	+45100
hI	+13400	+45600	+18200	+77200
h'I	- 9400	+23400	+ 9900	+23400
g'H	-27400	+16900	+ 6800	- 3700
f'G'	-24600	+16300	+ 6500	- 1800

VERTICALS

Bar	Dead	Live	Impact	Total
Aa	-128300	-133000	-13300	-165600
Bb	-77100	- 81500	- 9000	-167600
Cc	-43000	- 55000	- 6600	-104600
Dd	-30600	- 46500	- 6100	-83200
Ee	-13900	- 26400	- 3700	- 44000
Ff	- 5200	- 38200	- 5700	- 49100
Gg	+13500	- 22000	- 3500	- 12200
Hh	+12900	- 22900	- 3900	- 13900
Ii	+27600	- 15000	- 2700	+ 9900
Hh'	- 8600	- 35100	- 6300	- 49000
G'g'	- 6000	- 30700	- 5800	-42500
F'f'	-21000	- 36800	- 7400	-65200
E'e'	-20400	-32900	- 6900	-60200
D'd'	-35800	- 41200	-9000	-86000
C'c'	-42200	- 44800	-10300	-97300
B'b'	-65500	-60700	-15200	-141400
A'a'	-102000	-89900	-22500	-214400

(COUNTERS IN ACTION)

Ff	24500	-22600	-4800	-2900
Gg	27200	-23800	-4800	-1400
Hh	5800	-31300	-5900	-31400
Ii	6800	-28500	-5100	-26800
H'h'	23700	-14400	-2700	+6600

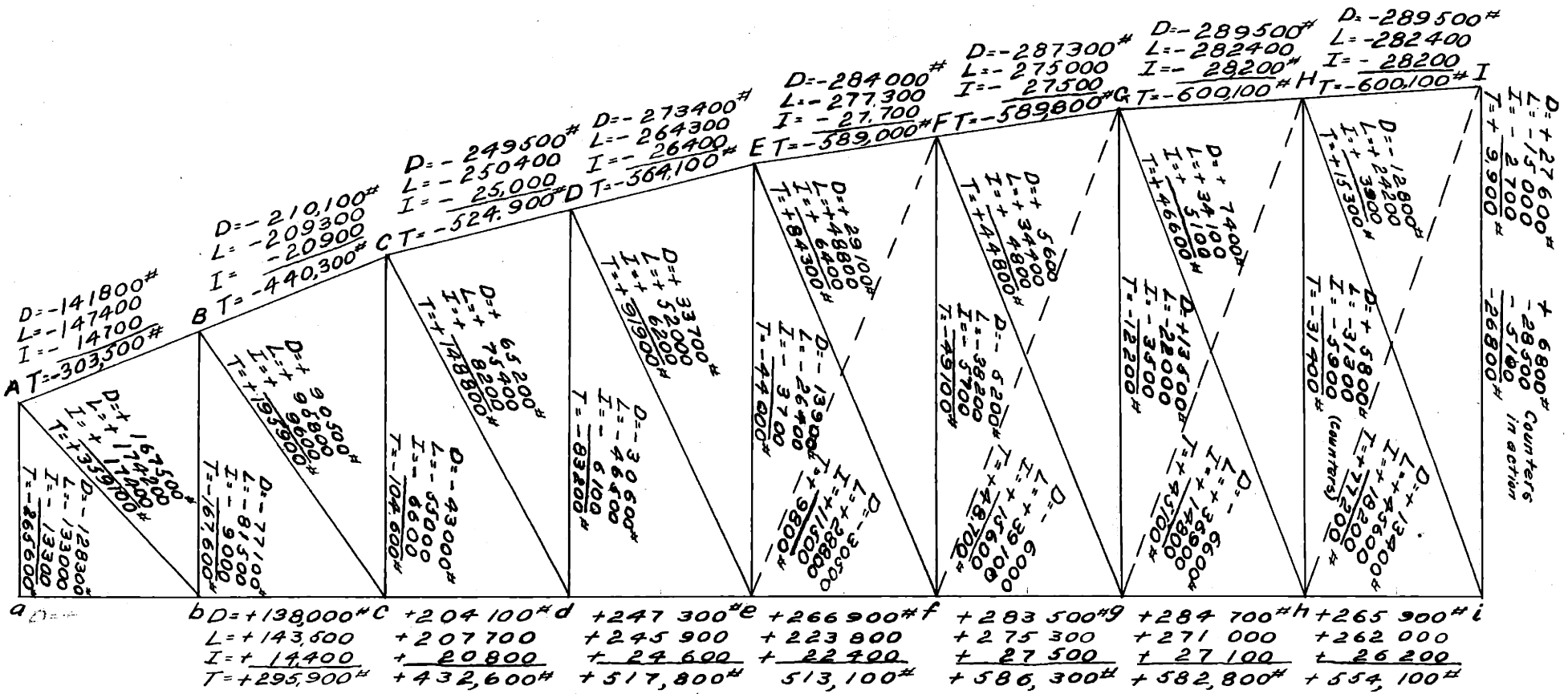
UPPER CHORD

Bar	Dead	Live	Impact	Total
A'B'	-112700	-99400	-9900	-222000
B'C'	-170800	-150500	-15100	-336400
C'D'	-208700	-187500	-18800	-415000
D'E'	-233000	-207300	-20700	-461000
E'F'	-246000	-225600	-22600	-494200
F'G'	-265700	-239100	-23900	-528700
G'H'	-278200	-252900	-25300	-556400
H'I	-283300	-261900	-26200	-571400
HI	-289500	-282400	-28200	-600100
GH	-289500	-282400	-28200	-600100
FG	-287300	-275000	-27500	-589800
EF	-284000	-277300	-27700	-589000
DE	-273400	-264300	-26400	-564100
CD	-249500	-250400	-25000	-524900
BC	-210100	-209300	-20900	-440300
AB	-141800	-147400	-14700	-303500

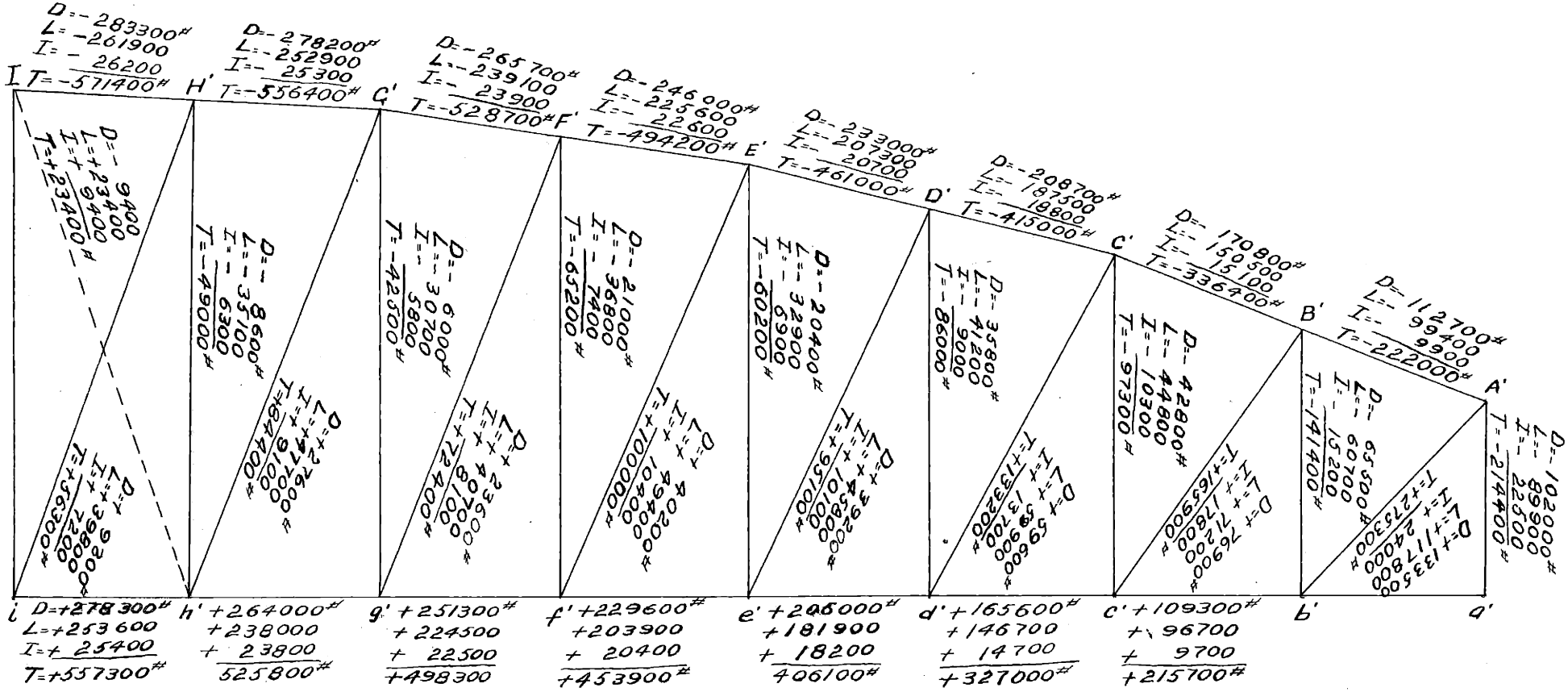
LOWER CHORD

bc	+138000	+143500	+14400	+295900
cd	+204100	+207700	+20800	+432600
de	+247300	+245900	+24600	+517800
ef	+266900	+223800	+22400	+513100
fg	+283500	+275300	+27500	+586300
gh	+284700	+271000	+27100	+582800
h'	+265900	+262000	+26200	+554100
h'i	+278500	+253600	+25400	+557300
g'h'	+264000	+238000	+23800	+525,800
f'g'	+251300	+224500	+22500	+498300
e'f'	+229600	+203900	+20400	+453900
d'e'	+206000	+181900	+18200	+406100
c'd'	+165600	+146700	+14700	+327000
b'c'	+109300	+ 96700	+ 9700	+215700

STRESS SHEET - LEFT SIDE



STRESS SHEET - RIGHT SIDE



DIAGONALS

Northerly Outside Truss

Bar	Original section	Measure Outside	Inside	Area Orig. Sec.	Measured Outside	Measured Inside	Area Total
Ab	6 x 1-8/8	5-15/6 x 1-7/16	5-7/8 x 1-3/8	9.75	8.53	8.08	16.61
Bc	5 x 1-1/8	4-13/16 x 7/8	4-7/8 x 7/8	5.63	4.21	4.26	8.47
Cd	4 x 1-1/16	3-3/4 x 3/4	3-5/8 x 11/16	4.25	2.82	2.49	5.31
De	4 x 3/4	3-7/16 x 7/16	3-7/16 x 3/8	3.00	1.51	1.29	2.80
Ef	4 x 3/4	3-3/4 x 1/2	3-11/16 x 7/16	3.00	1.88	1.61	3.49
Fg'	4 x 11/16	3-3/8 x 1/2	3-3/4 x 7/16	2.75	1.69	1.64	3.33
Gh	4 x 3/4	3-13/16 x 1/2	3-13/16 x 5/8	3.00	1.60	2.38	3.98
Hi	3 x 5/8	3-11/16 x 7/16	2-3/4 x 7/16	1.88	1.18	1.20	2.38
Hi'	4 x 3/4	3-11/16 x 7/16	3-11/6 x 7/16	3.00	1.61	1.61	3.22
G'h'	4 x 3/4	3-11/16 x 7/16	3-11/16 x 1/2	3.00	1.61	1.84	3.45
F'g'	4 x 3/4	3-3/4 x 9/16	3-13/16 x 5/8	3.00	2.11	2.38	4.49
E'f'	4 x 3/4	3-13/16 x 5/8	3-13/16 x 1/2	3.00	2.11	1.84	3.95
D'e'	4 x 3/4	3-7/8 x 1/2	3-7/8 x 5/8	3.00	1.94	2.42	4.36
C'd'	4 x 1	3-3/4 x 13/16	3-7/8 x 3/4	4.00	3.05	2.91	5.96
B'c'	5 x 1	5 x 15/16	5 x 15/16	5,00	4.68	4.68	9.36
A'b'	6 x 1-3/8	6 x 1-1/4	5-15/16 x 1-3/16	8.25	7.50	7.05	14.55

Northerly Roadway Truss.

Ab	6" x 1-5/8	5-15/6 x 1-3/8	5-7/8 x 1-5/16	9.75	7.30	7.71	15.01
Bc	5" x 1-1/8	4-5/8 x 1-3/16	4-5/8 x 1-3/16	5.63	5.50	5.50	11.00
Cd	4 x 1-1/16	3-9/16 x 5/8	3-9/16 x 5/8	4.25	2.23	2.23	4.46
De	4 x 3/4	3-3/4 x 1/2	3-5/8 x 3/8	3.00	1.88	1.36	3.24
Ef	4 x 3/4	3-11/16 x 1/2	3-11/16 x 7/16	3.00	1.84	1.61	3.45
Fg	4 x 11/16	3-3/4 x 7/16	3-3/4 x 1/2	2.75	1.64	1.88	3.52
Gh	4 x 3/4	3-3/4 x 1/2	3-3/4 x 1/2	3.00	1.88	1.88	3.76
Hi	4 x 5/8	2-11/16 x 3/8	2-3/4 x 5/16	1.88	1.01	.86	1.87
H' i	4 x 3/4	3-3/4 x 9/16	3-7/8 x 9/16	3.00	2.11	2.18	4.29
G'h'	4 x 3/4	3-7/8 x 5/8	3-13/16 x 9/16	3.00	2.42	2.15	4.57
F'g'	4 x 3/4	3-11/16 x 1/2	3-3/4 x 1/2	3.00	1.84	1.88	3.72
E'F'	4 x 3/4	3-13/16 x 9/16	3-13/16 x 9/16	3.00	2.15	2.15	4.3o
D'e'	4 x 3/4	3-13/16 x 1/2	3-3/4 x 9/16	3.00	1.91	2.11	4.02
C'd'	4 x 1	3-15/16 x 15/16	3-7/8 x 13/16	4.00	3.69	3.15	6.84
B'c'	5 x 1	5 x 15/16	5 x 15/16	5.00	4.69	4.69	9.38
A'b'	6 x 1-3/8	6 x 15/16	6 x 1-1/4	8.25	7.88	7.50	15.38

DIAGONALS

Southerly Outside Truss

Bar	Original section	Measured Section Outside	Inside	Area Orig.Sec.	Area Measured section Outside	Inside	Total
Ab	6 x 1-5/8	6 x 1-1/2	5-15/16 x 1-1/2	9.75	9.00	8.90	17.90
Bc	5 x 1-1/8	4-15/16 x 1-1/16	4-13/16 x 15/16	5.63	5.25	4.51	9.76
Cd	4 x 1-1/16	3-7/8 x 7/8	3-13/16 x 3/4	4.25	3.28	2.86	6.14
De	4 x 3/4	3-3/4 x 1/2	3-13/16 x 1/2	3.00	1.88	1.91	3.79
Ef	4 x 3/4	3-11/16 x 1/2	3-3/4 x 7/16	3.00	1.84	1.64	3.48
Fg	4 x 11/16	3-5/8 x 3/8	3-9/16 x 3/8	2.75	1.36	1.34	2.70
Gh	4 x 3/4	3-3/4 x 1/52	3-11/16 x 7/16	3.00	1.88	1.61	3.49
Hi	3 x 5/8	2-5/8 x 5/16	2-5/8 x 1/4	1.88	0.82	.66	1.48
H'i	4 x 3/4	3-5/8 x 3/8	3-5/8 x 3/8	3.00	1.36	1.36	2.72
G'h'	4 x 3/4	3-5/8 x 7/16	3-5/8 x 3/8	3.00	1.59	1.36	2.95
F'g'	4 x 3/4	3-5/8 x 7/16	3-5/8 x 3/8	3.00	1.59	1.36	2.95
E'f'	4 x 3/4	3-9/16 x 3/8	3-9/16 x 3/8	3.00	1.34	1.34	2.68
D'e'	4 x 3/4	3-9/16 x 7/16	3-1/2 x 7/16	3.00	1.56	1.53	3.09
C'd'	4 x 1	3-11/16 x 1/2	3-1/2 x 11/16	4.00	1.84	2.41	4.25
B'c'	5 x 1	4-5/8 x 5/8	4-11/16 x 11/16	5.00	2.89	3.22	6.11
A'b'	6 x 1-3/8	5-15/16 x 1-1/16	6 x 1-1/8	8.25	6.30	6.75	13.05

Southerly Roadway Truss.

Ab	6 x 1-5/8	6 x 1-1/2	5-15/16 x 1-1/2	9.75	9.00	8.90	17.90
Bc	5 x 1-1/8	4-15/16 x 1-1/16	4-13/16 x 15/16	5.63	5.24	4.52	9.76
Cd	4 x 1-1/16	3-7/8 x 13/16	3-13/16 x 3/4	4.25	3.15	2.87	6.02
De	4 x 3/4	3-3/4 x 1/2	3-3/4 x 1/2	3.00	1.88	1.88	3.76
Ef	4 x 3/4	3-3/4 x 1/2	3-5/8 x 7/16	3.00	1.88	1.59	3.47
Fg	4 x 11/16	3-3/4 x 7/16	3-11/16 x 5/16	2.75	1.64	1.18	2.82
Gh	4 x 3/4	3-5/8 x 7/16	3-5/8 x 7/16	3.00	1.59	1.59	3.18
Hi	3 x 5/8	2-9/16 x 5/16	2-1/2 x 5/16	1.88	.80	.78	1.58
H'i	4 x 3/4	3-3/8 x 5/8	3-5/8 x 7/16	3.00	1.27	1.58	2.86
G'h'	4 x 3/4	3-5/8 x 3/8	3-9/16 x 3/8	3.00	1.36	1.34	2.70
F'g'	4 x 3/4	3-9/16 x 3/8	3-1/8 x 7/16	3.00	1.34	1.37	2.71
E'f'	4 x 3/4	3-7/16 x 3/8	3-7/16 x 3/8	3.00	1.29	1.28	2.58
D'e'	4 x 3/4	3-1/4 x 3/8	3-1/4 x 1/4	3.00	1.22	.81	2.03
C'd'	4 x 1	3-11/16 x 5/8	3-11/16 x 5/8	4.00	2.30	2.30	4.60
B'c'	5 x 1	4-11/16 x 5/8	4-11/16 x 5/8	5.00	2.93	2.93	5.86
A'b'	6 x 1-3/8	5-3/4 x 1-1/16	5-3/4 x 1-1/16	8.25	6.11	6.11	12.22

COUNTERS

Northerly Outside Truss

Bar	Original Section	Outside	Inside	Original area	Outside	Inside	Total
ef	1 - 1-1/4 x 1-1/4	1-1/4 x 1-1/8		1.56	1.41		1.41
FG	2-3 x 5/8	2-3/4 x 7/16	2-3/4 x 3/8	1.88	1.20	1.03	2.23
Gh	2 - 3 x 5/8	2-7/8 x 1/2	2-11/16 x 7/16	1.88	1.44	1.18	2.62
Hi	2 - 4 x 3/4	3-3/4 x 1/2	3-11/16 x 9/16	3.00	1.88	2.08	3.96
h'i	2 - 3 x 5/8	2-5/8 x 3/8	2-5/8 x 3/8	1.88	.96	.96	1.96
g'h	1 - 1-1/4 x 1-1/4	1-3/16 x 1/16		1.56	1.26		1.26
f'G8	1 - 1-1/4 x 1-1/4	1-1/8 x 1-1/8		1.56	1.27		1.27

Northerly Roadway Truss

ef	1 - 1-1/4 x 1-1/4	1-1/8 x 1-1/8		1.56	1.27		1.27
Fg	2 - 3 x 5/8	2-13/16 x 1/2	2-13/16 x 7/16	1.88	1.41	1.23	2.64
gH	2 - 3 c 5/8	2-7/8 x 1/2	2-7/8 x 1/2	1.88	1.44	1.44	2.88
hi	2 - 4 x 3/4	3-11/16 x 1/2	3-11/16 x 1/2	3.00	1.85	1.85	3.70
h'i	2 - 3 x 5/8	2-13/16 x 7/16	3-12/16 x 7/16	1.88	1.23	1.23	2.46
g'H'	1 - 1-1/4 x 1-1/4	1-1/16 x 1-1/16		1.56	1.13		1.13
f'G'	1 - 1-1/4 x 1-1/4	1-1/8 x 1-1/8		1.56	1.27		1.27

Southerly Roadway Truss

ef	1 - 1-1/4 x 1-1/4	1-1/8 x 1-1/16		1.56	1.20		1.20
fG	2 - 3 x 5/8	2-3/4 x 3/8	2-3/4 x 3/8	1.88	1.03	1.03	2.06
gH	2 - 3 x 5/8	2-11/16 x 5/16	2-11/16 x 1/4	1.88	.84	.67	1.51
hI	2 - 4 x 3/4	3-9/16 x 3/8	3-9/16 x 3/8	3.00	1.34	1.34	2.68
h'i	2 - 3 x 5/8	2-11/16 x 1/4	2-5/8 x 1/4	1.88	.67	.66	1.33
g'H'	1 - 1-1/4 x 1-1/4	15/16 x 15/16		1.56	.82		.82
F'G'	1 - 1-1/4 x 1-1/4	15/16 x 15/16		1.56	.82		.82

Southerly Outside Truss

ef	1 - 1-1/4 x 1-1/4	1-1/8 x 1-1/16		1.56	1.20		1.20
fG	2 - 3 x 5/8	2-13/16 x 3/8	2-3/4 x 7/8	1.88	1.06	1.20	2.26
gH	2 - 3 x 5/8	2-5/8 x 5/16	2-5/8 x 5/16	1.88	.82	.82	1.64
hi	2 - 4 x 3/4	3-11/16 x 7/16	3-5/8 x 7/16	3.00	1.61	1.59	2.30
h'i	2 - 3 x 5/8	2-11/16 x 3/16	2-5/8 x 3/16	1.88	.50	.49	.99
g'H'	1 - 1-1/4 x 1-1/4	1 x 1		1.56	1.00		1.00
f'G'	1 - 1-1/4 x 1-1/4	1 x 1		1.56	1.00		1.00

REDUCTION OF AREA,

Percent

Bar	S.O.	S.R.	N.O.	N.R.
Ab	8	8	15	23
Bc	13	13	25	2
Cd	28	29	37	47
De	37	37	53	46
Ef	42	42	42	42
Fg	51	48	40	56
Gh	42	47	34	37
Hu	60	58	36	50
H'i	55	52	46	28
G'h'	51	55	42	24
F'g'	51	55	25	38
E'f'	55	57	34	28
D'e'	48	66	27	33
C'd'	47	42	25	14
B'c'	39	41	6	6
A'b'	21	26	12	7
16	648	676	499	461
	40.5%	42.3%	31.2%	28.8%
eF	23	23	10	19
fG	40	45	41	30
gH	56	40	30	23
hI	47	45	34	38
h'I	74	65	48	34
g'H	47	36	19	28
fG	47	36	19	19

UNIT STRESSES

In Diagonals

Bar	Total	S.O.	S.A.	N.O.	N.A.
Ab	359100	20100	20100	21600	23900
Bc	195900	20100	20100	23100	17800
Cd	148800	24200	24700	28000	33400
De	91900	24200	24500	32800	28400
Ef	84300	24200	24300	24100	24400
Fg	44800	16600	15900	13500	12700
Gh	46600	13400	20300	11700	12400
Hi	15300	10300	9700	6400	8200
H'i	56300	20700	19700	17500	13100
G'h'	84400	28600	31300	24500	18500
F'g'	72400	19500	16100	24500	26700
E'f'	100000	37300	38800	25300	23200
D'e'	95100	30800	46800	21800	23700
C'd'	133200	29000	31400	22400	31400
B'c'	165900	27200	28300	17700	17700
A'b'	275300	21100	22500	18900	17900

Counters.

Bar	Stress	S.O.	S.A.	N.O.	N.A.
eF	9800	8200	8200	7000	7700
fG	48700	21500	23600	21800	18500
gH	45100	27500	29900	17200	15700
hI	77200	28800	24100	19500	20900
h'i	23400	23600	17600	11900	9500

UNIT STRESSES

In Lower Chord.

Bar	Total stress	Area	Unit stress
b'c'	215700	14.00	15400
c'd'	327000	21.26	15400
d'e'	406100	25.00	16200
e'f'	453900	27,52	16500
f'g'	498300	31.50	15800
g'h'	525800	31.50	16700
h'i'	557300	33.00	16900
hi	571700	33.00	17300
gh	582800	33.00	17700
fg	586300	33.00	17800
cf	513100	27.00	19000
de	517800	28.76	18000
cd	432600	23.76	18200
bc	295900	16.00	18500

UNIT STRESSES IN UPPER CHORD

The column formula used in reducing the unit streesses istaken from the Specifications of the Massachusetts Railroad Commission for Bridges Carrying Electric Railways, by George F. Swain.

It is as follows $\frac{P}{A} = \frac{f}{1 + \frac{1}{20000}\frac{L^2}{r^2}}$

P = total stress in pounds
A = gross area of cross section in sq. in.
f = maximum fibre stress per square inch
L = length of bar in inches
r = least radius of gyration of cross section in in. units

$$f = \frac{P}{A}\left(1 + \frac{L^2}{20000\ r^2}\right)$$

The sections vary so little that the quantity in the brackets will be computed for the center sections only.

Moment of Inertia about	Axis AA	Axis BB
Side pl. 2x33⅝	=670	1320
Top " 22x5/16x6.9^2	=550	277
" Ls.2(3.2-2.9x7.7^2)	=354	405
Bot. " 2(4.1-4x7.6^2)	=472	544
	2046	2546

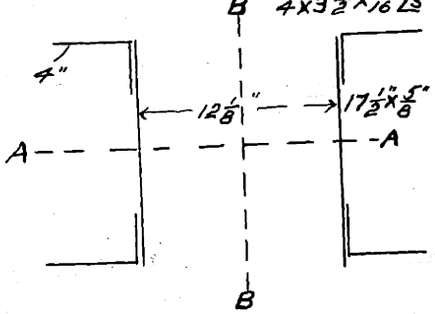
Least $r^2 = \frac{2046}{46.8} = 43.8$

$$f = \frac{P}{A}\left(1 + \frac{13.5^2 \times 144}{20000 \times 43.8}\right) = 1.03 \times \frac{P}{A}$$

Bar	Total stress	Area	Unit stress	U. S. reduced (f)
A^1B^1	222000#	36.94	6000	6200# per sq. in.
B^1C^1	336000	"	9100	9400
C^1D^1	415000	40.28	10300	10600
D^1E^1	461000	"	11400	11700
E^1F^1	494200	"	12300	12700
F^1G^1	528700	"	13100	13500
G^1H^1	556400	46.84	11900	12300
H^1I	571400	"	12200	12600
H I	600100	"	12800	13200
G H	600100	"	12800	13200
F G	589800	"	12600	13000
E F	589000	"	12600	13000
D E	564100	44.72	12600	13000
C D	524900	"	11700	12100
B C	440300	36.94	11900	12300
A B	303500	"	8200	8500

UNIT STRESSES IN THE VERTICALS.

Bars A a & A^1a^1 $f = \frac{P}{A}\left(1 + \frac{L^2}{20000\ r^2}\right)$



Moment of inertia about

Axis AA		Axis BB	
Side pl. 2 x 277	=554	2x11x6.4²	=896
Ls. 4(3.4-3.1x8²)	=808	4(3.4-3.1x5.5²	=388
	1362		1284

$r^2 = \frac{1284}{34.2} = 37.5$

A a; $f = \frac{265600}{34.2}\left(1 + \frac{9.33^2 \times 144}{20000 \times 37.5^2}\right) = 7800 \times 1.017 = 7900\#$

A^1a^1; the stress in this and the other bars on the right side of the bridge will not be so great as in those on the left, so it is not computed.

B b; $f = \frac{167600}{18.44}\left(1 + \frac{12.54^2 \times 144}{20000 \times 3.4^2}\right) = 9400 \times 1.097 = 10000\#$

C c; $f = \frac{104600}{13.5}\left(1 + \frac{15.75^2 \times 144}{20000 \times 3.6^2}\right) = 7700 \times 1.138 = 8800\#$

D d: $f = \frac{83200}{12.34}\left(1 + \frac{18.04^2 \times 144}{20000 \times 3.6^2}\right) = 6700 \times 1.18 = 7900\#$

E e; $f = \frac{44000}{12.34}\left(1 + \frac{20.33^2 \times 144}{20000 \times 3.6^2}\right) = 3600 \times 1.23 = 4400\#$

Having proceeded thus far with the stresses it is evident that the stresses in the remaining bars will not be any greater than the maximum already found; for the total stresses a re only a small amount greater in several cases and the area remains constant and the lengthh increases only slightly.

CONCLUSION.

The stresses per square inch in the upper chord were found to be below that of the allowable stress provided by the Railroad Commission.

The stresses in the verticals on the original section were found to be considerably below the allowable stress; and while these members had been corroded somewhat, it did not seem probable from a hasty examination, that the reduction of area had been sufficient to increase the stress to a dangerous degree.

The unit stresses in the lower chord members on the original section were found to be slightly in excess of the allowable; and the eye-bars were somewhat corroded, so the stress was probably increased considerably, but how much we cannot state as no measurements were taken.

The unit stress in diagonals and counter was found to be greatly in excess of the allowable stress and in some cases equal to the elastic limit provided by the original specifications.

The reduction of area in these bars was easily much greater than in any other part of the truss, and so careful measurements were made to obtain the exact results of corrosion.

This reduction of area over designed area as shown by table amounting in extreme cases to over 50%. This excessive corrosion was caused by gases from the locomotives passing but a few feet beneath the lower members of the truss. A noticeable feature in connection with the effect of the gases was that those portions of the bridge nearer to the locomotive smokestacks were less acted upon than the diagonals and portions of the floor beams not so well ventilated. The greatest effect of corrosion in almost every case was at the point where the floor system met the diagonals. The gases seemed to be blown up against the floor system and there to have remained until slowly dispelled by air currents, and but little of their harmful effects were visited upon the lower chord members that were nearer the stack but well exposed to the surrounding air currents.

Moreover, those portions of the truss nearer the eastern abutment were more noticeably corroded than the remaining portions. This was attributed to the fact that the eastern tracks was used in excess of others for switching purposes and as the track upon which a large number of the suburban trains ran.

While no measurements were made on the floor beams and the stresses were not computed, it is worthy of notice that the corrosion of them was very marked and in many cases the angles were almost entirely eaten away by the action of the gases. Above the flooring no bar seemed to have been unduly acted upon. In fact, the diagonals that beneath the

flooring showed the greatest reduction of area appeared quite unharmed above the flooring. In order to nullify the action of these gases, it is the intention of the City Engineering Department to enclose within cement all the iron and steel o work of the flooring system in the new bridge to be constructed. The flooring system is to be hung from the truss; and thus the members of the latter will no longer be exposed to the action of the gases. The members of the upper chord are wholly intact and, lacking a coat of paint, are in as good condition as when erected. This is equally true of the end parts but all other parts of the bridge must be replaced.

Loadings for maximum effect. In obtaining the above result the most severe combinations of loading were considered and used. Such combinations of loads as would scarcely ever, if at all, be likely to occur yet wholly within the range of possibility. Owing to the skew of bridge, causing the heavy loads to be confined at one end of the truss, the centre of loading is shifted one panel point to the left and the counter hI is brought into action for full loading. The counters G'f' and H'g' under no conditions of the loads used were brought into action. The counter Fe is brought into action only by the addition of impact to the live loads. The vertical Ii was found under one condition to have tension; that is when the counter hI was in action.

An interesting fact was noticed with regard to the placing of the locomotive excess for the different bars. On account of the skew of the bridge the excess to be used on

the truss was different at nearly every panel point and in most cases the maximum effect was not obtained by placing the excess at the centre of moments since the rate of decrease of the factor was less than that of the excess. By consideration of the excess at different points and the influence factors for the corresponding points, it was easy to see what position was the correct one.

The extremely harmful effect of locomotive gases on the bridge has been illustrated, and the facts shown easily justify the conclusion that the bridge was unsafe for traffic and was very properly condemned.