

MATHEMATICAL ANALYSIS

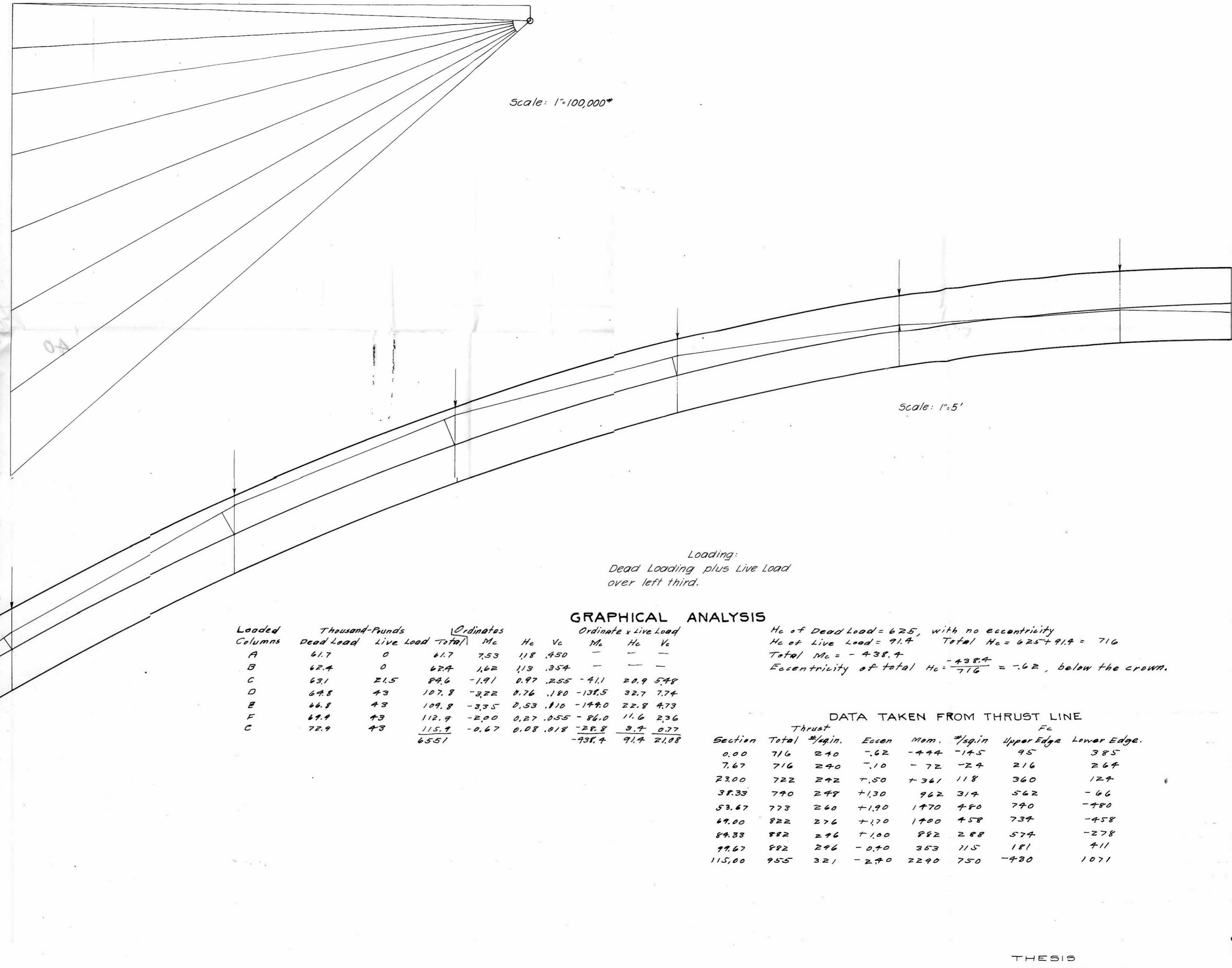
$$B.M. = M_c + H_c y + V_c x - \sum (PL)$$

Section	$\sum (PL)$	
0		0
15.33	$0 \times 7.67 =$	0
30.67	$0 \times 7.67 =$	0
46.00	$21.5 \times 7.67 =$	164.9
61.33	$21.5 \times 23.00 + 43 \times 7.67 =$	824.3
76.67	$21.5 \times 38.33 + 43 \times 30.67 =$	2142.9
92.00	$21.5 \times 53.67 + 43 \times 69.00 =$	4120.9
107.33	$21.5 \times 69.00 + 43 \times 122.67 =$	6758.3
115.00		

X	Y	M_c	$H_c y$	$V_c x$	$\sum (PL)$	M_L	$F_c L$
0	0	-438.4	71.5		0		
15.33	78.18		71.5	323.2	0	-43.7	-14
30.67	312.9		286.0	646.5	0	494.1	162
46.00	704.0		643.5	969.7	164.9	1004.9	330
61.33	012.51		1143.4	1292.8	824.3	1173.5	384
76.67	19.56		1787.5	1616.2	2142.9	822.4	269
92.00	28.16		2572.8	1939.4	4120.9	46.1	15
107.33	38.33		3503.4	2262.5	6758.3	-1430.1	-468
115.00	44.00						

X	Y	$\sum P \sin \alpha$	$H_c \cos \alpha$	N_c	$F_c L$
0	0	0	90		
15.33	0	0	90.9	90.9	30
30.67	0	0	89.6	89.6	30
46.00	21.5	6.3	87.4	93.7	31
61.33	69.5	29.4	84.6	109.0	37
76.67	107.5	48.9	81.3	130.2	44
92.00	150.5	78.6	78.0	156.6	53
107.33	193.5	112.4	74.4	186.8	63
115.00					

X	$N_D + N_L$	$M_D + M_L$	F_c (upper edge)	F_c (lower edge)
0				
15.33	241	-6	235	248
30.67	244	+184	428	60
46.00	250	369	619	-119
61.33	263	437	700	-173
76.67	280	333	613	-53
92.00	300	66	366	236
107.33	320	-447	-127	767
115.00				



Loading:
Dead Loading plus Live Load
over left third.

GRAPHICAL ANALYSIS

Loaded Columns	Thousand-Pounds		Ordinates	Ordinate x Live Load					
	Dead Load	Live Load		M_c	H_c	V_c			
A	61.7	0	61.7	7.53	1.18	.450	-	-	-
B	62.4	0	62.4	1.62	1.13	.354	-	-	-
C	63.1	21.5	84.6	-1.91	0.97	.255	-4.11	20.9	5.48
D	64.8	43	107.8	-3.22	0.76	.180	-138.5	32.7	7.74
E	66.8	43	109.8	-3.35	0.53	.110	-144.0	22.8	4.73
F	69.4	43	112.4	-2.00	0.27	.055	-86.0	14.6	2.36
G	72.9	43	115.4	-0.67	0.08	.018	-28.8	3.4	0.77
			655.1				-938.4	91.4	21.08

H_c of Dead Load = 625, with no eccentricity
 H_c of Live Load = 91.4
 Total $H_c = 625 + 91.4 = 716$
 Total $M_c = -438.4$
 Eccentricity of total $H_c = \frac{-438.4}{716} = -0.62$, below the crown.

DATA TAKEN FROM THRUST LINE

Section	Total Thrust	#sq.in.	Eccen	Mom.	#sq.in	F_c	
						Upper Edge	Lower Edge
0.00	716	240	-0.62	-444	-145	95	385
7.67	716	240	-1.0	-72	-24	216	264
23.00	722	242	+1.50	+361	118	360	124
38.33	740	248	+1.30	962	314	562	-66
53.67	773	260	+1.90	1470	458	740	-458
69.00	822	276	+1.70	1700	458	734	-458
84.33	882	296	+1.00	882	288	574	-278
99.67	882	296	-0.70	353	115	181	411
115.00	955	321	-2.70	2290	750	-430	1071