

93

Lengths of Members

25 May 1965

From	x'	y'	z'	Length center to center	ULT LOAD $i_{xx} \cdot 0.49$	CALC. LOAD	
P.707							
U1	10.25	.59	3.67				23.04
	5.45	0	3.01	ft	16	(1000 lb of wind 2014 ft p. 71)	-35
	$\Delta x = 4.80$	$\Delta y = .59$	$\Delta z = .66$	4.88	1400	1780	23.83
D1	10.25	.59	3.67				59.29
	2.55	0	8.26				-35
	7.70	.59	4.59	8.98	400	490	21.07
T2	10.25	.59	3.67				21.42
	10.25	0	8.26				
		.59	4.59	4.63	1500	300	
D2	10.25	0	8.26				37.21
	16.35	.91	4.64				-83
	6.10	.91	3.62	7.15	640	610	13.10
T3	16.35	.91	4.64				57.14
	16.35	0	8.26				
		.91	3.62	3.73	2300	320	
D3	16.35	0	8.26				36.00
	22.35	1.21	4.71				1.46
	6.00	1.21	3.55	7.07	650	600	12.60
T4	22.35	1.21	4.71				50.06
	22.35	0	8.26				
		1.21	3.55	3.75	2300	205	
D4	29.70	1.55	4.39				1.46
	22.35	0	8.26				12.60
	7.35	1.55	4.27	8.64	440	340	14.06
B1	10.25	2.55		7.70	1900	2600	
B2	16.35	10.25		6.10	2000	1550	
B3	22.35	16.35		6.00	3100	540	
C1				1.18	*32,400	Calculated	54.02
C2				1.82	L^2	without allowing	2.40
C3				2.42	L^2	for support	18.23
					111,000	given by boxed	74.65
					L^2	ends	

Total length of $\frac{1}{2}$ " tube (center to center) = 97.7 ft

Order 200 ft weight = 260 lb Cost \$312 at \$1.20 per lb

95

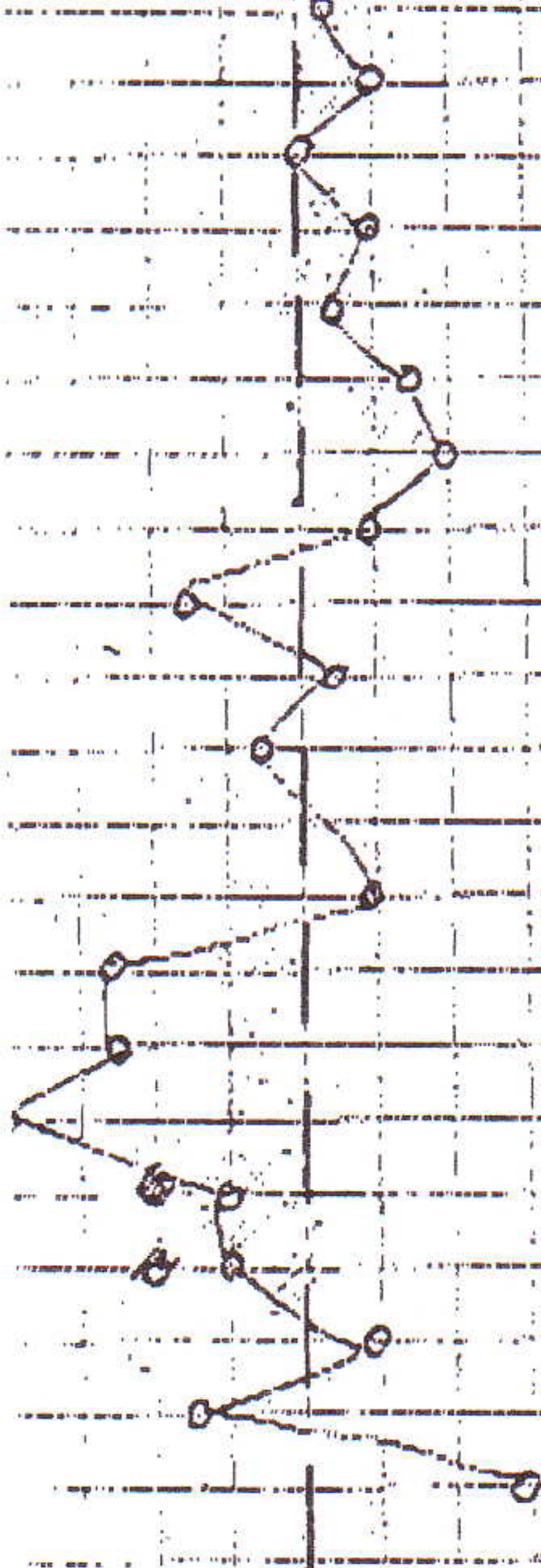
Shape of Panel 2

7/8 June 1965

Cold cloudy day. Panel tight
in form, as bolted down

hundredths wise

14 12 10 8 6 4 2

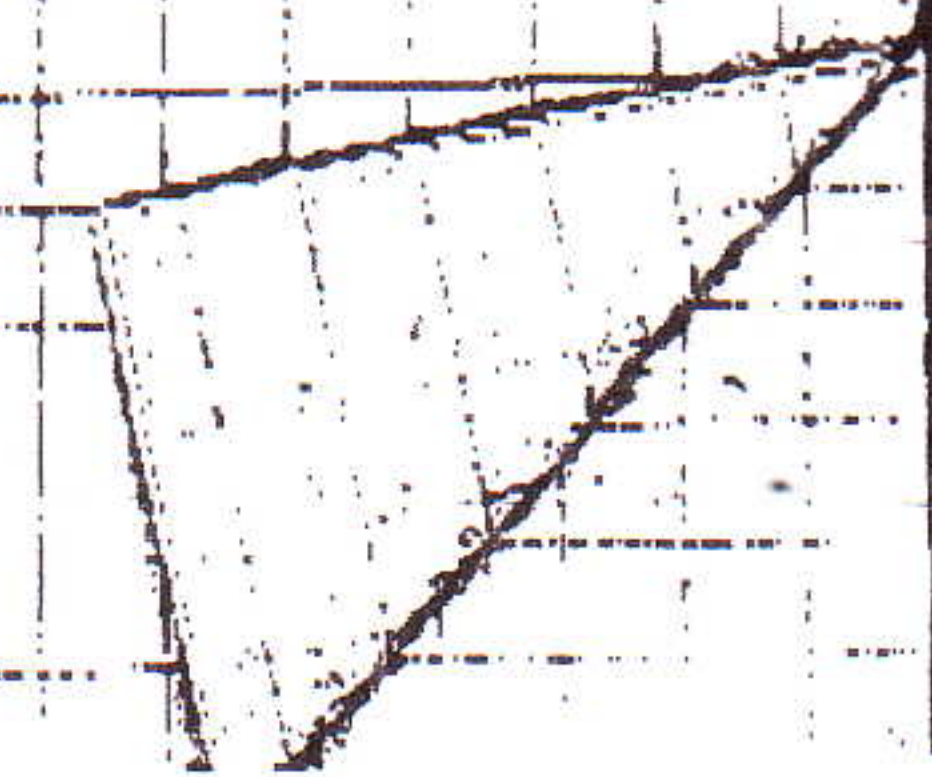


Sub No.	Rel.	Rel. pushing force on panel, if constant center rib of form	Displacement	Rel. after bolts removed	push down	Change in rib, if pushed down	Transverse Dim	Before	After unbolting	After unbolting unit of widening
Wide end	15	- .07	- .07	0	- .03	07	38" 1/4	38 1/4	38 1/4	1/16 in.
14	11	1.15	0	1.22	1.21	07	37 1/4	37 1/4	37 1/4	7
10	10	2.73	0	2.84	2.83	6	35 1/4	35 1/4	35 1/4	3
10	10	3.82	0.3	4.00	3.98	8	35 1/4	35 1/4	35 1/4	1
9	9	6.12	0.2	6.18	6.15	6	32 1/4	32 1/4	32 1/4	9
7	7	7.83	0	7.90	7.87	7	32 1/4	32 1/4	32 1/4	3
2	2	9.49	0	9.53	9.52	5	30 1/4	30 1/4	30 1/4	9
8	8	10.78	0	10.82	10.78	4	29 1/4	29 1/4	29 1/4	2
7	7	11.36	0	12.02	12.00	6	26 1/4	26 1/4	26 1/4	1
7	7	12.75	0.2	12.86	12.85	11	24 1/4	24 1/4	24 1/4	1
6	6	12.18	0.1	13.22	13.21	7	22 1/4	22 1/4	22 1/4	1
6	6	13.20	0.3	13.43	13.43	9	22 1/4	22 1/4	22 1/4	9
1	1	13.28	0	13.13	13.07	15	21 1/4	21 1/4	21 1/4	1
5	5	12.98	0	13.04	13.01	6	20 1/4	20 1/4	20 1/4	6
1	1	12.44	0	12.57	12.52	13	18 1/4	18 1/4	18 1/4	2
1	1	11.57	0.3	11.72	11.7	13	17 1/4	17 1/4	17 1/4	1
1	1	10.66	0.4	10.82	10.72	16	16 1/4	16 1/4	16 1/4	0
2	2	9.48	0.3	9.58	9.54	10	16 1/4	16 1/4	16 1/4	8
1	1	7.23	0.7	7.42	7.42	10	15 1/4	15 1/4	15 1/4	10
2	2	5.66	0.2	5.72	5.72	6	13 1/4	13 1/4	13 1/4	1
1	1	3.75	0.7	3.86	3.78	11	13 1/4	13 1/4	13 1/4	1
1	1	1.02	0	1.04	1.01	2	12 1/4	12 1/4	12 1/4	1

Panel 2 was measured from 7 June. Unbolted 8 June 9am (cold cloudy)

21) 167.53
8 3

Panel changed by near absolute amount of .03 inch, rise mainly at narrow end



57

10 June 1965

The panel is supported thus
and heights of the upper surface
measured



RWB
CC
B.W.

Arc length from vertex		Left	Center	Right	Arc	Left	Center	Right
(A-20) 7/8	Δ	3.45	3.46	3.38				
10	13.45	3.86	3.92	3.85	20'	15.78	3.78	
10 1/4	13.56	4.48	4.05	3.97			3.78	
10 1/2	13.74	4.68	4.72	4.57		75	3.73	
10 3/4	13.88	5.28	5.32	5.16			3.67	
11	13.98	5.86	5.88	5.75	21'	15.70	3.60	
	14.07	0.44	0.41	0.25			3.50	
8 1/2	14.22	0.95	1.00	0.83		64	3.42	
	14.39	1.48	1.48	1.38			3.38	
12	14.40	1.51	2.00	1.88	22'	15.69	3.29	
12 1/4	14.46	2.45	2.46	2.38			3.15	
12 1/2	14.58	2.94	2.96	2.88			3.05	
12 3/4	14.72	3.36	3.46	3.28			2.95	
13	14.74	3.84	3.95	3.75	23'	15.70	2.80	
13 1/4	14.94	4.21	4.38	4.19			2.63	
13 1/2	15.00	4.57	4.78	4.62		63	2.46	
13 3/4	15.01	5.00	5.10	4.94	24'	15.64	2.25	
14	15.08	5.38	5.48	5.35			2.04	
	15.09	5.73	5.78	5.66			1.84	
15	15.17	0.08	0.15	0.00		59	1.57	
	15.26	0.36	0.50	0.40			1.29	
	15.38	0.71	0.88	0.66	25'	15.55	1.05	
		1.01	1.18	1.03			0.81	
	50	1.25	1.48	1.20		57	0.55	
		1.57	1.72	1.50			0.26	
16	15.56	1.76	1.96	1.72?	26'	15.56	5.96	
		2.02	2.17	1.95			5.68	
	61	2.21	2.39	2.17		60	5.38	
		2.39	2.58	2.36			5.00	
17	15.7	2.56	2.80	2.50	27'	15.57	4.67	
		2.74	2.93	2.66			4.26	
	68	2.93	3.06	2.77		52	3.90	
			3.18				3.55	
18	15.73		3.33		28'	15.59	3.19	
			3.40				2.90	
	72		3.50			67	2.45	
			3.57				2.06	
19	15.8		3.70		29'	15.70	1.60	36 4.84
			3.73				1.18	30 4.28
			3.77				0.72	31 3.80
19 1/4	79		3.80		29 1/4	74	0.27	31 1/4 2.30
					30			32 2.84

This work
contained a zero
error of 0.7 ft in
the 8

FEAT

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ARC = 9.82 at edge of sheet

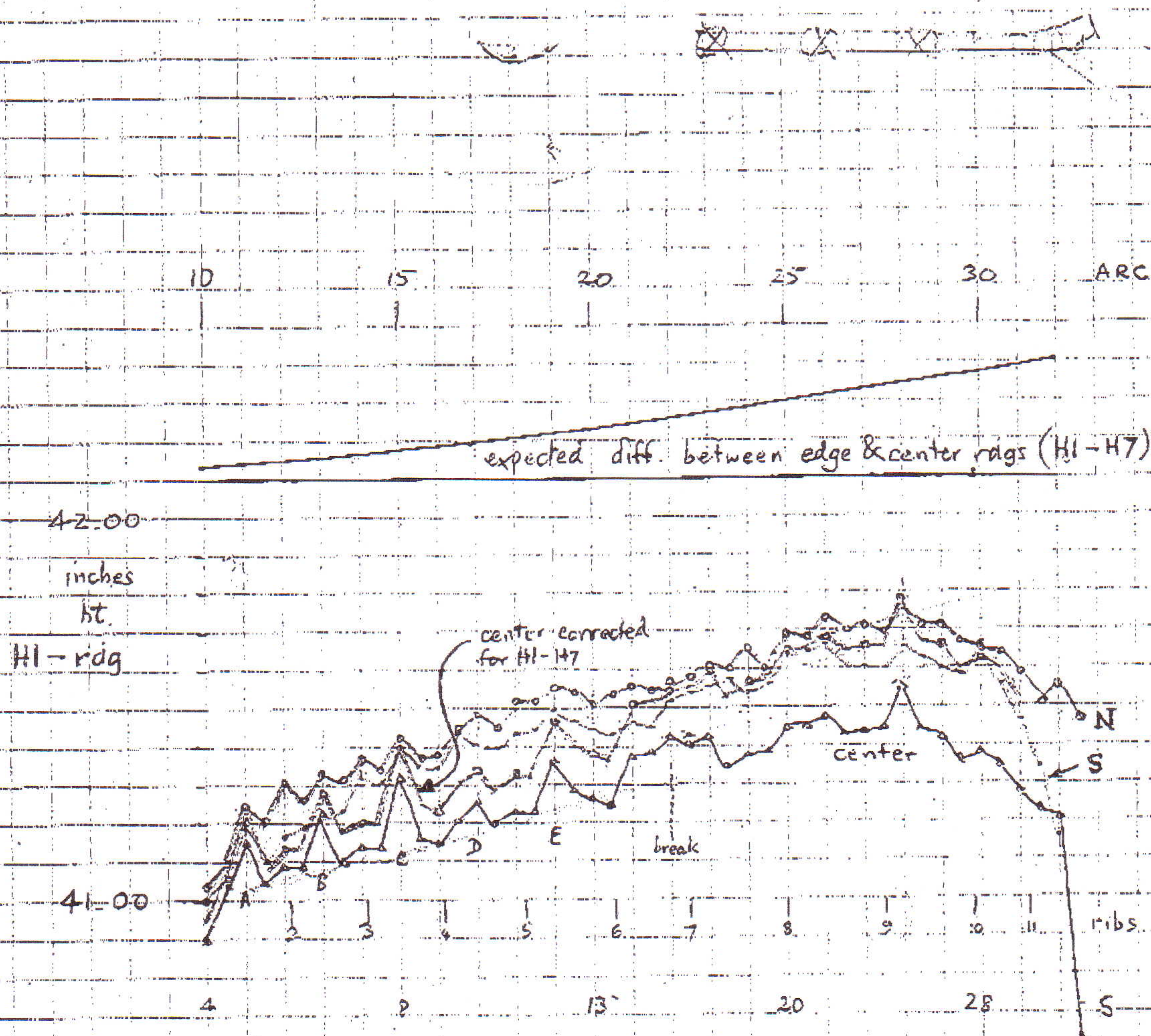
Repeat yesterday

11 June 1965

ARC	RDG	X	HI	ARC	ROF	X		
10'	2.15"	9.88	43.05	40.90	32'	4.03'	45.24	21
	3.35"	10.36	44.39	41.04		3.11'	36.17	63
11'	4.57"	10.84	45.73	.16	33'			
	5.85"	12.25 11.32	46.90	.05				
12'	0.99"		48.08	.09				
	2.04"	12.99 12.27	49.13	.09				
13'	3.95"		50.17	.22				
	4.00"	14.13 13.21	51.10	.10				
14'	4.90"	15.07	52.04	41.14				
	5.67"	14.87 14.15	52.81	6.14				
15'	6.26"		53.59	41.32				
	1.06"	15.99 15.07	54.23	1.17				
16'	1.71"		54.87	16				
	2.24"	15.90 15.99	55.45	21				
17'	2.67"		55.93	26				
	3.11"	17.61 16.90	56.31	20				
18'	3.47"		56.70	1.23				
	3.74"	18.51 17.80	56.97	23				
19'	3.88"		57.25	37				
	4.11"	18.39	57.40	29				
20'	4.28"		57.55	27				
	4.34"	20.27	57.69	41.25				
21'	3.99"	4.25	57.68	64.38				
	3.92"	4.18 21.13	57.51	65.39				
22'	3.82"	4.08	57.51	69.43				
	3.91"	21.99	57.32	41.41				
23'	3.70"		57.13	43				
	3.49"	22.84	56.84	35				
24'	3.18"		56.56	38				
	2.79"	23.68	56.18	39				
25'	2.33"		55.79	46				
	1.84"	24.52	55.30	46				
26'	1.34"		54.82	48				
	6.81"	25.34	54.24	43				
27'	6.22"		53.66	44				
	5.54"	26.16	52.99	45				
28'	4.77"		52.32	53				
	4.10"	26.97	51.55	45				
29'	3.37"		50.79	42				
	2.57"	27.77	49.95	38				
30'	1.72"		49.11	39				
	6.82"	28.57	48.18	36				
31'	5.97"		47.26	29				
	5.01"	29.27	46.25	24				

ARC	South Edge	HI	Diff	North Edge	Diff		
10'	2.05	43.05	41.00	2.02	41.03	03	
	3.31	44.39	1.08	3.29	1.10	10	
11'	4.54	5.73	1.19	4.48	1.25	25	
	5.80	6.90	1.10	5.69	2.1	21	
12'	6.91	8.08	1.17	6.77	3.1	31	
	1.94	9.13	1.19	1.86	2.7	27	
13'	-	50.17		2.84	3.1	33	
	3.87	51.10	1.23	3.78	3.2	32	
14'	4.72	2.04	32	4.67	3.7	37	
	5.50	2.81	31	5.47	3.4	34	
15'	6.19	3.59	40	6.17	4.2	42	
	6.88	4.23	35	6.86	3.7	37	
16'	1.52	4.87	35	1.49	3.8	3.8	
	2.01	5.45	44	2.00	4.5	45	
17'	2.52	5.93	41	2.44	5.7	49	
	2.91	6.31	40	2.86	4.5	45	
18'	3.26	6.70	44	3.18	5.2	52	
	3.52	6.97	45	3.45	5.2	52	
19'	3.76	7.25	49	3.70	5.5	55	
	3.93	7.40	47	3.86	5.4	54	
20'	4.10	7.55	45	4.04	5.7	51	
	4.16	7.59	43	4.06	5.3	53	
21'	4.16 (4.42)	7.63	47	4.07	5.6	56	
	4.11	7.57	46	4.02	5.5	55	
22'	3.99	7.51	52	3.96	5.5	55	
	3.78	7.32	54	3.74	5.8	58	
23'	3.57	7.13	56	3.52	6.1	61	
	3.26	6.84	58	3.24	6.0	60	
24'	3.01	6.56	55	2.91	6.5	65	
	2.61	6.18	57	2.58	6.0	60	
25'	2.15	5.79	64	2.10	6.9	69	
	1.65	5.30	65	1.62	6.8	68	
26'	1.15	4.82	67	1.09	7.3	73	
	6.64	4.24	60	6.54	7.0	70	
27'	6.65	3.66	61	5.95	7.1	71	
	5.39	2.99	60	5.30	6.9	69	
28'	4.65	2.32	67	4.56	7.6	76	
	3.92	1.55	63	3.84	7.1	71	
29'	3.19	0.79	60	3.08	7.1	71	
	2.37	9.95	58	2.28	6.7	67	
30'	1.44	9.11	67	1.45	6.6	66	
	6.62	8.18	56	6.54	6.4	64	
31'	5.79	7.26	1.47	5.67	5.9	59	
	4.91	6.25	1.34	4.74	1.51	51	
32'	4.07	5.20	1.17	3.67	1.57	57	
	3.21	4.14	0.93	2.66	1.48	48	

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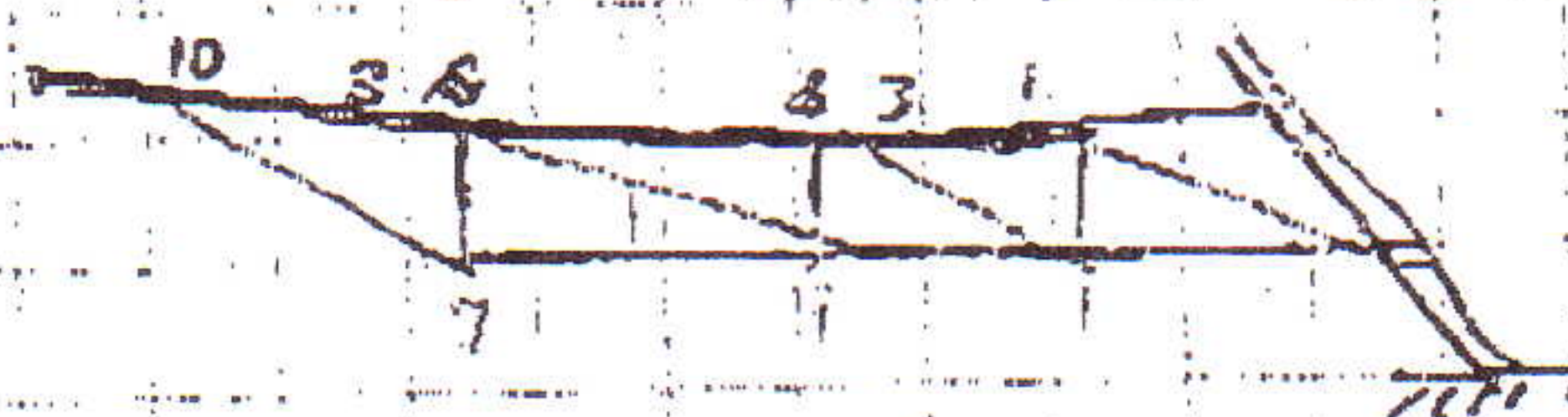
Conclusions - The outside 2 ft. (beyond the last diagonal) are bent downwards to about 0.3"; in addition, a major low dip in the S corner was produced by hanging a 185 lb wt on it. The 0.3 was checked by replacing the panel on the fig. If it repeats in the next panel, it could be compensated by lengthening the diagonals (raising the outer spine support) or possibly by stiffening the edge flanges. The humps ABCDE occur between ribs, amounting to about 0.1" peak. This could be reduced by using more ribs. When the center is corrected for H1-H7, the corner half seems to have the center low by about 0.1". This could result from the ribs not being firmly pressed down when being riveted to the edge flanges.

103

1000 lb Test

June 14

Rib No	A	B	C
1	1.42	08	1.34 07 1.27
3	2.22	15	3.55 20 2.25
8	5.46	34	5.12 49 4.72
10	9.32	33	11.12 44 3.10



(A) Loaded with 50 lb on ribs 4, 5, 6, 7

B " " 75 " " "

C Unloaded

This 600 lb load was applied to see that it was safe for 4 people to stand on the panel prior to photographing them.

Then 14 bags each containing 75 lb of sand were placed on the ribs (2 on ribs 4 & 7) making a total of 1050 lb corresponding to 20 lb/ft² (70 mph wind). The joints were damaged and the diagonals D1 and D2 began to buckle. U1 (in tension) was bent by rotation of its outer joint.

Conclusion Make a second panel with strong joints.

Strengthen D1 and D2 against buckling by connecting them together with plates. Make hub joints of steel. Do an elaborate program of deflection measurements on the 2nd panel, looking for hysteresis (onset of permanent elongations).